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Rethinking Error Correction Model in Macroeconometric Analysis: A Relevant Review

Christian P. PINSHI
University of Kinshasa, Congo
christian.pinshi@unikin.ac.cd

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Abstract:

The cointégration methodology has bridged the growing gap between economists and econometricians in understanding dynamics, equilibrium and bias on the reliability of macroeconomic and financial analysis, which is subject to non-stationary behavior. This paper proposes a comprehensive literature review on the relevance of the error correction model. Econometricians and economists have shown that error-correction model is a powerful machine that provides the economic system and macroeconomic policy with a refinement in the econometric results[1].

Keywords: cointegration; error correction model; macroeconomics.

JEL Classification: C32; E10.

Introduction

The advent of time series analysis in econometrics[2] and economics has transformed economic thinking (especially macroeconomic thinking, which is why the time series are called "macroeconometrics[3]"), Sophisticated processes radically transformed the landscape of research sector and added rigor in macroeconomic analysis. Although its birth is the result of the great battle between Keynesians and monetarists (Johnston and Dinardo 1999), the analysis of time series is therefore at the heart of macroeconomics and has emerged as the essential tool of the economic policy assessment.

The pioneering work of Box and Jenkins (1976) was based on the ARIMA (pdq)[4]. *Auto Regressive Integrated Moving Average*, introduced to model process behavior based on past values subjected to random shocks over time. A random event called noise or disturbance affects the temporal behavior of this process and thus modifies time series[5] values. This model develops the forecast by exploiting statistical characteristics (mean, variance, autocorrelation function, autocovariance function, ...). To fill the shortcomings of the univariate models (ARIMA, ...), which only described the behavior of a series, not to explain, the analyzes of the multivariate time series were born, of which the most known and used is the VAR family. The father of this process is Christopher Sims, Nobel Prize winner in 2011.

It is clear that these models had become the cornerstone of any macroeconomic analysis. However, these are analyzing that require the stationarity of the series, which, its mean and its variance must be constant over time. For more understanding, a process is said to be stationary if it tends to return to equilibrium (its mean value or variance) after suffering the effect of a shock over time (mainly over long periods). However, in economics several phenomena make that macroeconomic variables over time have non-stationary characteristics, such as, GDP,

[1] I am so indebted to Jennifer Louise Castle for many helpful conversations and comments that helped further refine and scrutinize this research paper. I also thank Valerio Scalone

[2] The study of time series is a discipline that appeared relatively before econometrics, since already around 1905 they were used in astronomy and a little further in statistics and meteorology. Econometrics, on the other hand, is a discipline that was born around the 1930s by the Alfred Cowles Research Institute called the Cowles Commission and the learned econometrics society founded by Ragnar Frisch and his colleagues (Fisher, Ross, Schumpeter).

[3] According to Greene, macroeconometrics is a discipline that focuses on the analysis of time series that are typically aggregates such as GDP, money supply, prices, exchange rate, investment, and so on (2011).

[4] Where p is the order of the autoregressive process AR (p), d the degree of integration of a process I (d), and q the order of the moving average MA (q)

[5] This model is generally in the following form: $Z_t = \Delta^d X_t$; it is a development of the form: $\Delta^d X_t = \gamma + \emptyset_1 \Delta^d X_{t-1} + \cdots + \emptyset_p \Delta^d X_{t-p} + \varepsilon_t - \theta_1 \varepsilon_t - \cdots - \theta_q \varepsilon_{t-q}$. For more details see Lardic and Mignon (2002).

exchange rate, inflation, stock prices and so on, and the price to pay is to apply the difference filter or the transformation by the regression on the trend. This could have the consequence of moving away from reality and proposing strategies and policies based on erroneous or unreal results.

In view of all these difficulties, econometricians refined their research by developing non-stationary time series analyzes to fit the data, to forecast macroeconomic and financial series and to apply them to retroactive control systems. Thus the so-called ARCH models (AutoRegressive Conditionally Heteroscedastics) and the methodology of cointegration with some models (error-correction model, vector error correction model, and so on) were born. These models are relevant because of their closeness to reality and their powers to produce better short-term forecasts and certainly long-term forecasts aggregated in economically meaningful ways for macroeconomic policy analysis (Maddala and In-Moo Kim 1998).

As Granger (1986) put it: "A *test for cointegration can thus be thought of as a pre-test to avoid 'spurious regression' situations*". According to Granger, instead of stationaryizing the series a priori in order to avoid the fallacious regression situation, the best approach would be to test whether the regression residuals are stationary, so the error-correction model can be estimated with non-stationary series and give better results in the dynamics of the short and long-term relationship. Cointegration is the key word in the new econometrics, referring to the long-term relationship between economic variables.

This paper is intended to illustrate the relevance of the cointegration methodology to the error correction model, its implications for macroeconomic modeling and forecasting, and its fundamental role in explaining short- and long-term dynamics.

The organization of this paper is as follows. Section 2 reviews a selection of empirical studies with the error-correction model contributing to the economic analysis. Section 3 illustrates the cointegration methodology by exploiting the different cointegration tests and the dynamics of the error correction model. Finally, section 4 summarizes the paper with a conclusion.

1. Relevant Literature Review

In 2003, the Nobel Prize in Economics was awarded to two researchers who conducted their research in the 1980s and 1990s: Robert Engle and Clive Granger for their scientific contributions to "*methods of analysis of economic time series on the one hand with seasonal volatility for Engle and on the other hand with a common trend for Granger"* that have contributed to the improvement of forecasts of macroeconomic and financial variables (Lardic and Mignon 2003). In fact, the winners were awarded for their work relating respectively to ARCH type models and non-stationary so-called cointegration analysis. The great merit of Granger was to show that specific combinations of non-stationary time series can behave *"stationarily"* and thus make it possible to find statistically correct results. Granger discovered cointegration by trying to refute Hendry's (1977) criticism of his research with Newbold on nonsense regressions between nonstationary data (Granger and Newbold 1974, 1977). Although the initial estimation approach has been replaced by a plethora of methods, the concept of cointegration has led to a fusion of analyzes of long-term equilibrium relationships with empirical dynamic systems (Castle and Hendry 2016).

However, cointegration could not have happened without Hendry's criticism. Hendry's role is overlooked in the economic literature, while he is the essential link between Sargan's (1964) work on the formulation of analysis of stationary time series with error correction and that of Granger on spurious and nonsense regressions, which will lead to error correction models. This link will be made by the cointegration analysis (Meuriot 2015). These models have been shown to be very effective for short-term dynamic systems and subject to strong stochastic disturbances, but whose long-term dynamics are also constrained by existing equilibrium relationships in an economy, for example, the relationship between exchange rate and inflation rate, both short-term and long-term (which will be analyzed for illustrative purposes in the next section).

The pioneering work of Davidson *et al.* (1978) on the dynamic relationship between consumption and disposable income in the United Kingdom is a treating essay on the error correction model. The literature on the relevance of cointegration on the economic phenomenon has spectacularly exploded. The work of Engle and Granger (1987) that cointegration and the error-correction model is a relevant model for analyzing the relationship between nominal GDP and money supply (verification of monetary neutrality) and other variables such as inflation, consumption. They have developed and demonstrated the importance of the error-correction model in economic policy analysis. The revival of the debate on monetary neutrality led other researchers to test this relationship with the relevance of the error-correction model, Mehra economist at the Federal Reserve of Richmond, verified this hypothesis in 1989 using cointegration, its results validated monetary neutrality hypothesis with the broad money. However, the hypothesis seemed to be invalid for money (M1).

Kremers *et al.* (1992) analyzed the power of cointegration by showing that the error-correction model gives more efficient results. They found that when there is a cointegration relationship, the error-correction model is usually more powerful. Several empirical studies of money demand demonstrate this power of the error-correction model and its strategic implications for monetary policy making (Hendry and Ericsson 1991, Mehra 1991).

After studies on monetary neutrality and money demand, the tendency was towards efficient financial markets (Van Quang 2007) and exchange rate behavior. Godbout and Van Norden (1997) conduct three case studies. The first on cointegration and the projection of nominal exchange rates. The second is based on work related to the long-term validity of the monetary model for determining the exchange rate. The third study presents the existence of stochastic trends common to international stock markets.

Eslamloueyan and Darvishi (2007) used an unrestricted error correction model and the test approach of limits proposed by Pesaran *et al.* (2001) to study the short and long-term effects of bank credit on inflation in Iran. Their result indicates that there is a long-term relationship between inflation and its main determinants, namely bank credit, import price, real GNP and the parallel exchange rate. However, bank credit has no short-term effect on the movement of price levels in Iran. In addition, they show that the nationalization of banks and the implementation of interest-free or interest-free banking system in Iran have caused a structural change in the behavior of inflation.

Researchers investigated the behavior of long-term growth rate determinants using the error-correction model (Morales 1998, Özmen and Şanli 2018). A major empirical interest in growth studies is whether permanent changes in the fundamentals of the economy affect the long-run growth rate. However, a direct time series analysis of this hypothesis is not always feasible because the permanence of many such changes is rather debatable. For example, Lau (2008) explains why examining the long-term effects of temporary changes in the share of investment on per capita output indirectly provides the answer to the effects of permanent (possibly hypothetical) investment changes. Applying the error-correction model, he finds that a disruption in investment does not produce a positive long-term effect in each of the three countries - France, Japan and the United Kingdom - in which GDP per capita and investment are cointegrated.

Adouka *et al.* (2013) modeled the Algerian public expenditure demand function using error correction and vector error correction (VECM) models from 1970 to 2010. They sought to study the sensitivity of the economic activity in the face of changes in public spending and to measure the effect of income and productivity on the growth of public spending. They found that all the coefficients of the variables that explain the growth of public expenditures are not significant and that there is therefore no short-term relationship between public expenditure and GDP. But in the long run they captured the effect of spending on activity, and thus the relationship was stable and significant in the long run.

Pinshi and Sungani (2018) analyze the relevance of the pass-through effect of the exchange rate in the DRC and its implications on monetary policy regime for the period from January 2002 to March 2017. The main idea is to measure the degree of transmission of exchange rate variations to the change in the general price level in a context of macroeconomic instability that is unfavorable to the Congolese economy. Indeed, a strong and/or weak degree of pass-through would suggest that changes in the exchange rate have more / less effect on inflation. This could alter the central bank's predictions of the future reaction of inflation, which are decisive for monetary policy strategies and tactics. Based on the cointegration approach with the error-correction model, the main conclusion is that a change in the exchange rate will affect inflation more than proportionally, the degree of pass-through being relatively high. A depreciation of 1% causes a rise in the general price level of 0.38% in the short term. This effect is even wider in the long run, where the increase in the general price level is 1.66%. In addition, the adjustment to balance will take time (12 months and 2 weeks). Their study suggests Central Bank, on the one hand, to be vigilant and closely monitor exchange rate movements in order to take quick action and contain inflationary pressures and secondly, reflect on the strategies of the political economy by adopting a hybrid regime (monetary targeting and implicit and flexible targeting of the exchange rate).

In 2019, Ntungila and Pinshi analyze the short and long-term sensitivity of the Congolese economy to fluctuations in commodity prices and verify the resource curse hypothesis in the DRC. They use the method of Fully modified least squares (FM-OLS) to estimate the error-correction model. They find that the Congolese economy is adversely affected by commodity price shocks in the short and long term. The readjustment of the economy is slow and persistent. The short and long term relationship seems to validate the hypothesis (or paradox) of resource curse. They conclude that if there is not an ambitious launch of the structural reform process, the economy would remain in an eternal whirlwind of curse.

The authors have contributed in some way to the research landscape and to macroeconomic and financial understanding through the powerful error correction model and the cointegration approach. The relevance of this

model to the problem of fallacious regression is a remarkable advance. What is extraordinary is that these econometricians know how to analyze macroeconomics and economic policy in a world characterized by the non-stationarity of variables, many have circumvented this problem with a price to pay and a risk of deviating from the real analysis, Engle, Granger and the other econometricians exploited this econometric weakness and were able to analyze against the current in the storm and swirl the error by using non-stationary variables to find relevant results.

2. Methodology: Relationship between Inflation and Nominal Exchange Rate

Consider two time series π_t and e_t, inflation rate and exchange rate, which are $I(d)$, that is, they have compatible properties in the long term. In general, any linear combination of π_t and e_t will also be $I(d)$. However, if there is a linear combination such that:

$$\pi_t - \theta e_t - \alpha = z_t \approx I(d-b), b > 0 \quad (1)$$

With $(1 - \alpha - \theta)$ called cointegration vector. The relationship between inflation and the exchange rate is cointegrated in the sense of Engle and Granger $(\pi_t, e_t \approx CI(d,b))$.

The concept of cointegration attempts to determine the existence of a long-run equilibrium towards which an economic system converges over time. If, for example, economic theory suggests the following long-term relationship between π_t and e_t in logarithm:

$$\pi_t = \alpha + \theta\, e_t + z_t \quad (2)$$

where: θ is an elasticity measuring the effect of a unit change in the exchange rate e_t on the inflation rate π_t. This relation defines the behavior of inflation is a function of the fluctuations of the exchange rate. Thus z_t is the distance at which the system is far from equilibrium at all times, that is, the equilibrium error (Dolado *et al.* 1990).

The statistical significance of the cointegrating coefficient θ is an indication of the existence of a long-term relationship between the rate of inflation and the exchange rate and that these have a common stochastic tendency whose fundamental characteristic is that the term estimated residual $\widehat{z_t}$ does not have a unit root (stationarity). However, this cointegrated relationship requires that each of two variables is not stationary in level, but that they become them after differential filtering (Pinshi and Sungani 2018).

2.1. Integration Tests

The aim of the integration or stationarity test is to examine empirically whether each series contains a unit root. These tests are mainly a descriptive tool used to classify the series into stationary and non-stationary. Since the integrated variables lead to nonstandard distributions and perhaps to fallacious regression results, the recommendation is as follows: *"If a data set appears to be non-stationary, assume that it is nonstationary and integrated. Once you have been able to categorize your variables as integrated steady-state trends, you are able to solve the long-term and short-term effects in your model"* (Sjö 2008).

The « t statistic » of Dickey-Fuller is based on the model estimation:

$$\Delta\pi_t = \alpha + \beta t + \vartheta\pi_{t-1} + \nu_t \quad (3)$$

In case of autocorrelation in the observed series, estimate the Augmented Dickey-Fuller (ADF Test) based on the following equation estimate:

$$\Delta\pi_t = \alpha + \beta t + \vartheta\pi_{t-1} + \alpha\pi_{t-1} + \sum_{j=1}^{p-1} \phi_j\, \Delta\pi_{t-j}\nu_t \quad (4)$$

The null hypothesis is that: $\pi_t = \pi_{t-1} + \nu_t$ where $\nu_t \approx ID(0, \sigma^2)$. According to the null hypothesis, ϑ will be negatively biased in a limited sample, so only one test is necessary to determine H_0: $\vartheta = 0[\pi_t \approx I(1)]$ against H_1: $\vartheta < 0[\pi_t \approx I(0)]$. This model is less restricted because it takes into account a deterministic trend.

It follows a distribution associated with that of the statistic t whose critical values are presented by Dickey and Fuller. The decision rule is such that we accept the null hypothesis of the existence of a unit root since: $t_{\widehat{\vartheta_1}} \geq t_{tabulée}$ (critical values).

2.2. Cointegration Test: Engle-Granger Approach

Once the variables have been classified as integrated of order $I(d)$, it is possible to establish models leading to stationary relations between the variables. There are several cointegration tests. Engle and Granger (1987) formulated one of the first cointegration tests. This test has the advantage of being intuitive, easy to achieve. The intuition underlying the test motivates him to play his role as the first cointegration test.

In order to test the existence of cointegration between the two series, it is imperative to use Engle-Granger's Augmented Dickey-Fuller cointegration test, or EG-ADF test (Stock and Watson 2012). The first step consists of a relation (2) from which the residual process $\hat{z_t}$ must be extracted. The second step is to look for a unit root in the residual process of the cointegration regression above. To this end, configure an ADF test like:

$$\Delta\hat{z_t} = \alpha + \vartheta\hat{z}_{t-1} + \sum_{j=1}^{k} \emptyset_j \, \Delta\hat{z}_{t-j} + v_t \quad (5)$$

where: k is the shift chosen according to the criteria of Akaike and Schwartz.

The assumptions are as follows:

$$H_0: \vartheta = 0 \ (No\ existence\ of\ a\ cointegration\ relation)$$

$$H_1: \vartheta < 0 \ (Existence\ of\ a\ cointegration\ relation)$$

The decision rule is such that the null hypothesis of non-cointegration will be rejected if the calculated McKinnon statistic is greater than the corresponding critical value. Otherwise, there would be no long-term link between the variables considered. The existence of a long-term relationship paves the way for the estimation of the Error Correction Model (ECM).

It should be noted that the Engle-Granger approach poses three main problems. First, since the approach involves an ADF test in the second step, all ADF test problems are also valid here, including the choice of the number of delays in the increase is a critical factor. Secondly, the test is based on the hypothesis of a cointegration vector, captured by the cointegration regression. Therefore, be careful when applying the test to models with more than two variables. If two variables are included, adding a third variable built into the model will not change the result of the test. If the third variable does not belong to the cointegration vector, the OLS estimate will simply set its parameter to zero, leaving the residual process unchanged. Two-variable test logical strings are often necessary (or sufficient) to solve this problem. Third, the test assumes a common factor in the dynamics of the system. To avoid this problem, it would be more prudent to rewrite the simplest version of the two-variable test (Sjö 2008). Another solution in front of more than two variables, it is better to apply the cointegration approach of "Johansen" which is one of the most powerful cointegrating tests.

There is a lot of work on managing structural breaks and outliers in the error correction model, as non-stationarity can result from changes in distribution and not just stochastic trends. Failure to model the offsets leads to processes which resemble stationary variables in difference I(1) but can be stationary in level I(0) with breaks.

However, the advantage of the Engle-Granger procedure is that it is easy to implement and therefore relatively inexpensive compared to other approaches. This may work quite well for two variables in particular, but remember that the common factor restriction is a severe restriction since any short-term dynamics are forced into the residual process. In this regard, one would expect the dynamic model advocated by Hendry, Banerjee and other econometricians to behave better.

2.3. Error Correction Model

In order to analyze the short-term and long-run dynamics of exchange rate changes on the behavior of inflation (*pass-through*) one can use an ECM. The value of ECM formulation lies in the fact that it combines flexibility in dynamic specification with long-term desirable properties. It could be perceived as capturing the dynamics of the system while integrating the equilibrium suggested by economic theory.

The greatest reliability of the ECM is that it does not suffer from serial correlation of residues; in addition, its regression coefficients offer a good economic interpretation (IMF 2013).

2.3.1. Engle and Granger Methodology

If all the above conditions are satisfied and the inflation rates and the exchange rate share a common stochastic trend, *i.e* they are cointegrated $(\pi_t - \hat{\theta}e_t - \hat{\alpha} \approx I(0)$, the ECM describing the relationship between the two series is written :

$$\Delta\pi_t = \tau_0 + \tau_1\Delta e_t + \gamma(\pi_{t-1} - \theta e_{t-1} - \alpha) + \mu_t \quad with\ \gamma < 0 \quad (6)$$

The term $\pi_{t-1} - \theta e_{t-1} - \alpha$ can be symbolized in z_{t-1} as the delayed error term, it represents the magnitude of the imbalance between the level of inflation π_t and exchange rate e_t in the previous period. The ECM indicates that the changes in π_t depend not only on the changes in π_t, but also on the magnitude of the imbalance z_{t-1}.

This equation can be rewritten:

$$\Delta\pi_t = \tau_0 + \tau_1 \Delta e_t + \gamma z_{t-1} + \mu_t \quad (7)$$

The parameter τ_1 represents the short-run elasticity of inflation relative to exchange rate fluctuations. The long-run elasticity is θ in equation (2).

The mechanism of error correction (the restoring force) or of catching up γ, expresses the speed of the adjustment towards the long-term equilibrium, must be significantly negative; otherwise, an ECM specification should be rejected. The slope coefficient of γ implies that, if in the preceding period the level of the inflation rate was 1% higher than that predicted by the long-run equilibrium ratio, there will be an adjustment to reduce the inflation level of γ during this period to restore the long-run equilibrium relationship between the inflation rate and exchange rate fluctuations.

2.3.2. Methodology at Banerjee and Hendry

In the same way that Engle and Granger identify and estimate the ECM, the methodology of Banerjee and Hendry (1992) also offers a good interpretation and approximates the Engle-Granger approach. The major difference is that unlike the first two-step ones, Banerjee and Hendry's approach proceeds in one step to estimate the ECM:

$$\Delta\pi_t = \tau_0 + \tau_1 \Delta e_t - \gamma \pi_{t-1} + \tau_2 e_{t-1} + \mu_t \quad (8)$$

The parameter τ_1 represents the dynamics of the short-term pass-through that is to say the short-term repercussions of the exchange rate variations on inflation and the parameter τ_2 characterizes the long-term pass-through equilibrium, where $-\tau_2/\delta$ represents the long-term elasticity that is the long-term impact of exchange rate changes on inflation. The parameter γ is the error correction mechanism (error correction coefficient) or the restoring force, it must be less than unity and negative. This parameter γ indicates the rate of adjustment of inflation π_t to its equilibrium level, *i.e.* the way in which inflation adjusts when there is an imbalance in the foreign exchange market. In addition $|1/\gamma|$ represents the duration by which price volatility is fully absorbed after adjusting the imbalance in the foreign exchange market.

Conclusion

The considerable gap between economists, who have a lot to say about equilibrium but relatively little about dynamics, and econometricians, whose models focus on the dynamic adjustment process, has been to some extent fulfilled by the concept of cointegration (Dolado *et. al*. 1990). Cointegration theory has significantly alleviated the problems of fallacious regressions due to the non-stationary behavior of macroeconomic and financial variables. This article provides a relevant review of the power of cointegration and the error correction model.

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Structural Dynamics and 'Forward-Looking' Regional Economic Resilience

Paweł GAJEWSKI
Department of Economics, Faculty of Economics and Sociology
University of Lodz, Poland
pawelg@uni.lodz.pl

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Abstract:

Building on the ongoing discussion, this paper introduces a new type of regional economic resilience, labelled as forward-looking or anticipatory resilience. Further, it advocates that empirical research over this type of resilience can be fruitful, especially in Central and Eastern European countries. Using an example of Polish NUTS-3 regions, it is shown that intensive structural dynamics may have a detrimental impact on regional resistance to external shocks, but, if launched after the shock has occurred, a positive impact on the recovery might be achieved. Finally, the paper suggests paths along which the research can proceed and discusses the problem of operationalization.

Keywords: resilience; regional growth; structural dynamics; CEE.

JEL Classification: E3; R10; R11.

Introduction

The highly asymmetric impact of the recent global crisis across countries is widely acknowledged. Indeed, some countries weathered the crisis relatively well, while others were heavily affected[1] Similarly, some economies managed to "bounce back" to pre-shock growth rates, or even exceed them relatively quickly, while others have not managed to fully recover to date. Therefore, the academic interest in the sources and mechanisms of this varying performance is natural, and there are good reasons to take a national perspective for investigating economic resilience, as is done by Didier *et al.* (2012) or Gomes (2018), among others. First, a considerable amount of resilience is determined by country-level regulations. Second, a considerable number of shocks is generated or absorbed by national policies.

Country-wide factors, however, do not tell the entire story about economic resilience. On the contrary, it appears that cross-regional resilience differences within countries could have been as deep as cross-national ones (Giannakis and Bruggeman 2017). For example, within the hardly hit economy of Spain, where GDP (PPP) growth rate fell by 16% (peak-to-trough), NUTS-2 regional GDP growth losses ranged from 12% to 20%. The pace of recovery was also very differentiated. Between the outbreak of the crisis and 2015, GDP increased by 6% in Spain, ranging between 1% and 11% across individual regions. Even stronger variations were recorded in the relatively resilient Germany. The nation-wide loss of GDP (PPP) growth rate amounted to 12 percentage points, but it ranged between 8% and 18% across NUTS-2 regions. The subsequent rebound was generally much more potent than in Spain, as national GDP in Germany increased until 2015 by as much as 27%, ranging between 18% and 40% regionally.

The performance of CEE countries has proven to be even more diverse than 'old' EU members (Megyesiova and Rozkosova 2018). While the GDP of Latvia and Lithuania decreased by more than 20% in real terms, Poland stood as the only country that avoided a recession. This does not mean, however, that the crisis led to no damage to the economy. Real GDP growth slowed by 4.2%, from 7% to 2.8%. Across voievodships (NUTS-2 regions), this loss varied between 2% and 9% and pushed some of them into a recession, whereas other enjoyed robust, hardly interrupted growth. Moreover, while the Poland's GDP (PPP) per capita increased between 2008 and 2015 by 38%, this number varied regionally between 22% and 47%.

In light of these divergent performances, it comes as no surprise that regional, local and urban resilience has emerged as one of the hottest research areas in the field of regional science, and the interest is still rapidly increasing (Martin and Sunley 2015).

[1] The asymmetry was also visible in other breakdowns, *i.e.* between income groups (Kaya 2017).

Often, regional economic resilience has meant different things to different researchers. In the struggle to organize the concept, Martin and Sunley (2015) put forward the three dimensions of resilience:

- the ability of a regional economy to rebound to pre-shock state following the shock, and the speed at which it occurs (we will refer to it as type I resilience in the remainder of this paper);
- the ability of a regional economy to absorb the shock, *i.e.* remain near the pre-shock state (type II resilience);
- the capability of a regional economy to adapt its structure in response to the shock in order to maintain core performances (type III resilience).

While the last dimension encompasses positive adaptability not only in response, but also in anticipation of a shock, this 'forward-looking' perspective is not further elaborated in Martin and Sunley (2015), nor is it discussed elsewhere in the literature. We feel, however, that it might substantially improve our understanding of resilience; therefore, we explicitly propose to introduce another type of regional economic resilience that we define as: the capability of a regional economy to 'look forward' and 'modify' its structure, launch 'insurance mechanisms' against shocks and reroute its activity in order to minimize the effects of a negative shock and facilitate a recovery (type IV resilience).

The aim of this paper is twofold. First, it is to introduce the concept of type IV resilience (as defined above) and motivate launching empirical studies over it. Second, it is to emphasize the role of structural dynamics for this type of regional economic resilience, or its two distinct aspects: resistance to shocks and the ability to recover to pre-shock conditions.

1. State of the art

In the context of your research paper the literature review should be a critical synthesis of previous research in the subject field. The evaluation of the literature leads logically to the research question. Who is doing what? Who has done what? Who first did it or published it? Taken from published papers, research monographs, catalogues etc. based on primary sources. Offering a, probably new, structured view of the field of study.

Acknowledging the rapidly increasing awareness of regional resilience, Christopherson *et al.* (2010) admitted that one of the reasons could be the 'malleability' of the concept itself. Understanding the notion of economic resilience has progressed rapidly in the recent years, which is reflected in its evolving definition. Indeed, it has taken several years of debate to clarify and frame the concept theoretically. The foundations of the consensus, which we now seem to be arriving at, were laid in the 2010 special issue of the *Cambridge Journal of Regions, Economy and Society* 3(1), which comprised a number of important contributions including Hudson (2010), Simmie and Martin (2010), Hassink (2010), Pike *et al.* (2010), Pendall *et al*. (2010), Bristow (2010), and Wolfe (2010). Owing to these contributions, some critical issues related to the relationship between resilience, growth, competitiveness, and sustainability were addressed. It is useful to recall Scott (2013), who added that, among many other concepts, it is the explicit emphasis on shocks and unknowable perturbations that is distinctive for the concept of resilience.

Resilience, defined as the ability and speed of a regional economy to recover to their pre-shock equilibrium, was derived from engineering sciences and soon became known as the engineering approach. Another contribution came from ecological sciences, where resilience is understood as the ability to absorb or resist the shock. The main difference between these two approaches is that ecological resilience rejects the assumption of a single equilibrium and instead allows multiple equilibria and the possibility of regional economies to flip into alternative stability domains following a shock (Davoudi *et al*. 2012). Engineering and ecological approaches contributed to establishing the concepts of type I and II regional resilience, respectively. From this stage, we have observed the literature expanding in two directions. On the one hand, the two concepts were sufficiently framed to trigger their operationalization and application to empirical research, and we indeed observed the emergence of empirical studies on regional resilience (*e.g*. Brakman *et al.* 2015, Crescenzi *et al.* 2016, Giannakis and Bruggeman 2017). On the other hand, some theoretical dissatisfaction remained, and work on the notion and theory of resilience continued. Davoudi *et al*. (2012), for example, still complained about the lack of clarity around the concept, but the main critique towards the existing consensus was voiced by evolutionary economists and economic geographers. Even though the role of agents, institutions, and interactions were acknowledged earlier, Bristow and Healey (2014) have called for putting the evolutionary approach to understanding regional change at the center of the concept.

The evolutionary approach became a strong alternative to the engineering and ecological approaches by introducing a fundamental change in the perception of regional economies, here viewed as collections of agents, principally firms and institutions, who interact with each other in complex and non-linear ways (*i.e*. complex adaptive systems in the sense of Bristow and Healey 2014). Since resilience is still defined in terms of capability to absorb,

resist and respond to the disturbance, the evolutionary approach enriches the concept of type II resilience while also adding a new dimension (type III). Within the latter, agents are assumed to continually adapt their behavior based on observations of the system as a whole or of others around them through interactive mechanisms such as learning, imitation or evolution. This is how the system is adaptive and able to respond to changing conditions over time (Waldrup 1992, Bristow and Healey 2014, Boschma 2015). Another important distinction of the evolutionary approach, in general, is that it does not assume the economic systems to be in equilibrium prior to the shock or to return to it after the shock occurs. While this approach is intellectually appealing, it would be a real challenge to propose a framework to operationalize the evolutionary perspective of regional resilience. The first step was made by Duschl (2016), who suggested fitting a flexible Asymmetric Exponential Power density to firm-level data.

As mentioned earlier, we propose considering yet another form of resilience (type IV), which amounts to an anticipatory restructuring of the regional economy in order to avoid or minimize the negative impact of shocks and facilitate the subsequent recovery.

Some of the questions to be asked within this framework are: how do decisions taken by firms influence their performance (and also aggregate regional economic dynamics as a consequence) during the shock? What determines whether firms created before the shock perform well when the shock hits? Is this good performance related to taking up 'resilient' activities? Is there a structural shift visible in firm-level data that makes the regional structure resistant to shocks? To what extent are firms capable of reorienting their export activity towards markets, which are subsequently less affected by a shock? What are the linkages between regional resilience and regional specializations? Does the intensity of interactions between firms and other local actors, including research institutions, raise the immunity of regional economies to adverse shocks?

Empirically, disentangling type IV regional resilience from the other types requires using firm-level data and case studies to determine its relative importance. With the help of this data it would be more feasible to investigate whether *e.g.* a weak impact of a shock was due to the pre-existing structural features of a region, or because some changes were introduced consciously in advance of the shock. Additionally, was the fast recovery because of a swift reaction to the shock, or were the adjustments originally implemented ahead of the crisis.

Another strand of empirical research that shall open lies in the area of the determinants of type IV resilience. Attention should be devoted to firm-specific factors, such as their innovative and internationalization capabilities, and the local environment in which they operate. While innovation, per se, is disruptive to the current status quo, it can be seen as a forward-looking activity at the firm level. It would be interesting to examine what innovation and internationalization patterns can be identified at the regional level and their interrelationships with type IV (and other types) of resilience. Additionally, substantial information might be recovered from the processes of firm entry and the behavior of young firms. For example, it might be that young innovative companies (including startups) have a stronger ability to change the structure of sectors and businesses dynamics because of their higher adaptability and flexibility, compared to more mature companies. Innovation activity might also offset experience that was seen as a crucial factor determining the success of the companies, containing modes of internationalization. Finally, we believe that there may be a crucial role of cooperation between firms and other local actors, including universities and other research institutions, in building type IV resilience. All the above arguments underpin the hypothesis, that type IV resilience is generated endogenously within a region.

2. Central and Eastern Europe as a Laboratory to Investigate Type IV Resilience

We believe that there are strong reasons to consider CEE as an excellent laboratory to investigate regional resilience. On the one hand, regional income disparities within CEE countries are as large as in comparable Western European ones, merely reflecting the extent of structural divergence, which influences all areas of economic dynamics (Anagnostou and Gajewski 2019). Most of these differences have deep historical roots. In the case of Poland for example, Wysokińska (2017) illustrated how the partitions-related paths of agrarian reforms in the 19th century determined the pattern of regional economic structures for the following decades. On the other hand, all CEE countries have some common features that may produce similarities in the patterns of regional resilience, such as comparable level of development, the ongoing catching-up process, the recent EU integration experience, and similar institutions, among others. One striking feature of this region, for example, lies in large differences of labour productivity across sectors, which is a legacy of non-market based factor allocation established under the centrally-planned system. This problem is especially striking when productivity is compared between overgrown and backward agriculture (partly of subsistence nature) and other sectors. To illustrate, labour productivity in the Polish agriculture industry is, on average, five times lower than in other sectors and much more diversified, compared to 1.5-2.1 times lower in other big EU countries, such as Germany, UK, France, Italy and Spain. Subsistence agriculture is also partly responsible for the relatively low differentiation of regional

unemployment rates, as it has been traditionally absorbing, in 'bad times', those people who lost jobs and were unable to find another in non-agricultural activities and releasing them in 'good times', a mechanism known as the 'sponge effect' (Landesmann and Romish 2006). This effect alone, also observed in other CEE countries, such as Romania, Bulgaria or Hungary, has the potential to impact regional resilience in a 'CEE-specific' manner, *i.e.* promoting type II resilience, but undermining types III and IV resilience. The latter presumption can be derived from possibly an inward-looking attitude of the agents in these areas, although it should also be subject to detailed empirical investigations.

Some earlier studies indicate great research potential and a number of possibly interesting findings. Anagnostou and Gajewski (2019), for example, using Bayesian Panel VAR models unveiled regional differences in the reaction to a common monetary policy shock in Poland. Their paper finds more heterogeneity with regards to the response of GDP and investment activities, compared to the unemployment rate or inflation. As far as GDP is concerned, for example, some eastern voivodeships seem to be much more vulnerable to interest rate shocks, compared to the western part of the country. Not only is the response stronger there, but monetary policy shocks are also substantially more persistent. Furthermore, it seems that these differences are related to the regional industry-mix (its role rises in importance over time for up to two or three years after the shock) and demographic situation, among others.

Some very intriguing results are also obtained in Gajewski and Tchorek (2017). The study exploited firm-level data to gain some insights into sources of regional export performance in Poland. The paper sheds a new light on the pattern of regional development in Poland and also suggests a potentially interesting research path in regional resilience in Poland. More specifically, we demonstrate that exporters in rural, eastern Poland follow a very distinct internationalization strategy, which cannot be deemed inferior. On the contrary (and contrary to the common perception), eastern exporters rely on innovation activity, non-price competitiveness, and family experience as sources of success in international markets to a greater extent than exporters in the western part of the country. While we could have only detected the beginning of the process, sustaining it might eventually earn the East solid grounds for its long-run development by rooting it in industries governed by increasing returns, and it can also exert an impact on regional resilience to shocks. Gajewski and Tchorek (2017) emphasize that that it is not possible to adequately describe regional economic mechanisms without investigating the behaviour and decisions taken at the firm level, and it calls for such an approach in the future. We also argue that after the great trade collapse in 2008/2009 and the fragile recovery thereafter accompanied by structural weaknesses, local resources and capabilities were more decisive in creating sustainable and resilient growth of regions and countries.

Acknowledging the importance of firms for regional economic dynamics, Gajewski and Kutan (2018) examined both long- and short-run drivers of new firm creation in the Polish NUTS-2 regions, as well as the role of firm entry for the region's economic activity. The results confirm the hypothesis that local economic structures and the broad business environment are critical for stimulating new business creation. The second exercise, in which we methodologically follow Gourio *et al*. (2016), turns out to be very informative as well. Using the Local Projections Method of Jorda (2005), we investigate the propagation of shocks to firm entry on regional GDP, non-agricultural employment, and the total number of firms. Firm creation is found to be facilitating optimal labour allocation, but their impact on total employment is much lower, if not negligible. Moreover, firm entry in agriculture-dominated (and low-income) regions constitutes a much weaker mechanism of raising productivity than in non-agricultural regions. Lower productivity growth reduces their relative competitiveness, which eventually limits the potential to pull employees out of agriculture (visible in the fourth year after the shock) and locks agricultural regions in a disadvantaged position, a source of regional divergence within CEE countries revealed in many studies (*e.g.* Monastiriotis 2014, Goschin 2015).

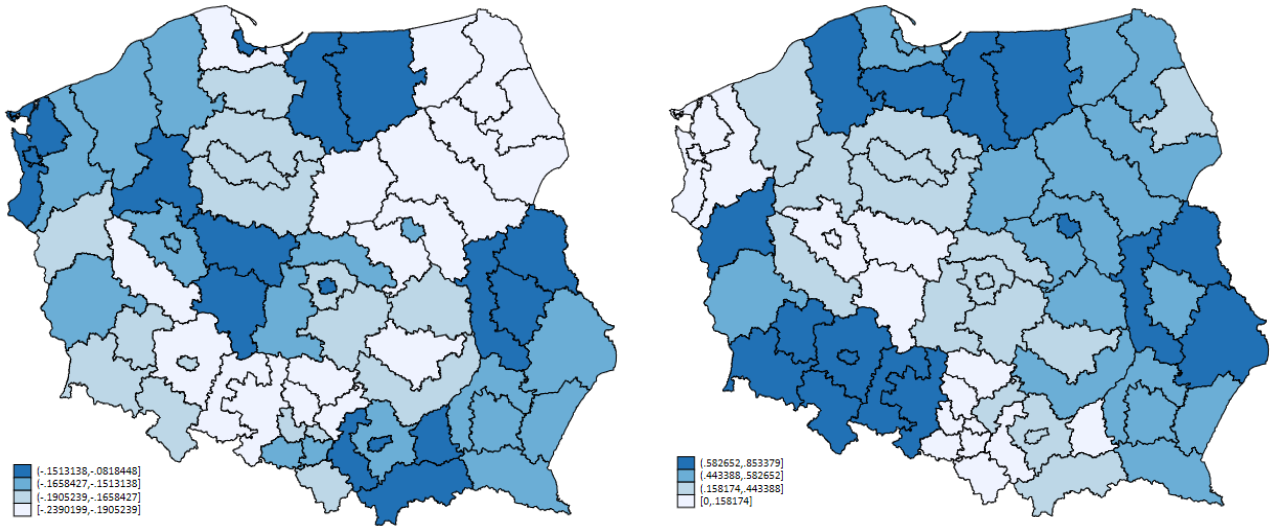
3. Preliminary Insights from Polish NUTS-3 Regions

Resilience to external shocks during the recent global crisis should be investigated carefully, since it overlaps with longer-run trends, associated (especially in the case of CEE countries) with structural transition or migrations. Another important distinction to be made is that of the resistance to shocks and recoverability, *i.e*. the ability to recover to pre-shock state, following the shock.

We employ data on non-agricultural employment changes in 66 NUTS-3 Polish regions, which is first stripped off the long-run effects by extracting a quadratic trend from the series. For each series maximum positive deviation from trend in the period 2007-2009 (peak) is identified. Further, maximum negative deviation in the mid-crisis period (2009-2011) is identified and labelled as trough. Finally, the resistance index is calculated as trough employment minus peak employment.

Figure 1 maps resistance in Polish NUTS-3 regions, which can now be attributed to the effects of the crisis – a negative shock. As it can be seen, no strong spatial dependence of resistance is observed. Recoverability in turn is defined as a share of non-agricultural employment restored between the mid-crisis trough and the year 2015, which marks the end of our sample. Importantly, recoverability is also calculated in terms of deviations from trend. Admittedly, there is no clear pattern that would link the resistance and recoverability indices.

Figure 1. Regional resistance index and recoverability index



The main focus of this paper is on the role of structural dynamics, *i.e.* the intensity of structural change in the regional economy. Hence, we construct modified Lilien indices (Ansari *et al*. 2014) of structural change in two periods: pre-crisis, *i.e.* 2005-2007 and mid-crisis, *i.e.* 2008-2010, using employment data in 11 sectors:

$$mli_i = \sqrt{\sum (\bar{b}_{ijT}) \times \left\{ \ln\left({}^{b_{ijt_1}}/_{b_{ijt_0}} \right) - \ln\left({}^{B_{it_1}}/_{B_{it_0}} \right) \right\}^2} \quad (1)$$

where: b_{ijt_1} employment in region *i*, sector *j*, time t_1; B_{it_1} total employment in region *i*, time t_1; $\bar{b}_{ijT}$ average share of sector *j* in total regional employment (in region *i*) in the period between t_0 and t_1.

The two *mli* indices are used as regressors in the equations of resistance and recoverability, as defined above. Additionally, we also use the pre-crisis (*i.e.* 2007) share of agriculture in total employment (agriculture), as a control variable capturing the (inverse of) overall level of development. The functional form of the models read:

$$resistance = f(mli_{05-07}, agriculture) \quad (2)$$

$$recoverability = f(mli_{08-10}, agriculture) \quad (3)$$

Table 1 contains summary statistics for all the variables used in regressions. Note that the value of recoverability is restricted to be non-negative. Hence, the minimum value is zero (if the cyclical component of employment has not at all recovered since the mid-crisis trough) and 0.853, *i.e.* 85.3% of the crisis-induced employment loss was restored by 2015.

Table 1. Summary statistics

Variable	Obs.	Mean	Std. dev.	Min	Max
Resistance	66	-0.166	0.031	-0.239	-0.082
recoverability	66	0.387	0.241	0.000	0.853
mli 05-07	66	1.127	0.491	0.309	2.376
mli 08-10	66	0.943	0.334	0.377	1.730
Agriculture	66	0.164	0.122	0.002	0.493
Resistance	66	-0.166	0.031	-0.239	-0.082

Source: Polish Central Statistical Office (GUS).

Table 2 presents estimation results of equations corresponding to functions (2) and (3). The estimated coefficient indicates that structural changes before the shock were detrimental to regional economic resistance. This might be because the newly created industries and firms tend to be relatively vulnerable. While exploiting resistance at a firm level might add some new information and enable extracting most relevant structural adjustments, *i.e.* those undertaken consciously with an intention to weather the coming negative shock, it is still likely that the fragility that accompany structural changes will prevail.

On the other hand, the results suggest that intense structural changes after the crisis has already struck, might facilitate the subsequent recovery. This conclusion goes beyond a trivial observation that modern, dynamic regions find it easier to recover from shocks. On contrary, regions with a higher share of agriculture (proxying backwardness in our study) recovered more swiftly, at least during the recent global crisis.

Table 2. OLS estimation results

Variable	Resistance	Recoverability
mli 05-07	-0.02*** [-2.94]	
mli 08-10		0.22** [2.22]
agriculture	0.00 [0.00]	0.64*** [3.03]
intercept	-0.14*** [-13.62]	0.08 [0.71]
F	4.34 [0.02]	5.99 [0.00]
R^2	0.14	0.13
N	66	66

It should be reiterated that the above estimation results are not meant to answer the question about the nature of regional type IV economic resilience. Rather, they constitute a starting point to define the research agenda on this concept. The questions that must be addressed are those of the nature and motivation of structural changes. Firm-level data, including firm-level surveys are needed to get a deeper insight into these processes. A key research problem that should be solved is that of operationalization.

4. Operationalization problems

To date, as Giannakis and Bruggeman (2017) stressed, there is no universally agreed upon approach for operationalizing and empirically measuring regional resilience, and regional and economic sciences are on the stage of proposing and testing various methodological approaches.

Given the current state of world research, it is easiest to operationalize resilience within the engineering approach. Fingleton *et al*. (2012) proposed to employ an empirical strategy using Seemingly Unrelated Regressions (SUR), derived from the Friedman's "Plucking Model" of Recessionary Shocks (Friedman 1993). Consider the following equation:

$$x_{it} = b_{0i} + b_{1i}R_{1t} + b_{2i}R_{2t} + ... + b_{ni}R_{nt} + b_{n+1i}S_{1t} + b_{n+2i}S_{2t} + ... + b_{n+mi}S_{mt} + e_{it} \quad (4)$$

where: x_{it} denotes a response variable (*e.g.* employment or output) in region *i* and time *t*; b_{0i} is the autonomous (or potential) growth rate; $b_{1i}...b_{ni}$ denote changes of the response variable following consecutive adverse shocks, while $b_{n+1i}...b_{ni+m}$ are changes during the recovery periods. Negative shocks are denoted by $R_{1t}...R_{nt}$ dummy variables, while $S_{1t}...S_{mt}$ denote recovery periods.

Within this framework, various aspects of resilience can be investigated by imposing restrictions on parameters and testing whether these restrictions are permitted. Following Fingleton *et al.* (2012), we can test, for example, whether the impact of shocks is constant over time for each region, ($b_{1i} = b_{2i} = ... = b_{ni}$), whether a given shock has the same impact across *k* regions ($b_{11} = b_{12} = ... = b_{1k}, b_{21} = b_{22} = ... = b_{2k}$, etc.), whether for each region the post-shock recovery is constant over time ($b_{n+1i} = b_{n+2i} = ... = b_{n+mi}$), or whether for a given

shock the post-shock recovery is the same across regions ($b_{n+2,1} = b_{n+2,2} = ... = b_{n+2,k}$, $b_{n+1,1} = b_{n+1,2} = ... = b_{n+1,k}$, etc.).

Doran and Fingleton (2016) approached the regional resilience issue from yet another perspective. They use individual-level data from the European Social Survey (ESS) combined with regional economic statistics. This modelling approach leads to calculating a resilience index:

$$r_{it} = \hat{E}_{it} - \overline{E}_{it} \quad (5)$$

The index is a simple difference between an individual's 'observed' (estimated) probability of employment $\hat{E}_{it}$, which accounts for a predefined shock, and the individual's probability of employment assuming there is no shock $\overline{E}_{it}$. The r_{it} resilience index is subsequently used as a dependent variable in regional equations capturing its possible determinants. Also, Giannakis and Bruggeman (2017) constructed resilience indicators, although their values depended on the relative performance of regions in the neighborhood of a shock.

The least progress so far has been in operationalizing the evolutionary approach. To our knowledge, the only contribution in this field comes from Duschl (2016). This paper analyzed firm dynamics and compared their distributional properties across different regions. Interestingly, a somewhat similar dataset to the one we plan to utilize is used for this study (*i.e.* combined firm-level data from the Amadeus database and regional data). The main idea of the paper was to estimate the parameters of an asymmetric exponential power density (Bottazzi and Secchi 2011), which accounts for normally distributed growth rates and fat-tailed distributions of growth events. It is the sum of the two shape parameters that are used to approximate regional resilience (Napoletano and Nesta 2016). The estimated distributional parameters are subsequently regressed on regional factors, related to industrial variety and availability of a skilled workforce.

The results (obtained for German regions) are indeed encouraging and the methodology itself might be considered a starting point to operationalize the type IV resilience. More specifically, quantifying type IV resilience requires that evidence is found of a structural break occurring much earlier than when the forming of a shock or a crisis hits and subsequently less impact from the crisis. The Duschl's approach would need to be adjust to accommodate variables shifted in time.

Conclusion

This paper explicitly introduces the concept of forward-looking, or anticipatory (type IV) regional economic resilience and emphasizes that it should be investigated with tight links to structural dynamics. First insights from the Polish NUTS-3 regions suggest that structural changes undertaken before the shock might have a negative effect on economic resistance. However, there could be a positive impact of structural adjustments to recoverability, *i.e.* the second "part" of resilience.

We believe that there is immense research potential for empirical studies on type IV resilience, although its operationalization admittedly requires further work on developing adequate toolbox. In any case, the evolutionary approach seems best suited for investigating this phenomenon, since interplays between agents at the local level are probably crucial for developing forward-looking perspective of local and regional economic systems and insurance mechanisms against possible adverse, exogenous shocks.

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Productivity of Innovations in European Union Member States and Enterprises

Jan ZWOLAK
Faculty of Economics and Finance
Kazimierz Pulaski University of Technology and Humanities in Radom[1], Poland
jan.zwolak@yahoo.com; j.zwolak@uthrad.pl

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Abstract:

The regression dependence of sales value of new innovative products onto the total innovative expenditure in EU enterprises and member states has been analyzed considering a breakdown into groups of countries above or close to the EU innovation average (N=14) and a group of countries below the EU innovation average (N=14) in 2012 and 2016. Based on the Cobb-Douglas regression model, marginal and mean productivity values were determined within the range of total innovative expenditure in enterprises and countries above or close to the EU average innovation and below the EU average innovation in 2012 and 2016. The shaping of marginal and average productivity in the determined country and year groups allowed for an indication of the areas of rational management of the total innovative expenditure in these countries. The research confirmed the hypothesis that a group of countries above the EU innovation average, or those close to this average value, is located within the rational management zone, whereas countries below the EU innovation average are located within the initial zone of irrational management of the total innovative expenditure, regardless of the year in which the study was conducted.

Keywords: innovation; index innovation UE; new innovative products; innovative expenditures regression.

JEL Classification: F02; L11; O31.

Introduction

The concept of innovative entrepreneurial activity conditioned by the distance to reach the technological boundary was introduced into the Schumpeter's Theory by Howitt and Mayer-Foulkes (2005). This technological boundary determines the likelihood of innovation for enterprises that are approaching it. Both enterprises and their sectors that are closer to the technological boundary gain an increase in the productivity of total expenditures per one enterprise conducting innovative product and/or process activities. It is possible to point out the pressure resulting from the competition on the product market and the impact of globalization and trade liberalization which serves to strengthen the enterprise from the inside out while boosting the growth of powerful innovations. This pressure then develops into financial coercion (Alvarez and Crespi 2011).

This article presents innovation research which is one of the first on the national level and one that increments information on the innovative activity of an average innovative enterprise in individual EU member states, as divided into two sets of countries above or close to the EU innovation average and those states that are below the EU average for implementation of product and process innovations. Up to date, few studies have been conducted that encompass 28 countries of the associated economic region that is the EU. In addition, the EU Innovation Index used for the country classification, which is substantively based on the OECD Directive, ensures international comparability and reference to the rolling average level of innovation implementation over time in the EU. This criterion classifies EU member states into countries that use innovations above or close to the EU average or below the EU innovation average. We can trace here an analogy to the technological boundary contained in the Schumpeter's Theory. Therefore, the author proposes to incorporate the EU Innovation Index into the Schumpeter's Theory. This index is constantly calculated, which renders it current and precise. Thus, it constitutes a significant substantive enrichment of the Schumpeter's Theory of Innovation. The hitherto application of the technological boundary as the probability of innovation implementation is not very precise in view of the variability of technological solutions over time and the respective comparative difficulties they represent.

The issue of use of innovations in an enterprise is not only a question of great scientific significance but also of practical one. However, the state of theoretical knowledge in this field is still relatively meagre, while its connection with the Theory of Innovation remains rather unsatisfactory. The research conducted so far into the

[1] 26-600 Radom, ul. Chrobrego 31, Poland

various aspects of the use of innovations is unsubstantial considering the importance and complexity of this issue; there is no comprehensive study covering the economic aspects of implementation, assessment and rational management of innovations in enterprises and national economies or associated regional economic ties.

The aim of the research is to identify enterprises and EU countries which are above or close to the EU innovation average and those below the EU innovation average. A further purpose of the study is to determine the marginal and average productivity of total innovative expenditure per one company conducting innovative product and process activities in EU member states in 2012 and 2016.

The premise of the study was the hypothesis that the productivity of total innovative expenditure lies in the initial zone of irrational management in the countries below the EU innovation average, whereas in countries which are above the EU innovation average or close are located in the zone of rational innovation management.

In order to achieve the established goal, the article has been divided into five sections. The first section presents the related reference literature. The second section describes the methodological procedures and dependencies. The third one describes data and variables. The fourth section presents the effects of an empirical study. Finally, the fifth section sums up the final considerations.

1. Literature Review

In the case of product innovations, the level of innovation in an enterprise and a country can be measured by the level of sales value of new innovative products. Similarly, to the case of process innovations, many countries choose such level of total innovative expenditure that contributes to the reduction of the cost of the innovation process (Mohnen and Hall 2013). A new innovative product usually requires new production technology. Its launch onto a newly created market also requires innovative marketing. New production technology alongside process innovation causes restructuring of the work flow in the enterprise (Siedschlag *et al.* 2010, Prokop *et al.* 2017). Expenses for innovative activities also include intense factors, such as purchase of equipment and software, process enhancement, feasibility and market research conducted prior to the launching of a new product onto the market. It is then that a part of innovation productivity reflects the price effects (Dobbelaere and Mairesse 2010, Brzozowski and Tchorek 2018).

Nowadays, the progress in econometric techniques induces an increase in empirical research (Cassiman and Golovko 2011). In the reference literature on the subject, the assessment of innovation implementation is usually executed by means of the labor productivity measure and the total factor of productivity (TFP) (Santana, Cavalcanti and Bezerra 2011). Labor productivity is criticized in terms of its instability in determining and increasing the total productivity gains, and in view of the difficulties in demonstrating productivity enhancement resulting from efficiency and adjusting production to employees (Britto 2009).

Labor productivity and its technical utilities constitute direct factors in the productivity of fixed assets. Examining them as interdependent relationships allows us to identify what part of the increase in labor productivity is caused by the increase in technical utilities (factors of an extensive nature), and which part is obtained by non-property-related means referred to as technical and organizational progress and innovation progress (factors of intense nature). Also, intense enterprises in Germany were among the first ones ever to use the knowledge resource for productivity assessment (Peters 2006).

The total factor of productivity (TFP) is the result of including the productivity of each factor resource into one productivity expression (Cassiman *et al.* 2010). The advantage of this solution is that it takes into account a substitution in the use of factors and synergy in the relationship between the factors in the situation of merging of two types of activity, whereas the disadvantage lies in the difficulty in measuring various factors of production and their partial productivity values. However, the total factor of productivity is often used in international economics for the needs of empirical research (Carvalho and Macedo de Avellar 2017).

An important role in the propensity and intensity of exports is played by the level of innovation implementation in EU enterprises and member states (Caldera 2010, Bustos 2011 and Tavassoli 2017). There is research-based evidence on the significant impact of innovative activities on the export rate (Ganotakis and Love 2011, Golovko and Valentini 2011, Becker and Egger 2013). Most of the research, however, focuses on the role of investment in R&D (Stanek *et al.* 2018). Nonetheless, these investments do not show a causal relationship with export support. Thus, the measure of the level of innovation implementation in a given country is the level of sales value of new innovative products in international trade. This means that R&D investments are included only in studies conducted on larger enterprises with separate R&D departments. This is an important consideration relative to the specification of empirical data in the study of innovation implementation. This is also the reason for the insignificant number of studies conducted into the role of innovation in the growth in the turnover of innovative production within the framework of economic cooperation between countries. Hence, R&D becomes an indirect

and unconvincing measure of innovation (Harris and Li 2008). In addition, the innovation indicator includes the entry of R&D innovations and the total new innovation production, and defines them using one Index of EU Innovation (Edquist and Zabala-Iturriagagoitia 2015). The open innovation mode allows you to acquire and share new product development projects (Torok and Toth 2013). However, the open innovation literature brings insufficient contributions at the international level (Chesbrough *et al.* 2014).

A well thought-out innovation policy consists in allowing the implementation of only high-productivity investments and the maximum technological and innovative progress by means of non-financial improvements. They do not constitute a qualitative element, as they are the result of certain mathematical transformations of the functioning factor structure.

The rivalry of innovation implementation is an important element of national policy, while the role of innovation as a result of modern knowledge being the motor of economy is crucial for EU member states (Kostoska and Mitrevski 2016). What is paramount in this respect, is research concerning global forecasts (Djogo and Stanisic 2016) and a theoretical interpretation of the factors of domestic competition (Cho and Moon 2013). These factors relating to the innovation, as well as the use and processing of information by means of Communication Technology, despite its direct and indirect impact, create a potential which affects the total productivity in proportion to the size of the sector in question (Gordon 2012).

Research on global prediction is of crucial importance in this respect (Djogo and Stanisic 2016). Recent studies show that developed economies provide important structural patterns for needed changes (Kostoska and Hristoski 2017).

Only an international comparison of productivity indicates a similarity of patterns in the global economy and its respective subeconomies. Competitiveness necessitates a choice of models of economic growth, based on consumption and stability of productivity (Vujović 2014). Innovation contributes to the growth of investment on volatile markets and to the increase in production factor efficiency. Therefore, the new quality structure expressing the measurement of productivity includes capital services with the help of information technology and software. The key economic indicator for assessing the use of innovation is productivity (Jorgenson 2011). On the other hand, strong relations with a bank increase the probability of export intensity and implementation of product innovations (Mancusi *et al*. 2018).

2. Econometric Model and Its Dependencies

Research shows that the implementation of innovation with the right relation of capital to work has a real impact on productivity (Brown and Guzman 2014).

Relations between fixed assets (and technology – innovation) and the value of sales of new innovative products are reflected in the asset productivity ratio (pertaining to technology and innovation), which is related to the remaining economic and econometric categories. The source of productivity growth is capital and labor, which explain less than 50% of this growth (Hall 2011).

The relation of asset productivity (or innovation) ($\frac{P}{M}$) occurring between the technical labour utilities ($\frac{M}{L}$) and work efficiency ($\frac{P}{L}$) can be presented as follows:

$$\frac{P}{M} = \frac{P}{L} / \frac{M}{L} \quad (1)$$

It follows that:

$$\frac{P}{L} = \frac{M}{L} * \frac{P}{M} \quad (2)$$

The substantive principle of rational management suggests that the reverse of the relation between the productivity of fixed assets (pertaining to technology and innovation) as the capital intensity of the sold innovative production, which can be recorded as follows:

$$\frac{M}{P} = \frac{M}{L} / \frac{P}{L} \quad (3)$$

It is (3) a relationship between the capital intensity of innovative production ($\frac{M}{P}$) and the technical labour utilities ($\frac{M}{L}$) and labour productivity ($\frac{P}{L}$). A directly proportional dependence of capital intensity of the new innovative production sold in relation to the technical labor utilities and a change of the relation to $\frac{M}{L}$ / $\frac{P}{L}$ is in inversely proportional dependence to work productivity, with a simultaneous expansion of interpretation possibilities.

Physical capital has a positive effect on preserving the export of new innovative production sold (Andersson and Lööf 2009).

In turn in (4), the level of labor productivity is directly proportional to technical utilities and inversely proportional to the capital intensity of new innovative production sold, or to the inverse value of asset productivity:

$$\frac{P}{L} = \frac{M}{L} / \frac{M}{P} \quad (4)$$

Just like in the case of average relationships, you can present their marginal relations as follows (5):

$$\frac{\Delta P}{\Delta M} = \frac{\Delta P}{\Delta L} / \frac{\Delta M}{\Delta L} \quad (5)$$

Between the magnitude of the marginal and average productivity of a given factor there is a dependence of proportionality by the product-based establishment of the elasticity coefficient (power) of this factor relative to the dependent variable (mathematically, marginal productivity is the first derivative). Relations between productivity growth and the level of innovation are highly non-linear (curvilinear) (Huergo and Jaumandreu 2004). Based on the Cobb-Douglas regression, this allows for a calculation of marginal productivity and average productivity of the total innovation expenditure in an average EU enterprise and country (or in sets of countries with different levels of innovation). The use of the Cobb-Douglas model indicates that the majority of innovation assessments are of a cross-sectional character after a period of three years. It follows that the measures of innovation (level) are of a *post factum* character, and hence modern measures strengthen the cross-sectional assessment and the long-term nature of the course of these effects.

3. Data and Variables

The latest microeconomic research on innovation allowed for the recognition of the actual value of new innovative production sold as a direct measure of innovation (Jienwatcharamongkhol and Tavassoli 2015). It has the causal effect of product differentiation and market development. Expenditure on R&D is just the first step towards innovation, and one which does not guarantee its success. There are rational justifications for the implementation of both concepts (Hall 2011).

The classification of EU enterprises and countries was made on the basis of the Innovation Index, which encompasses the sum of R&D and the sales value of new innovative production, and constitutes one EU Innovation Index (Edquist and Zabala-Iturriagagoitia 2015). It combines a measure of a microeconomic and macroeconomic nature.

The value of sales of new innovative products was adopted as a dependent variable and it was calculated per one enterprise conducting innovative product and process activities in EU countries above or close to the EU innovation average (Y1 and Y3). The following set of countries was distinguished: Austria, Belgium, Cyprus, Denmark, Estonia, Finland, France, the Netherlands, Ireland, Luxembourg, Germany, Slovenia, Sweden and the United Kingdom (N=14) in 2012 and 2016. The measure of the sales value of new innovative products defines the degree of achievement of the company's objective and the extent to which the enterprise is satisfying social needs (increase in value for the client).

The second set is the value of sales of new innovative products as calculated per one company conducting innovative product and process activities in EU countries which lie below the EU innovation average (Y2 and Y4). The following set of countries was selected: Bulgaria, Croatia, the Czech Republic, Spain, Lithuania, Latvia, Malta, Poland, Portugal, Romania, Slovakia, Hungary and Italy (N=14)) in 2012 and 2016.

The basis for the separation of the above sets of innovative enterprises and countries is the EU Index of Innovation (an arithmetic mean). This index determines the direction of changes in innovations undertaken by those countries and, at the same time, it constitutes the boundary between the various sets of innovations – not unlike the technological boundary in the Schumpeter's Theory. Since it serves to identify the actual state of innovation, the EU Innovation Index is an objective measure of international spatio-temporal comparisons and it constitutes a substantive contribution to the Schumpeter's Innovation Theory. The sets of values of sales of new innovative products in various enterprises and countries according to the sources shown in Table 1 was assigned the total innovative expenditure per one company conducting innovative product and process activities in EU member states (X1 and X3) above or close to the EU innovation average (N = 14) in 2012 and 2016 and those below the EU innovation average (X2 and X4) (N = 14) in 2012 and 2016, see Table 1.

The year 2012 determines the state and the innovation level before the 2013-2015 wave, while the year 2016 presents the state and level in the aftermath of this wave. That makes for four years following one year of reviews (Mairesse and Mohnen 2010). Research confirms that during the first year, the process innovation increases productivity (1.5%), while in the subsequent three and more years it starts decreasing over further three

and more years (Huergo and Jaumandreu 2004). However, it is not possible to separate wave periods, whereby the ending year is also the beginning of the next wave (Bengtsson and Tavassoli 2018). This results in a narrowing range of sets and in an increase in set homogeneity, which changes the influence of variables in the estimation process (collinearity). With respect to the data obtained in 2012 in countries above or close to the EU innovation average, the value of sales of new innovative products was growing by 71.5% in 5 countries, while in nine countries, it was reduced by 134%. However, in two countries below the EU innovation average, the value of sales of new innovative products was growing by 15.3%, while in 12 countries it was reduced by 207.4% in 2016.

On the other hand, total innovative expenditure per one company conducting innovative product and process activities in 5 countries above or close to the EU innovation average was growing by 71.7%, and in 9 countries its value decreased by 123%. The total innovative expenditure per one company conducting innovative product and process activities in 3 EU countries below the EU innovation average increased by 15.7%, while in 11 countries it diminished by 252%. In countries above the EU innovation average or those close to it, the increase in sales value of new innovative products is similar to the increase in total innovative expenditure, while the decrease is also similar. In contrast, in 2016, in countries below the EU innovation average, the value of sales of new innovative products increased in the same way as the total innovative expenditure, and it was falling accordingly to the deepening of the decrease in total innovative expenditure (by 44.6%). It can be assumed that in countries below the EU innovation average and those with a deeper decline in total innovative expenditure, the relationship of sales revenues to innovative expenditure is beneficial (favorable economic calculation) and thus the productivity of total innovative expenditure is higher.

The data presented as sets of variables are transformative in nature, and the dependent variable (Y1, Y2, Y3 and Y4) and the independent variable (X1, X2, X3 and X4) are of a comprehensive nature (aggregated) (Wixe 2015).

The R&D value is often a measure of the current year (Hall 2011), hence following the three-year period (wave), it is better to implement total innovative expenditure in the Cobb-Douglas model in order to verify the past period of application of innovation in the enterprise and the country in question. The value of sales of new innovative products constitutes the level of verification by the market (in terms of quantity and price).

Two groups of EU countries were examined using the Cobb-Douglas model before and after the expiry of the three-year period, whereby, the categories of marginal and average productivity of the total innovative expenditure in 2012 and 2016 were also taken into consideration.

The randomness of the distribution of the random component was examined using a graphical analysis and a batch number test, with a significance level of 0.05. Graphical analysis and a series number test verify the hypothesis about the accuracy of model selection (Table 2). The normality of the random component was examined using the Shapiro-Wilk test. The calculated values related to critical values at the significance level of 0.05 do not dismiss the hypothesis that the distribution of random components is normal. The autocorrelation was assessed by means of the Durbin-Watson test and no autocorrelation of the random component was determined at the significance level of 0.05. The hypothesis of homoscedasticity of random components was verified using the Godfeld-Quandt test (Aczel 2002, 587). At the significance level of 0.05, the recorded critical values of Snedecor's distribution are higher than those calculated, and, consequently, there is no reason to reject the hypothesis of homoscedasticity of the random components.

4. Econometric Effects and Discussion

The basis of the research are the sets of empirical data pertaining to the value of sales of new innovative products per one company conducting innovative product and process activities in a given country above or close to the EU innovation average in the following countries: Austria, Belgium, Cyprus, Denmark, Estonia, Finland, France, The Netherlands, Iceland, Luxembourg, Germany, Slovenia, Sweden and the United Kingdom and in member states below the EU innovation average: Bulgaria, Croatia, Czech Republic, Spain, Lithuania, Latvia, Malta, Poland, Portugal, Romania, Slovakia, Hungary and Italy in 2012 and 2016.

The subsequent sets of empirical data represent the total innovative expenditure per one enterprise conducting innovative product and process activities in a given country above or close to the EU innovation average and below the EU innovation average in the above-mentioned EU member states in 2012 and 2016.

Table 1. Parameters of variables in EU enterprises and countries conducting innovative activities (2012, 2016)

Item	Specification	Year	Unit of Measurement	Symbol	Arithmetic Mean	Range min. - max	Coefficient of variation %
1.	The value of sales of new products per one enterprise conducting product and process activities in EU countries (above or close to the EU innovation average): Austria, Belgium, Cyprus, Denmark, Estonia, Finland, France, the Netherlands, Ireland, Luxembourg, Germany, Slovenia, Sweden and Great Britain (14).	2012 2016	1 thousand Euro 1 thousand Euro	Y1 Y3	3060 3010	770-6,970 840-7,030	64,1 70,2
2.	The value of sales of new products per one enterprise conducting product and process activities in EU countries (below the EU innovation average): Bulgaria, Croatia, Czech Republic, Greece, Spain, Lithuania, Latvia, Malta, Poland, Portugal, Romania, Slovakia, Hungary, Italy (14).	2012 2016	1 thousand Euro 1 thousand Euro	Y2 Y4	2245.7 2130.7	570-9,170 500-10,450	105,9 127,8
3.	Total expenditure per one enterprise conducting innovative product and process activities in EU countries (above and close to the EU innovation average): the same countries as in item 1.	2012 2016	1 thousand Euro 1 thousand Euro	X1 X3	1253.9 1205.6	230-2,434 151.2-2,193	55,4 53,6
4.	Total expenditure per one enterprise conducting innovative product and process activities in EU countries (below the EU innovation average): the same countries as in item 2.	2012 2016	1 thousand Euro 1 thousand Euro	X2 X4	601.3 497.0	206-1,137 180.7-1,171.5	51,1 59,0

Source: Eurostat Statistics Database (inn_cis8_exp); European Innovation Scoreboard (2017); Author's calculations

The parameters of the variables of enterprises and EU countries have been included in Table 1. The data presented in Table 1 show that the range of sales values of new innovative products in countries above or close to the EU innovation average and those below this average varies significantly, especially between different EU member states. The comparison of internal variability between variables in groups of countries shows that the value of sales of new innovative products is generally similar in terms of years, and significantly diversified when it comes to the innovation levels (6% and 22%). This means that the lower the level of innovation in a given set of countries, the more dispersed around the average in the set are the values of the characteristics of the sales of new innovative products. This indicates that the value of sales of new innovative products on the markets of countries located below the EU innovation average is shaped by the number of new innovative products and their respective prices. This means that in the markets of these countries these products get a higher price and a higher value of product sales, which in turn indicates their smaller supply and an increase in their exportation.

On the other hand, the range of total innovative expenditure is conditioned by the level of the relative EU innovation average, and not by the year in which the research was conducted. In countries below the EU innovation average, the range of total innovative expenditure is narrowed to less than a half relative to the countries above or close to the EU innovation average, where it is expanded by more than a half. The internal variability of the total innovation expenditure is analogous, regardless of the level of innovation and the year in which the study was performed. This means that the value of the innovation expenditure trait is similarly distributed around the average

in all EU member states. This fact points to the coinciding role of this value in the shaping of the value of sales of new innovative products in all EU countries.

Table 2 shows the curvilinear regressive relation of the examined sets (groups) of countries in a tabular form. The data presented in Table 2 show the regressive dependence of the value of sales of new innovative products (Y1, Y2, Y3 and Y4) on the total innovative expenditure (X1, X2, X3 and X4) in EU countries in 2012 and 2016.

The strength of the relationship expressed by the multiple-partial correlation coefficient (R) between the value of sales of new innovative products and the total innovation expenditure in countries above or close to the EU innovation average amounts to 50% and 55%, and in countries below the EU average it amounts to 62% and 72%. The correlation does not indicate a causal relationship (Griffith, Huergo, Mairesse and Peters 2006). Hence, regression dependence has been studied. Standard errors of all regression coefficients (parameters) are lower than 50% of their absolute values. However, all absolute values of the t-test are several times higher than the values of regression coefficients. And the level of significance of all regression coefficients ranges from 0.00 to 0.05. Statistical assessments of regression coefficients indicate the possibility of their use in the econometric analysis of the volatility of value of sales of new innovative products with respect to the total innovation expenditure recorded in enterprises and EU member states.

Table 2. Power regressions of the value of sales of new innovative products per one enterprise (Y1, Y2, Y3 and Y4)

Year	a*	Regression Coefficient (Parameter)				Standard Error				T-Test				R^2
		X1	X2	X3	X4	X1	X2	X3	X4	X1	X2	X3	X4	
2012	108.85	0.45				0.22				1.89				0.50
2012	3.00		0.99				0.36				2.75			0.62
2016	59.74			0.53				0.23				2.30		0.55
2016	5.01				1.15				0.34				3.44	0.71

Note: * Delogarithmised equation constant (free expression); ** in countries above or close to the EU innovation average and in those below this average (as presented in Table 1) from the total innovative expenditure per one enterprise (X1, X2, X3 and X4) conducting innovative product and process activities in EU countries (as presented in Table 1) in 2012 and 2016. The range of the level of significance of the parameters: 0.00 - 0.05.

Source: Eurostat Statistics Database (inn_cis8_exp); European Innovation Scoreboard (2017). Author's calculations.

Regression coefficients (parameters) at X1, X2, X3 and X4 indicate flexibility (elasticity coefficients) (Solow 1956) of the value of sales of new innovative products with respect to the total innovation expenditure above or close to the EU innovation average and below the EU innovation average in enterprises and EU countries (Table 2).

The elasticity of the value of sales of new innovative products was at its highest in relation to the total innovative expenditure in enterprises and countries below the EU innovation average in 2016 (1.15). This fact points to the type of a regressive relationship of more than proportional nature, which is, therefore, to be interpreted as curvilinear. In contrast, in the same group of countries in 2012, the elasticity of the value of sales of new innovative products with respect to the total innovative expenditure amounted to 0.99. We are dealing with a constant regressive relationship, which assigns the same value of the dependent variable Y2 = X2 to each independent variable.

The elasticity of the value of sales of new innovative products with respect to the total innovation expenditure in countries above or close to the EU innovation average is less 2.17 times (0.53) lesser than in countries below the EU innovation average in the same year, that is in 2016. In contrast, in countries above the EU innovation average or those which are close to it, the elasticity of sales of new innovative products with respect to the total innovation expenditure was at its lowest in 2012 and amounted to 0.45. The nature of dependencies in countries above or below the EU innovation average was less than proportional and curvilinear in 2012 and in 2016.

The 10%, increase in total innovation expenditure in countries below the EU innovation average with the other expenditures remaining unchanged, is associated with an increase in the value of sales of new innovative products, and in 2012 it amounted to 9.9% and to 11.5% in 2016. In the wake of the wave, the increase in total innovative expenditure by 10% between 2012 and 2016 resulted in an increase in the value of sales of new innovative products by 1.6%. In contrast, in countries above the EU innovation average or those close to it, the 10% increase in the total innovation expenditure (with the other expenditure remaining unchanged) caused a surge in sales of new innovative products by 4.5% in 2012, and by 5.3% in 2016. In countries which are above the EU innovation average or close to it in the wave period, with a 10% increase in the total innovative expenditure, the increase in the value of sales of new innovative products amounted to 0.8%. At the same time, the increase in the

value of sales of new innovative products was twice as high in countries below the EU innovation average. This is explained by the theory of international integration, from which it follows that the actual integration benefits occur when the economies of various countries are competitive. Such a condition engenders trade, which consists in shifting production from economies with higher costs to lower-cost economies. The range of total innovative expenditure is smaller, and the value of sales of new innovative products is higher in the economies of countries below the EU innovation average (Table 1). The low level of innovative expenditure leads to a faster shrinkage of enterprises than in the case of those that respond to the Chinese competition (Bloom, Draca and Van Reenen 2016).

As a result of the liberalisation of the internal EU turnover, more costly production in countries is replaced by cheaper imports from other member states, while cheaper production from these countries gets exported to other EU member states (production effect). The effect of trade creation is beneficial because it leads to lower production costs and savings in production factors in EU countries. The consumers of EU countries also gain in this situation (price decrease), while the released factors are shifted to another production where their productivity will be higher. The total EU national income is thus also growing, as does the competition of the integrated economic group. Trade integration also induces long-term effects such as growth in production and trade efficiency, allocation efficiency, economies of scale, dynamic efficiency over time, as well as economic growth in EU member states. The increase in the innovation level in rich countries in the sectors where China wields relative benefits, reduces the standard trade profits (Levchenko and Zhang 2010).

The econometric analysis of the macroeconomic classic function of the Cobb-Douglas form has a significant interpretive meaning for the parameters which express the average elasticity of the value of sales of new innovative products versus the total innovation expenditure in the studied groups of EU countries (Table 1). They also allow for determining the marginal and average productivity of these outlays. The indicated changes in marginal and average productivity in the examined EU member states and in the surveyed years allow for a determination of the areas of rational management of the total innovative expenditure in the studied groups of countries.

Table 3 presents the marginal and extreme productivity of the total innovative expenditure in EU countries above the EU innovation average or close to it in 2012.

Table 3. Marginal and average productivity of the total innovative expenditure in EU countries above or close to the EU innovation average in 2012

Value of sales of new innovative products (Y1) expressed in thousand EUROS.	Total innovative expenditure (X1) expressed in thousand EUROS.	Productivity:	
		mean EURO/EURO	marginal EURO/EURO
1,701.27	450.00	3.78	1.70
2,034.99	670.00	3.04	1.37
2,312.35	890.00	2.60	1.17
2,554.02	1,110.00	2.30	1.04
2,770.52	1,330.00	2.08	0.94
2,968.09	1,550.00	1.91	0.86
3,150.77	1,770.00	1.78	0.80
3,321.33	1,990.00	1.67	0.75
3,481.81	2,210.00	1.58	0.71
3,633.72	2,430.00	1.50	0.67

Source: Author's calculations based on the data from Table 1 and Table 2

The data in Table 3 show that the marginal productivity of the total innovative expenditure decreases (up to zero), while also causing a decrease in the productivity of the average expenditure, albeit at a slower pace. The nature of these changes means that the global productivity of these outlays (which has not been included) increases, while the rate of this growth is tending towards zero. The nature of the changes in marginal productivity and in the average of the total of innovation expenditure indicates that the total innovative expenditure in the rational management zone was used in the group of countries above the EU innovation average or those close to this mean in 2012.

In turn, the data in Table 4 show that the marginal productivity of total innovative expenditure in the group of countries below the EU innovation average decreases until it gets equal with the mean productivity of these outlays, which continues to grow, whereas the global productivity of these expenditures (which was not included therein) is grows at a slower pace. The nature of these changes unfolds in the initial irrational management zone, and thus in the zone of the start of a wave of innovation in this group of EU countries in 2012.

Table 4. Marginal and average productivity of total innovative expenditure in EU countries below the EU innovation average in 2012

Value of sales of new innovative products (Y2) expressed in thousand EUROS.	Total innovative expenditure (X2) expressed in thousand EUROS.	Productivity:	
		mean EURO/EURO	marginal EURO/EURO
847.30	299.00	2.83	2.81
1,107.83	392.00	2.83	2.80
1,367.75	485.00	2.82	2.79
1,627.16	578.00	2.82	2.79
1,886.15	671.00	2.81	2.78
2,144.78	764.00	2.81	2.78
2,403.10	857.00	2.80	2.78
2,661.14	950.00	2.80	2.77
2,918.92	1,043.00	2.80	2.77
3,176.48	1,136.00	2.80	2.77

Source: Author's calculations based on the data from Table 1 and Table 2

Table 5. Marginal and average productivity of total innovative expenditure in EU countries above the EU innovation average or close to it in 2016

Value of sales of new innovative products (Y3) expressed in thousand EUROS	Total innovative expenditure (X3) expressed in thousand EUROS	Productivity:	
		mean EURO/EURO	marginal EURO/EURO
1,342.41	355.00	3.78	2.23
1,707.63	559.00	3.05	1.80
2,013.74	763.00	2.64	1.56
2,283.19	967.00	2.36	1.39
2,526.97	1,171.00	2.16	1.27
2,751.48	1,375.00	2.00	1.18
2,960.79	1,579.00	1.88	1.11
3,157.73	1,783.00	1.77	1.04
3,344.34	1,987.00	1.68	0.99
3,522.13	2,191.00	1.61	0.95

Source: Author's calculations based on the data from Table 1 and Table 2

It follows from the data shown in Table 5 that in the group of countries above the EU innovation average or in those close to it, the marginal productivity of the total innovative expenditure is decreasing (up to zero), while it also affects the decrease of the average productivity of these expenditures at a slower rate. The not included, global productivity is then growing, albeit tending towards zero. The nature of these changes indicates the zone of rational management of the total innovative expenditure in 2016.

The data included in Table 6 present the dependencies of the productivity category of the total innovative expenditure recorded in the EU group of countries below the EU innovation average in 2016. With the increase of the total innovative outlays, their marginal productivity increases and exceeds the average productivity of such expenditure, which is then growing more slowly. The global productivity of these outlays (not included) is increasing faster and faster. However, this is characteristic of the initial zone of irrational management, which is the entrance zone for the commencement of the innovation wave.

Table 6. Marginal and average productivity of total innovative expenditure in EU countries below the EU innovation average in 2016

Value of sales of new innovative products (Y4) expressed in thousand EUROS	Total innovative expenditure (X4) expressed in thousand EUROS	Productivity:	
		mean EURO/EURO	marginal EURO/EURO
3,278.96	279.00	11.75	13.52
4,649.51	378.00	12.30	14.15
6,075.58	477.00	12.74	14.65
7,547.05	576.00	13.10	15.07
9,057.13	675.00	13.42	15.43
10,600.92	774.00	13.70	15.75
12,174.69	873.00	13.95	16.04

Value of sales of new innovative products (Y4) expressed in thousand EUROS	Total innovative expenditure (X4) expressed in thousand EUROS	Productivity:	
		mean EURO/EURO	marginal EURO/EURO
13,775.51	972.00	14.17	16.30
15,401.01	1,071.00	14.38	16.54
17,049.24	1,170.00	14.57	16.76

Source: Author's calculations based on the data from Table 1 and Table 2

The established levels of marginal productivity and the average total innovation expenditure in EU countries above or close to the EU innovation average indicate that the use of total innovative expenditure in both 2012 and 2016 remained well within the rational management zone. In contrast, in countries below the EU innovation average, although marginal productivity equaled the average productivity of total innovative expenditure in 2012, while in 2016, the marginal productivity of these expenditures grew faster than the average productivity of total innovative expenditure, both values were growing five times faster in 2016 compared to 2012, however, in these years, they remained in the entrance zone of irrational management.

Table 7. An average growth rate of the value of sales of new innovative products (Y1, Y2, Y3 and Y4)*

Specification	Table 3	Table 4	Table 5	Table 6
Value of sales of new innovative products (Y1)	8.80			
Value of sales of new innovative products (Y2)		15.82		
Value of sales of new innovative products (Y3)			11.31	
Value of sales of new innovative products (Y4)				20.10
Total innovative expenditure (X1)	20.61			
Total innovative expenditure (X2)		15.92		
Total innovative expenditure (X3)			22.41	
Total innovative expenditure (X4)				17.27
Productivity: - marginal - average	 -9.79 -9.79	 -0.15 -0.15	 -9.07 -9.07	 2.42 2.42

Note: within the range of total innovative expenditure (X1, X2, X3 and X4) and an average growth rate of marginal and average productivity of the total innovative expenditure in EU countries in 2012 and 2016%.

Source: Author's calculations based on the data presented in Table 3, Table 4, Table 5 and Table 6 using a dynamics based on variables and the geometric mean.

The growth rate within the range of total innovation expenditure in groups of countries above or close to the EU innovation average and those below the EU innovation average in 2012 and 2016 has been shown in Table 7.

Conclusion

The conducted research confirms the hypothesis that the productivity of total innovative expenditure remains in the entry zone of irrational management in the group of countries below the EU innovation average, and in countries above the EU innovation average or those close to, it is located in the rational management zone.

The intensity of total innovative expenditure in enterprises and EU countries, although it differentiates the marginal and average productivity of the total innovative expenditure and their rationality of management, yet in countries below the EU innovation average the implementation of total innovative expenditure increases their marginal and average productivity, even in the case of irrational management of these outlays. In contrast, in EU enterprises and countries above the EU innovation average or those close to it, the wave of innovation gets blurry over time, while marginal productivity and average innovation expenditure, although they are lower while being relatively stable and remaining in the rational management zone in the economies of these EU countries. In contrast, in countries below the EU innovation average, shaping the marginal and average productivity of total innovation expenditure situates these member states in the initial irrational management zone and characterizes the continuous commencement of the wave, making it difficult to identify it.

The real benefits of integration in the EU are obtained in countries above or close to the EU innovation average (Table 1). This is due to the increase in competitiveness, especially in the group of countries with an increase in the effect of the trade creation, which occurs by means of shifting (turnover) of production from these economies, from those with cheaper production to those with more expensive production, albeit within the grouping. It is a production effect. The effect of trade creation is beneficial since it leads to lower production costs and savings in production factors.

Consumers also gain from this effect as prices fall. The released factors of production are allocated on the scale of the integrated area, which is consistent with the principle of cost minimization. Productivity and the competition's cost advantage are on the increase. Lowering the price level intensifies consumption and leads to a lower new price balance. It is then that the level of innovation and the number of new innovative products are growing.

The EU Innovation Index used to classify the sets of countries with a structured innovation implementation allowed for a spatio-temporal determination of the regressive dependence of the value of sales of new innovative products on the total innovation expenditure in enterprises and countries. In turn, this dependence made it feasible to assess the efficiency of innovation management in EU member states.

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Earnings Management During the Oil Price Crisis

Abbullah BUGSHAN
School of Business, Western Sydney University, Australia
Assb1399@gmail.com

George LAFFERTY
School of Business, Western Sydney University, Australia
G.Lafferty@westernsydney.edu.au

Walid BAKRY
School of Business, Western Sydney University, Australia
W.Bakry@westernsydney.edu.au

Yongqing LI
School of Business, Western Sydney University, Australia
Yongqing.Li@westernsydney.edu.au

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Abstract

This paper investigates the impacts of oil price crisis on earnings management behaviour in Gulf Cooperation Council (GCC) countries. Starting in mid-2014, oil prices began to fall drastically, hereafter this is referred to as the oil price crisis. Earnings management is measured in terms of accrual based earning management (AEM) and real activity based earnings management (REM). The modified Jones model is adopted to estimate AEM, and three models from Roychowdhury (2006) are used to estimate REM. The results reveal that companies have tended to use downward REM during the oil price crisis, engaging less with AEM. Control variables covering firm characteristics, including ROA, leverage, growth and OCF exhibit significant relationships with EM. The present study examines EM during the oil price crisis, considering both accrual and real activity earnings management. In contrast to most previous research in this domain which has only considered upward REM, a non-directional approach is used herein whereby the absolute (unsigned) term is applied to capture this metric.

Keywords: earnings management; discretionary accruals; real earnings management; gulf cooperation council.

JEL Classification: M41; G34; O16; D53.

Introduction

The oil price crisis which began in mid-2014 has had varying effects on different nations. Although countries consuming oil have tended to benefit from declining prices, economies whose incomes rely on the production and selling of oil were impcted negatively (Besso and Feubi 2017). GCC countries (Bahrain, Kuwait, Oman, Saudi Arabia, Qatar, and the United Arab Emirates) rely heavily on oil income, which accounts for about 80% of their revenues and more than 50% of GDP. This region contributes more than 25% to global oil production and contains about 30% of the world's crude oil reserves. Changes in oil prices impact significantly on GCC economic activites because these activities are dependent on government spending, which in turn is dependent on income from oil (Colacelli *et al.* 2016).

Firms´ profits are strongly affected by economic crises and economic slowdowns. This may lead managers to resort to earnings management (EM) to meet pre-determined targets and the expectations of market participants (Chia *et al*. 2007). In addition, large fluctuations in profits increase companies´ financing costs. Managers may aim to control earnings to eliminate large declines in profits, or to avoid reporting losses (Goel and Thakor 2003). However, managers may decide to push profits downwards to take a "big bath" by saving profits for a future period or to obtain concessions from banks and lenders. The probability of banks accepting such concessions during crisis periods is high due to the lower asset market value of the firm (Shleifer and Vishny 1992). However, some studies have found that these periods coincide with higher scrutiny by auditors and market regulators, which may constrain managers from attempting to manipulate earnings (Rohde 2011, Xu *et al.* 2013, Pisedtasalasai and Rujiratpichathorn 2017).

The main objective of this paper is to examine the earnings management practices of companies in GCC countries in response to the oil price crisis.

There is a rich literature examining managerial decisions related to accrual earnings management (AEM) behaviors during the Asian financial crisis and the global financial crisis. For example, prior research has revealed that companies tended to decrease AEM during the global financial crisis to restore investors' confidence and moderate the undesirable impacts of the crisis on companies. Also, companies audited by the Big-4 auditing firms reported lower AEM compared to those audited by other firms (Arthur *et al.* 2015, Cimini 2014, Dimitras *et al.* 2015). In addition, according to Saleh and Ahmed (2005) distressed companies that violated their debt covenants and re-negotiated debt contracts during the Asian financial crisis engaged in upward AEM in the two to three years preceding the crisis and downward AEM during financial difficulties.

The dramatic decline in oil prices has affected the fiscal incomes of GCC countries; the average surplus of 9.2% of GDP in 2013 had fallen to a deficit of 10.4% of GDP in 2016 (Khan *et al*. 2017). As a result, the governments of these countries established coordinated initiatives to diversify their incomes. The removal of fossil fuel subsidies (FFSs) is key in this respect, as annual spending on FFSs in GCC countries is around $160 billion, which accounts for more than 11% of their GDP (Guzansky and Feldman 2015). Removing energy subsidies not only decreases the burden on GCC governments' budgets, but also plays to the global agenda vis-à-vis "getting the price right" (Lahn 2016). Rentschler and Kornejew (2016) suggest that local firms´ loss of competitiveness is one of the main challenges faced by governments that have implemented energy reforms in the past, and it is also a proximate concern for policymakers in GCC countries. Therefore, GCC governments have established step-by-step plans to remove FFSs, and the impact of doing so on all salient stakeholders will be closely monitored (Rodriguez *et al*. 2015).

This study argues that the suggested energy price reforms may create an incentive for firms to manage earnings downward for two possible reasons. First, reporting lower profits may increase the possibility of obtaining political advantage (Makhtaruddin *et al.* 2018), as GCC governments carefully observe the impact of each stage of the reforms in the private sector, and their assessment most likely will be largely measured based on accounting data. In doing so, companies aim to delay the phasing out of energy subsidies. Second, poor performance is largely anticipated by market participants, and managers are less likely to receive bonuses during the oil crisis (Filip and Raffournier 2013). Therefore, companies are incentivized to strategically report lower profits during this period.

This paper uses data for a sample of listed companies in GCC countries for the period between 2007 and 2016. Results suggest that companies engaged more in downward REM during the oil price crisis whilst the magnitude of AEM decreased. The findings of this study support the view that companies preferentially use REM during periods of high scrutiny. Downward REM implies that companies incentivized to lower the reported profits to gain political advantage.

This study offers a number of contributions to the accounting literature. First, despite the large impact of the sharp decline in oil prices on oil producing countries, there is no up-to-date study examining EM behavior during this period. This period is unlike the earlier global financial crisis and the Asian financial crisis, which were associated with the loss of investors' confidence (Bukalska and Krol 2020), the failure of financial institutions and large corporations, and substantial government interventions (Statman 1999, Choi *et al.* 2011, Arthur *et al.* 2015). Bukalska and Krol (2020) showed that there was a sharp decline in the confidence during the financial crisis and the provision for loan-losses increased dramatically.

The oil price crisis is a unique event because it is associated with energy price reforms. The gradual removal of subsidies may encourage managers to exaggerate the impact of subsidy cuts on firms´ performance. Second, most previous studies concerned with EM quality during the crisis have focused on accrual earnings management. This paper extends the scope of prior literature by considering both accrual and real activity earnings management. If the use of AEM declines, it may not be the case that EM behaviors have declined overall; instead it may be that one type of EM has been substituted by another type to avoid scrutiny (Cohen *et al.* 2008). Third, this paper uses the absolute (unsigned) term to capture AEM and REM, rather than pre-empting their direction[1]. Fourth, there is only a limited amount of extant research investigating earnings management in GCC countries, most of which was

[1] It is common practice in the EM literature to use the absolute value of discretionary accrual ABS_DA as a proxy for accrual quality (AEM). The rationale is that this discretionary accrual reverses over time, and it can be employed for income increasing and decreasing EM. Most existing research related to real earnings management has considered income increasing REM. However, Francis *et al.* (2016b) found evidence that companies use downward earnings management around different corporate events. There is a growing interest in the use of the absolute value of REM as a measure of deviation of real operations (*e.g.* Francis *et al*. 2016a, Mao and Renneboog 2015, Ascioglu *et al.* 2012).

carried out in national settings. This study explores the regional context using panel data and is thus more comprehensive and amenable to generalization.

The remainder of the paper is structured as follows. The next section reviews the relevant literature and develops the study's hypotheses. The methodology is then delineated and described before a presentation of descriptive inferential results. Finally, conclusions are offered including a discussion of the study´s limitations.

1. **Literature Review and Hypotheses**

1.1. Accrual Earnings Management

The evidence concerning EM behaviors is mixed. Studies have found that managers are encouraged to manipulate earnings downwards during a crisis. This may allow companies that fail to repay debts to obtain concessions from banks and lenders. The probability of banks accepting such concessions during crisis periods is high, due to the lower asset market value of the firm (Shleifer and Vishny 1992). In addition, during crisis periods, governments are more likely to offer support to financially distressed companies. For example, during the Asian financial crisis, the Malaysian government played a role in facilitating debt repayments (Ahmed *et al.* 2008). However, companies may be incentivized to use upward EM to increase reported profits to avoid breaching a debt covenant (Dichev and Skinner 2002), to avoid a large decline in stock price (Charitou *et al.* 2007).

In contrast, some studies have suggested that, during the global financial crisis, the vigilance of investors and auditors, along with market panic, created an incentive for managers to maintain reporting quality and lower AEM. Filip and Raffournier (2013) studied the impact of the global financial crisis on the EM behavior of European firms. They found that EM and income smoothing are affected by national economic conditions: earnings quality improved and income smoothing decreased during the crisis compared to the pre-crisis period. However, the level of income smoothing differs widely from country to country, depending on the nature and extent of relevant legislation and corporate governance practices. Consistent with this, Dimitras *et al.* (2015) focused on a sample of distressed European firms that were audited by one of the Big-4 firms using discretionary accruals as a proxy for EM. They found that companies tended to reduce the use of AEM during periods of recession.

Further, Arthur *et al.* (2015) examined accrual quality in 14 European countries during the global financial crisis. They found that during the crisis, earnings quality represented by accruals was higher compared to that in the pre-crisis period. The authors attributed higher earnings quality to the need to obtain investors' confidence, which was greatly affected by the crisis. Moreover, during the crisis, auditors' business risks increased because it became difficult to assess the actual economic situations of businesses, and they faced pressure from regulating bodies. Tano (2014) examined the impact of the financial crisis on accruals and audit quality in the Swedish market. They found that audit quality was higher both during and after the global financial crisis, compared to before it. Whilst Xu *et al.* (2013) found that "ongoing concern opinions" by auditors increased during the crisis period compared to before it. They attributed this to increased pressure from regulatory bodies and the increased risk of reputational damage incurred through giving inaccurate opinions. One strategy employed by auditors in response to this was boosting audit efforts.

In addition, a number of studies have found that the implementation of international financial reporting standards (IFRS), considered high quality standards, leads to lower AEM (Adibah Wan *et al.* 2013). However, Gideon *et al*. (2018) didn't find any difference between IFRS and rules-based standards.

1.2. Real Earnings Management

Whilst the foregoing literature has focused on accrual-based earnings management, other studies have posited that companies may use real earnings management. For instance, Graham *et al*. (2005) found that managers have an incentive to increase their reported income by employing REM. More specifically, 80% of respondents reported that they reduce spending on research and development (R&D), advertising, and maintenance to increase profits; whilst 55% reported that they would delay new projects, even if the consequences of the delay required a small sacrifice. Hsiao *et al.* (2017) found that managers use their discretion over R&D investments to meet targets. Further, there is evidence to suggest that during periods of high scrutiny, managers employ REM more than AEM. For example, Cohen *et al.* (2008) investigated implementation of the Sarbanes-Oxley (SOX) Act on the use of AEM and REM in the US market. The study found that while firms tended to use AEM more before the SOX Act was implemented, REM was increasingly used after the Act's passage. In other words, firms were more inclined to use REM after the increase in corporate governance requirements and directors' responsibilities. Ho *et al.* (2015) found that after the adoption of the new accounting standards related to auditing and disclosure requirements, companies tended to reduce their reliance on AEM and shift to REM.

There are a few existing studies which have examined REM in crisis contexts. Xu and Ji (2016) examined AEM and REM during the global financial crisis for leading sectors in the Chinese market. They found that companies use both AEM and REM although there were systematic sectoral trends in terms of which type of EM predominates. The recent significant decline in oil prices has impacted fiscal incomes in GCC countries. As a result, GCC governments took initiatives to incrementally remove FFSs and thus decrease budgetary pressures. Companies may conceivably influence governments' decisions at any stage via reporting poor performance and exaggerating the impact of FFS cuts on their competitiveness, or even their survivability. When assessing the impact of the reforms on the private sector, governments will depend, at least partly, on information concerning companies' financial performance.

1.3. Hypotheses

Despite FFS cuts possibly creating an incentive for firms' to manage earnings downward, AEM is more likely to be constrained during periods of significant economic slowdown due to careful monitoring by regulating bodies, auditors, and investors (Chia *et al.* 2007, Cohen *et al.* 2008, Tano 2014). Therefore, if managers have an incentive to manage earnings, they may shift from AEM to REM as the latter is more difficult to detect. Accordingly, we posit two hypotheses to be subjected to inferential testing:

H1: Companies in GCC markets have tended to engage less in accrual-based earnings management during the oil price crisis.

H2: Companies in GCC markets have tended to engage more in real-activity earnings management during the oil price crisis.

2. **Data and Research Design**

2.1. Sample

To test the hypotheses, financial data are collected from Data Stream, companies' annual financial reports, and the official website for GCC financial markets. Specifically, a sample is constructed for companies listed in six GCC markets for the period from 2007 to 2016. Financial institutions such as banks and insurance companies are excluded from the sample because they have different financial disclosure requirements (Rusmin 2010).

As market regulation may vary from country to country, the sample includes only companies that follow international financial reporting standards (IFRS) in preparing their financial statements. Therefore, companies listed in Saudi Arabia were excluded as the first financial reports following IFRS in that country were not released until January 2017. Industries with fewer than 15 observations for each industry-year are also excluded. The final sample consists of 2,149 firm-year observations from five countries during the period 2007 to 2016. As shown in Table 1, the largest number of firm-year observations stems from Kuwait (737 firm-year observations) followed by Oman (714 firm-year observations). There are 424 observations for the United Arab Emirates and 166 from Qatar. Bahrain only constitutes 5% of the total sample, with 108 firm year observations. The observations pertain to six different industries: Consumer Discretionary, Consumer Staples, Industry, Materials, Real Estate, and Utilities.

Table 1. Variable definitions

Variable	Definition
DACC	Discretionary accruals earnings management measured using the modified Jones model.
ABS_DA	Absolute value of accrual earnings management
DA_P	Positive value of accrual earnings management
DA_N	Absolute value of negative value of accrual earnings management
An_OCF	Abnormal cash flow estimated using the Roychowdhury (2006) model. This measure is
An_PrCost	Abnormal production costs estimated using the Roychowdhury (2006) model.
An_Expn	Abnormal discretionary expenses estimated using the Roychowdhury (2006) model This
RMBS2	Sum of the absolute values of An_Expn and An_OCF.
RMBS3	Sum of the absolute values of An_PrCost and An_Expn.
RMBS	Sum of the absolute values of An_Expn, An_OCF, and An_PrCost.
RM	Sum of three signed proxies of real earnings management: An_Expn, An_OCF, and
RM_N	Absolute value of negative value of real earnings management.
RM_P	Positive value of real earnings management.

2.2 Measuring Accrual-based Earnings Management

This study uses a cross-sectional version of the modified Jones model developed by Dechow *et al.* (1996) to estimate AEM for each industry-year (Equation 1).

$$TAccr_{i,t} = \alpha_1 \frac{1}{Assets_{i,t-1}} + \alpha_2 \frac{\Delta Rev_{i,t} - \Delta AR_{i,t}}{Assets_{i,t-1}} + \alpha_3 \frac{PPE_{i,t}}{Assets_{i,t-1}} + \varepsilon_{i,t} \quad (1)$$

where: TAccr is total accruals calculated as the difference between operating cash flow (OCF) and net income; ΔRev is the change in revenue from the previous year; ΔAR is the change in accounts receivable from the previous year; PPE is the net amount of property, plant and equipment.

The discretionary accrual is the estimated residual from Equation 1, and the absolute value of the discretionary accrual is our proxy for AEM. In addition, we split the discretionary accrual into two groups: positive accruals (DA_P) and negative accruals (DA_N). The absolute value of negative accruals is used, so the higher value indicates higher negative AEM. All variables are summarized and defined in Table 2.

Table 2. Variable definitions for Equations 7 and 8

Variable	Definition
REM	Different measures of real earnings management: RMBS2, RMBS3, RM, RM_P, and RM_N, estimated using the Roychowdhury (2006) model.
AEM	Different measures of accrual earnings management, ABS_DA, DA_P, and DA_N, estimated using the modified Jones model.
Oil_Cri	Dummy variable that equals 1 if year coincides with the period of sharply declining oil prices (2014, 2015, and 2016), else 0.
ROA	Net income divided by lagged total assets of the firm.
Size	Firm value measured as the natural logarithm of the firm's total assets.
Growth	Change in assets from the preceding year.
Leverage	Total liabilities divided by assets.
OCF	Operating cash flow divided by lag total assets.
$Year$	Dummies for each year from 2007 to 2013. We exclude 2014 to 2016 to avoid multicollinearity with the oil price crisis period.

2.3. Measuring real earnings management

Three models from Roychowdhury (2006) are used to measure REM as a function of abnormal cash flow, abnormal production costs, and abnormal discretionary expenses. Abnormal operating cash flow occurs as a result of management's implementation of lenient credit policy. It is worth noting that this measure is vague because it is directly influenced by other REM measures (Roychowdhury 2006). For instance, increases in operating cash flow may occur as a result of decreasing discretionary expenses. On the other hand, reductions in operating cash flow may occur because of overproduction.

Normal operating cash flow for each industry and year is expressed as a function of sales and changes in sales (Equation 2).

$$\frac{OCF_{i,t}}{Assets_{i,t-1}} = \alpha_0 + \alpha_1 \frac{1}{Assets_{i,t-1}} + \alpha_2 \frac{Sales_{i,t}}{Assets_{i,t-1}} + \alpha_3 \frac{\Delta Sales_{i,t}}{Assets_{i,t-1}} + \varepsilon_{i,t} \quad (2)$$

OCF is the operating cash flow. Sales represent the firm's revenue, and ΔSales is the change in revenue from the previous period to the current period. The predicted coefficient on normal cash flow is then deducted from actual operating cash flow and the residual is the abnormal operating cash flow.

The second measure of real earnings management is production costs. The normal level of production costs is calculated as the sum of the cost of goods sold (Equation 3) and the change in the level of inventory (Equation 4).

$$\frac{COSG_{i,t}}{Assets_{i,t-1}} = \alpha_0 + \alpha_1 \frac{1}{Assets_{i,t-1}} + \alpha_2 \frac{Sales_{i,t}}{Assets_{i,t-1}} + \varepsilon_{i,t} \quad (3)$$

$$\frac{\Delta Inve_{i,t}}{Assets_{i,t-1}} = \alpha_0 + \alpha_1 \frac{1}{Assets_{i,t-1}} + \alpha_2 \frac{\Delta Sales_{i,t}}{Assets_{i,t-1}} + \alpha_3 \frac{\Delta Sales_{i,t-1}}{Assets_{i,t-1}} + \varepsilon_{it} \quad (4)$$

COGS in Equation 3 represents the cost of goods sold and ΔInve in Equation 4 refers to the change in inventory. The normal level of production is estimated as per Equation 5.

$$\frac{Production_{i,t}}{Assets_{i,t-1}} = \alpha_0 + \alpha_1 \frac{1}{Assets_{i,t-1}} + \alpha_2 \frac{Sales_{i,t}}{Assets_{i,t-1}} + \alpha_3 \frac{\Delta Sales_{i,t}}{Assets_{i,t-1}} + \alpha_4 \frac{\Delta Sales_{i,t-1}}{Assets_{i,t-1}} + \varepsilon_{i,t} \quad (5)$$

Discretionary expenses include selling, general and administrative expenses (SG&A) as well as advertising and R&D expenses[2].

Following the literature, discretionary expenses are estimated as a function of lagged sales instead of current sales. This is because if firms use sales increases to manipulate earnings, the reported residual will be significantly lower (Cohen *et al.* 2008).

$$\frac{Discr\_Expen_{i,t}}{Assets_{i,t-1}} = \alpha_0 + \alpha_1 \frac{1}{Assets_{i,t-1}} + \alpha_2 \frac{Sales_{i,t-1}}{Assets_{i,t-1}} + \varepsilon_{i,t} \quad (6)$$

The residuals in Equations 2, 5, and 6, are estimated for each industry-year with a minimum of 15 observations. REM is measured as the difference between actual and estimated values. This process creates the three initial measures of REM which are required: abnormal cash flow (An_OCF), abnormal discretionary expenses (An_Expn), and abnormal production costs (An_PrCost). An_OCF and An_Expn are multiplied by -1 so that higher values indicate higher EM.

Following earlier literature (Cohen and Zarowin 2010, Zang 2012, Francis *et al*. 2016a), these three measures are combined into two proxies that capture the aggregate effects of REM. The first proxy is RMBS2, which is the sum of the absolute values of An_Expn and An_OCF. The second proxy is RMBS3, which is the sum of the absolute values of An_Expn and An_PrCost. To explore the robustness of salient results, we generate a third measure, RMBS, which is the sum of the three measures of REM: An_OCF, An_Expn, and An_PrCost. Th absolute value of REM is used herein because REM could occur in either direction. The absolute value captures reversals over time (Francis *et al.* 2016a). Further, we report the signed residuals which include the sum of the three REM measures; we denote this as RM and split it into positive (RM_P) and negative (RM_N) groups for comparison. The absolute value of negative group is used in the analysis, so the higher value indicates higher negative REM.

2.4. Regression Models

Equations 7 and 8 are estimated to test the relationship between earnings management measures and the oil price crisis in GCC countries. Hausman tests are employed to determine if random effects or fixed effect models are preferred (Baltagi *et al*. 2003). Three generalized least squares (GLS) regression models are estimated to test Hypothesis H1 (Equation 7, variable definitions in Table 3).

$$AEM_{i,t} = \beta_0 + \beta_1 OilCri_{i,t} + +\beta_2 ROA_{i,t} + \beta_3 Leverage_{i,t} + \beta_4 Growth_{i,t} + \beta_5 Size_{i,t} + + \beta_6 OCF_{i,t} + \beta_7 Year + \varepsilon_{i,t} \quad (7)$$

Accrual earnings management (AEM) is the dependent variable. Companies may use income increasing or income decreasing approaches during the period of economic slowdown. Therefore, we use three proxies for AEM as dependent variables: the absolute value (ABS_DA) of the estimated residual from the modified Jones model, positive accrual (DA_P), and negative accrual (DA_N).

The oil price crisis (Oil_Cri) is a dummy independent variable, which takes the value 1 if the observation falls between 2014 and 2016, inclusive, else 0. Hypothesis H1 anticipates a negative sign for Oil_Cri with ABS_DA. Several control variables that relate to EM are also included.

Next, Equation 8 is used to test H2.

$$REM_{i,t} = \beta_0 + \beta_1 Oil_{Cri_{i,t}} + \beta_2 ROA_{i,t} + \beta_3 Size_{i,t} + \beta_4 Leverage_{i,t} + \beta_5 Growth_{i,t} + +\beta_6 OCF_{i,t} + \beta_7 DACC_{i,t} + \beta_8 Year_{i,t} + \varepsilon_{i,t} \quad (8)$$

The dependent variable is real earnings management. Recent studies suggest that REM may occur in either direction, upwards and downwards (Francis *et al.* 2016b, Kim and Sohn 2013). Therefore, the absolute values of REM proxies are used as dependent variables, RMBS2 and RMBS3. Also, the estimated residual RM (signed) and subgroups RM_P, and RM_N are reported. The subgroups explain whether the direction of RMBS2 and RMBS3 is derived by increases are decreases in income.

Hypothesis 2 anticipates a positive sign for Oil_Cri with RMBS2 and RMBS3. The model includes several control variables that are related to EM.

[2] These three items are included under selling, general and administrative expenses (SG&A) in the Datastream database.

Table 3. Sample summary

Country	N	% of total	Consumer Discretionary	Consumer Staples	Industry	Material	Real Estate	Utility
Bahrain	108	5%	51	18	20	12	7	0
Kuwait	737	34%	102	56	276	39	254	10
Oman	714	33%	142	197	195	79	0	101
Qatar	166	7.7%	20	29	74	0	33	10
UAE	424	20%	61	96	187	0	61	19
Total	2,149	100%	376	396	752	130	355	140
%Total			17.5%	18.4%	35%	6%	16.5%	6.5%

2.5. Control Variables

Several control variables are used in Equations 7 and 8. Return on assets is included, measured as net income to lagged total assets, to control for firm performance. Previous research has found that profitability has a negative impact on earnings management (Kothari *et al.* 2005). Firm size is also included as a control Variable, as the level of monitoring in small firms is lower. Thomas and Ahmed (2018) found that large companies tend to disclose more financial information compared to small firms. Following prior research, assets growth is also added as a control variable: high growth firms have a greater incentive to manage earnings (Skinner and Sloan 2002).

Prior research provides mixed evidence concerning the impact of leverage on earnings management. Alsharairi and Salama (2012) found that firms with higher leverage exhibit a lower propensity to manage earnings, due to higher scrutiny by lenders. However, Muradoglu and Sivaprasad (2012) documented a positive relation between abnormal earnings and leverage. Anagnostopoulou and Tsekrekos (2017) revealed a positive relation between leverage and real earnings management, but not accrual earnings management. Siregar (2018) documented positive relationship between leverage and earnings management. Therefore, leverage is added as a control variable. Also, we control for firms operating cash flow (OCF). Prior literatures find a relationship between EM and OCF (Becker *et al.* 1998).

3. Results

3.1. Descriptive Statistics

Table 4 presents descriptive statistics for the variables.The magnitudes of the absolute terms of REM proxies are higher than those for the AEM proxies for the mean, median, 25th and 75th percentile. In addtion, the values of positve and negative subgroups of REM proxies are higher than the AEM proxies which supports the hypotheses of this study, as companies employ more REM during the crisis than AEM.

Table 4. Descriptive statistics

Variable	Mean	Median	SD	25th percentile	75th percentile
Firm characteristics					
ROA	0.06	0.05	0.09	0.02	0.10
Size	12.1	12.12	1.77	10.83	13.3
Leverage	0.41	0.38	0.24	0.21	0.58
Growth	.07	0.02	0.22	-0.04	0.11
OCF	0.07	0.06	0.09	0.018	0.12
Estimated (signed) earnings management proxies					
DiAc	0.00	0.00	0.08	-0.04	0.04
REM	0.00	0.01	0.20	-0.10	0.11
Absolute (unsigned) value of estimated earnings management proxies					
ABS_DA	0.06	0.04	0.06	0.02	0.08
RMBS	0.18	0.14	0.15	0.08	0.23
RMBS2	0.11	0.09	0.10	0.05	0.14
RMBS3	0.12	0.08	0.12	0.04	0.16
Sub-groups of REM and AEM proxies					
DA_P	0.06	0.04	0.06	0.02	0.07
DA_N	0.06	0.04	0.07	0.08	0.02
RM_P	0.13	0.10	0.13	0.04	0.16
RM_N	0.16	0.11	0.16	0.04	0.24

Note: All variables are winsorized at 1% and 99% percentiles.

3.2. Bivariate Correlations

Table 5 is a correlation matrix between the vairables. There is no indication of strong correlations between the regression independent variables. The contol variables exhibit negative relation with ABS_DA, except firm growth and, leverage. The EM proxies, RMBS2 and RMBS3, show a negative relation with firm size, but positive relation with growth , ROA, and OCF.The relationship between ABS_DA and the oil price crisis is negative and significant which support H1. However, there is negative relation between the REM proxies and the oil price crisis. Since firm characteristics have an impact on EM and correlation results are not interpretable in *ceteris paribus* terms, we rely on the results from mutivariate analysis.

Table 5. Correlation matrix between variables

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	
(1) Abs_DACC	1.000											
(2) RM	0.134	1.000										
(3) RMBS	0.310	-0.178	1.000									
(4) RMBS2	0.367	-0.194	0.894	1.000								
(5) RMBS3	0.151	-0.212	0.888	0.655	1.000							
(6) Oil_Cris	-0.093	-0.011	-0.030	-0.027	-0.005	1.000						
(7) ROA	-0.048	-0.367	0.206	0.184	0.163	-0.053	1.000					
(8) size	-0.090	0.059	-0.257	-0.256	-0.256	0.071	0.020	1.000				
(9) Growth	0.141	-0.108	0.158	0.186	0.069	-0.149	0.434	0.078	1.000			
(10) leverage	0.099	0.143	-0.004	0.040	-0.031	-0.055	-0.333	0.124	0.037	1.000		
(11) OCF	-0.102	-0.542	0.131	0.108	0.139	0.034	0.511	-0.062	-0.011	-0.227	1.00	

Hypothesis H1 tests the relationship between discretionary accrual and the oil price crisis. The dependent variable in the first regression is absolute discretionary accrual ABS_DA, which is a proxy for accrual earnings management. The higher is the absolute value of discretionary accrual, the higher the earnings management. The independent variable of interest is the identifier of the oil price crisis, which occurred between 2014 and 2016. The first hypothesis predicts a negative coefficient for the oil price crisis.

Table 6 presents the regression results. The oil price crisis coefficient is significantly negative in the ABS_DA regression (-0.03, p<0.01). This supports the view that companies reduce accrual earnings management during periods of low economic activity because of the higher scrutiny environment during such times (Cohen *et al*. 2008, Arthur *et al.* 2015).

AEM is further divided into two groups: positive accrual (DA_P) and negative accrual (DA_N). When negative accrual is the dependent variable, the oil price crisis has a negative and significant effect, which means that the period of sharply declining oil prices can be characterized by lower income decreasing EM. The positive group also exhibits a negative, but insignificant relation with the crisis. The analysis of ABS_DA along with subgroups indicates that lower ABS_DA is driven by a decrease in negative accruals during the oil price crisis. This result is in line with the view that during periods of economic slowdown, companies engage less in AEM (Filip and Raffournier 2013, Dimitras *et al.* 2015, Arthur *et al*.2015, Tano 2014, Xu *et al.* 2013).

Table 6. Regression results for AEM

	ABS_DA	Positive DA	Negative DA
	RE	FE	RE
Oil_Cri	-0.03***	-0.01	-0.031***
ROA	-0.09***	0.60***	-0.71***
Leverage	0.05***	-0.02*	0.01
Size	-0.01	0.01*	0.00
Growth	0.07***	-0.01	0.08***
OCF	0.02	-0.75***	0.67***
Intercept	0.15***	-0.05	0.03***
Year	Yes	Yes	Yes
R^2	0.08	0.66	0.60
F / Wald chi2	35.29***	107.20***	24.74***

Note: *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels respectively. Fixed-effects panel models $R2$

3.3. Regression results: Hypothesis 2

Estimation results related to H2 are summarized in Table 7. The dependent variables are different proxies of REM, including RMBS2, RMBS3, RM, and subgroups: positive REM (RM_P), and negative REM (RM_N). In support of H2, the oil price crisis coefficient is positive and statistically significant in the analyses using the absolute value of REM measures, RMBS2 and RMBS3 (0.01, p<0.05; 0.02, p<0.05, respectively). This implies that managers rely more on deviations from real business activity to decrease or increase the effects of the crisis on profits.

Oil price crisis exhibits a negative and statistically significant relationship with RM_P (-0.04, p<0.01), but a positive and significant relationship with RM_N (0.05, p<0.01). This implies that the positive effect of the crisis on RMBS2 and RMBS3 is driven largely by the negative REM group, and companies tend to employ downward real earnings management in response to proposed economic reforms, which occurred during the oil price crisis. This supports the findings of earlier studies (*e.g.* Peltzman 1976, Jones 1991, Ahmed *et al*. 2008, Makhtaruddin *et a*l. 2018) which suggest that companies employ downward EM to gain political advantage. In doing so, companies seek to signal to governments that some elements of the energy price reforms may deleteriously affect competitiveness in the private sector. The "big bath" hypothesis is another possible explanation where during periods of inferior performance, managers tend to conduct income-decreasing EM (because this poor performance is anticipated by investors during the crisis) to save profits for future periods (Yoon and Miller 2002).

Table 7. Regression results for REM

	RMBS2 RE	RMBS3 FE	RMBS FE	RM RE	RM_N RE	RM_P FE
Oil_Cri	0.01** (1.76)	0.02 ** (2.39)	0.01* (1.68)	-0.048*** (-4.59)	0.05*** (2.90)	-0.04*** (-3.65)
ROA	0.20 *** (4.39)	0.09 *** (2.89)	0.26*** (4.04)	-0.33*** (-7.16)	0.85*** (9.46)	-0.48*** (-5.67)
Leverage	0.06 *** (4.64)	0.09*** (5.54)	0.10 *** (4.34)	-0.06** (-2.40)	0.12*** (3.84)	0.08*** (2.90)
Size	-0.02*** (-7.73)	-0.01 (-1.27)	0.01 * (-1.70)	0.02 (0.23)	-0.02*** (-3.46)	-0.02 (-1.55)
Growth	0.07*** (6.20)	0.03*** (2.46)	0.07*** (4.60)	-0.07*** (-3.96)	0.04** (2.17)	0.02 (0.91)
OCF	0.05** (2.18)	0.05** (2.20)	-0.05 (-0.77)	-0.98*** (-27.33)	0.36*** (4.38)	-0.32*** (-3.86)
DACC	-.08* (-1.80)	-0.01 (-10)	-0.11** (-1.95)		-0.42*** (-5.29)	0.44*** (5.86)
Intercept	0.26*** (7.56)	0.16** (2.23)	0.19 (7.17)	0.15 (1.39)	-0.01 (-0.03)	0.42*** (3.00)
Year	Yes	Yes		Yes	Yes	Yes
R^2	0.08	0.04		0.42	0.34	0.31
F/ Wald chi2	218.28***	4.41***	544.94***	91.44***	30.24***	28.76***

Note: *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels respectively. Fixed-effects panel models are used in all regressions based on the results of Hausman tests. t-statistics are in parentheses. within-R^2 values are reported.

There is a negative and significant association between DACC and both RMB2 and RMBS3, which suggests that when manipulating profits, companies need to substitute AEM with REM, to reduce the cost associated with EM.

Firm size exhibits a negative and statistically significant relationship with REM RMBS2, RMBS3, and RM_N proxies which support the view that larger firms have less ability to manage earnings (Bamber 1987, Swastika 2013, Thomas and Ahmed 2018). In addition, ROA is significant and positive, which supports the idea that over performing firms are stimulated to conduct EM to maintain good performance (Pincus and Rajgopal 2002). Leverage also has a positive and significant effect on earnings management; this is in line with the view that the higher the leverage, the greater the incentive to report EM to gain political advantage (Muradoglu and Sivaprasad 2012, Anagnostopoulou and Tsekrekos 2017, Makhtaruddin *et al.* 2018, Siregar 2018). For example, during economic slowdown companies can obtain concessions from banks and lenders. The probability of banks accepting such concessions during crisis periods is high due to the lower asset market value of the firm (Shleifer and Vishny 1992).

The coefficient for OCF is positive and significant of REM proxies, RMBS2, RMBS3, and RM_N; but insignificant with ABS_DA. Although during the recent oil price crisis companies have incentive to exaggerate the impact of the crisis on their performance, only companies with high OCF afford to use downward REM.

The coefficient of the AEM proxy is negative and significant, which indicates companies rely more on REM and reduce their reliance on AEM during periods of economic slowdown.

3.4. Robustness Testing

Several tests have been conducted to explore the robustness of our findings. First, the analysis is repeated using the Jones (1991) model and the modified Jones model with current return on assets. Secondly, as an extra control for heteroscedasticity, an intercept is added to the Jones model (Kothari *et al.* 2005). Also, a third proxy for REM is employed, which includes the sum of the absolute values of all absolute value of REM measures, An_OCF, An_PrCost, and An_Expn. Results did not change substantively in any of these cases. Further, since the data used herein pertain to different markets, and the impact of the crisis may vary from one to another, the analysis is repeated using ordinary least squares regression (OLS) with year and country fixed effects. The OLS results support the main findings of the study.

Conclusion

This paper has explored AEM and REM in GCC countries, which include some of the largest oil exporting nations in the world. The study investigated whether the sharp decline in oil prices between 2014 and 2016 affected managerial decisions. Results indicate that AEM decreased during the crisis. Although REM tends to be more expensive for companies to adopt (Graham *et al.* 2005), there is evidence that companies used income decreasing real earnings management during the crisis. This behavior may have occurred because of governments´ intentions to impose taxes and reduce subsidies on energy prices in the region, and it also supports the view that companies take “a big bath” by reducing earnings in periods of economic slowdown for future periods. Various control variables were used in this analysis. There is a positive and significant relationship between ROA, leverage, growth, OCF and EM. However, firm size is negatively related to EM. In addition, there is a negative and significant association between real earnings management and accrual earnings management, which suggests that companies use these management methods as a substitute

In common with applied research more generally, there are a number of limitations to this study which should be considered. First, managerial decisions to deviate from normal business activity may be a rational response to the oil price crisis (Roychowdhury 2006). Therefore, caution must be exercised when attributing the deviation from normal activity to opportunistic behavior. Second, earnings management metrics are subject to inherent measurement errors, which may affect the validity of the findings. In addition to this, despite the fact that the data cover most GCC countries, the impact of the oil price crisis varies from country to country, depending on the proportion of total income derived from oil sales. Two thirds of the sample observations (67%) pertain to two countries (Kuwait and Oman) with zero observations for Saudi Arabia. As such, the findings reported herein should be interpreted with reference to distortions in terms of sample coverage. Finally, future research may wish to consider investigating the impact of earnings management on post-crisis operating performance.

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The Role of Quality Costs in Achieving the Entrepreneurial Orientation of Organizations: Survey Study in the General Company for Electrical Industries

Hazim Abed AZEEZ
Department of Public Administration
Sumer University, Thiqar, Iraq
hazimazeez2@gmail.com

Tarek Kazem SHALAKAH
Department of Public Administration
Sumer University, Thiqar, Iraq
tareq8120@gmail.com

Latfe ALHUSSEINAWI
Department of Public Administration
Sumer University, Thiqar, Iraq
Latfeej@yahoo.com

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Abstract:

The research focused on the variables of quality costs in terms of their dimensions (examination, evaluation, internal failure, external failure) as an independent variable, and the pioneering orientation in its dimensions (creativity, risk taking, proactive) as a dependent variable. The aim of the study is to study the main question in the research problem and it is What is the perception of the General Company for Electrical Industries members of the dimensions of the costs of quality and dimensions of leadership orientation, and the impact of the cost of quality on the leading direction of the organizations, the research achieved its goal through the use of descriptive analytical approach in the study of the problem of research, and to be accompanied by the analysis in both theoretical and applied research, A questionnaire consisting of two sections prepared for this purpose was designed and distributed to a sample of 45 employees of the General Company for Electrical Industries in Baghdad, and for the purpose of achieving the objectives and test hypotheses was used the statistical program of social sciences SPSS and used descriptive statistics (mean and arithmetical, standard deviation, correlation relationship Spearman, Impact of F and Test T). The research reached a number of conclusions, the most important of which are: The Company's interest in testing the internal raw materials in the process of production, dealing with reliable suppliers and paying attention to the good design of the product in order to reduce costs. The set of recommendations including: Focus on activities that add value to the organization and are low-cost, including costs for the development of creative capabilities of personnel and market studies.

Keywords quality costs; entrepreneurial orientation; internal and external failure; creativity; risk taking; proactive.

JEL Classification: L15; D23; D24.

Introduction

The cost of quality has increased in the last decades of the 20th century and the beginning of the eleventh century due to the rapid and complex changes and successive developments in the business environment. For various reasons including the emergence of a huge number of new products in addition to increasing competitive offers to customers and the opening of markets to each other. To meet these challenges, there must be an awareness of the expectations of the customer and the suitability of these expectations with the characteristics of the products.

This indicates that improving the quality of products to suit the needs of customers can give companies two advantages:

- the first is to reduce the cost of its products;
- the second is to proactively develop strategies that enable it to acquire new opportunities efficiently by examining the external environment.

These features can increase the company's profits and thus be able to compete for price and product quality. It is also possible to say that quality is one of the important pillars of the orientation of leading organizations at present, and that the quality associated with the cost is also an important aspect because it began to increase and grow to constitute a large proportion of sales and then profits of companies and therefore increased the attention of accountants withe quality costs as an inevitable result to achieve the desired results of quality in reducing costs and improve quality and achieve customer satisfaction and increase the share of the company in Market and then progress on competitors. The research department is divided into four sections, the first of which is devoted to the research methodology, the second to the cognitive framework of the research variables and the third to the practical aspect. The fourth is to the conclusions and recommendations.

Definition of quality: In this section, we will discuss in detail the concepts of quality in general from different points of view as presented in the literature of accounting and administrative thought, as follows.

1. Literature Review

1.1. Quality Concepts and Elements of Quality Costs

Quality is defined by the American Quality Control Association as a set of qualities and characteristics related to the product or service provided according to specifications that meet the needs of customers at the time of purchase or use (Baghaee 2020). Quality is defined as suitability for use and in the form that makes the product or service closer to the customer when used (Chaiwan 2018). Crosby, indicate in his definition of quality, refers to conformity to specifications, and that not conform in specifications do not mean quality. In other words, the manufacture of a product or the provision of a service that does not conform to established standards cannot be considered as quality (Summers 2006) and the quality is the degree of conformity of the product to the specified standards or specifications which customers want so that they can meet their needs and expectations (Khanna *et al*. 2008).

On this basis, quality can be seen from one of the following perspectives:

- *Customer's perspective*: This perspective relates to the value and use of the product in a manner equivalent to the price paid (Bugdol 2020). There are several considerations for the product that can meet the needs and expectations of customers as follows (Samarrai *et al.* 2012);
- *Performance*: The manner in which the functions and the basic operational characteristics of the product perform;
- *Aesthetics*: Gravity means in terms of shape, colour, smell, taste, that is how the product looks from the point of view of the customer,
- *Appearance*: It means the characteristics of tangible product or tangible or visual related by the customer;
- *Service*: Availability of maintenance and repair services for the product when the product has been displayed for problem for a problem when it used as a result of a manufacturing error.

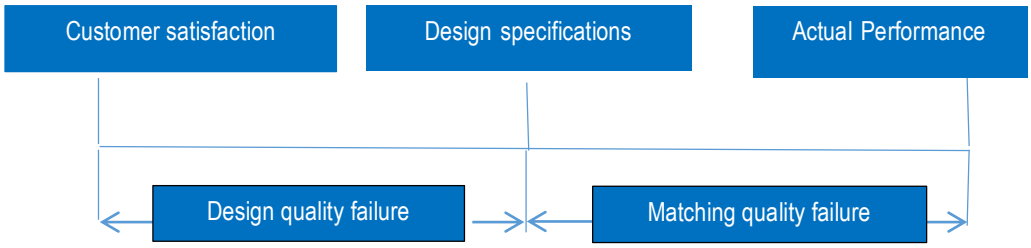
1.2. Economic Unity Perspective or Product

This perspective relates to conformity with specific specifications. Quality is classified from the factory's point of view to the following (Bugdol 2020):

- *Quality of the design*: The quality is planned form production of product it's means put of the specification at production location and related to Product specifications and market-based decisions of the specifications required for use, and the difference in quality design is result to, the difference in the prescribed specifications and this quality is the responsibility of the engineering departments.
- *Quality of conformity*: The quality here means that the product conforms to the engineering characteristics of the industry, that is, the degree of conformity of the product to the specified specifications, and the difference in quality here is due to the operational process, therefore, the products are not conforming specifications require repair and re - operation or prepare failed products cannot be repaired Is an important influence on the reputation of economic unity, and the quality here is the responsibility of those Who are responsible for the production process.

Actual performance (quality of service) quality is meant here product performance response and the packing case and guarantees post - marketing maintenance periods and shipping methods and delivery of products to customers. The following figure will show whether the actual performance does not meet the level of customer satisfaction due to a failure in the quality of design and conformity. The following figure shows the failure of the quality of design and conformity and its relation to customer satisfaction.

Figure 1. The failure of Quality of design and the Conformity with customer satisfaction



Source: Horngren, Charles, Datar, and Rajan (2015)

1.3. The Concept of Quality Costs and Their Components

Before turning to the concept of quality costs we should shed light on the concept of cost as stated in the literature of accounting thought, Cost is resources being sacrificed or lost to achieve a particular goal. Cost (such as the cost of work or advertising) is usually measured by the amount of cash payable for goods and services. There are two types of costs, the actual cost It is the cost actually incurred, such as (Historical or historical cost), and cost balancing, which is an expected or forecasted cost (Horngren *et al.* 2015). After subtracting the concept of quality costs by leader of the quality Goran in 1951 in his book, quality control, it emerged after numerous writings and increased attention being include elements of cost and quality, which are among the part of the success of the four main factors (cost, quality, time, innovation) for any unit economic and which directly affect the viability of the unit and its ability to compete and grow in the environment in which it operates.

Moreover, the cost of quality is clearly linked to the level of quality and its impact on the size of the units produced and their reflection on sales and then on the level of profitability. There may be variation in cost components of quality and between economic units and others. But mainly aims to achieve the quality level and work to reduce the cost of defective and it often added to the cost of production (Najm 2003). Many large companies have been able to reduce their quality costs from 30% to 40% of their sales revenue when the quality of their products has improved as a result of the adoption of quality programs that implemented annually (Heizer and Render 2001). It is noteworthy that most economic units spend about 20% -30% of total production costs on quality that related to prevention and evaluation activities and internal and external failures in order to manufacture products and provide quality services that required to customers and meet their needs and expectations (Alle *et al.* 2019). Quality costs were defined as the costs incurred by the economic unit to prevent from production defects and to repair defects when it discovered. (Chaiwan 2018) It was also known as "all costs spent by the unit to ensure the high quality of products or services" (Summers 2006). Horkren defined it as the cost incurred by the economic unit to prevent the manufacture of low-quality products or the costs that the result of such products (Horngren *et al.* 2015). Quality costs are classified into four main categories in the following order:

1. *Preventive prevention costs*: Quality costs are defined as those costs that are spent in order to reduce the internal and external failure of products (Jackson and Sawyers 2001). It is also known as the costs spent to prevent the manufacture of non-conforming products (Horngren *et al.* 2015). Prevention costs consist of a set of elements which can be classified in the following order (Baghaee 2020, Horngren *et al*. 2015):
   - *Planning and design*: The costs of developing and improving quality management systems to maintain the quality levels achieved.
   - *Product design*: The cost of product design is to suit the needs of customers and a method meet with their needs and expectations.
   - *Process engineering*: These costs are intended to make the production processes conform to quality standards that Pre-defined of it.
   - *Quality training*: These costs relate to the development and implementation of Staff training programs of quality.
   - *Information costs*: It is the costs of obtaining and maintaining quality data and information, as well as processes aimed at developing and analysing quality reports.
   - *Preventive maintenance*: This component aims to maintain machinery and equipment in order to improve production processes and increase the quality of its products.

- *Quality assurance*: Quality planning and controlling the quality to ensure that the standards and quantifications are properly applied.

2. Evaluation costs (examination): Which relate to the assessment of the status of materials, products and services (Chaiwan 2018) It is also known as costs which spent on To discover products that do not conform to specifications (Horngren *et al.* 2015) Assessment costs consist of a set of elements which can be classified in the following order (Baghaee 2020, Horngren *et al*. 2015):
   - *Testing and examination*: These are the costs associated with the activities of the examination of raw materials, production under operation and the complete product.
   - *Maintenance and calibration of inspection devices*: These are the costs related to the maintenance of the devices and equipment used to ensure the validity to do inspections process, and to ensure that it is suitable for testing and examination quality standards.
   - *Testing and examination reports*: These are details that Special of defective units that are submitted in the form of reports to High management for appropriate decisions.
3. Internal failure costs: The costs spend by the economic unit on its defective products before shipping to customers (Horngren *et al.* 2015). They are also known as "costs associated with service failure before they are submitted to customers" (Summers 2006). Prevention costs consist of a set of elements, which can be, classified it according to the following order (Baghaee 2020, Horngren *et al*. 2015):
   - *Scrap*: The costs associated with finished materials and products, and half manufactured, which are defective, and cannot be fixed.
   - *Recycling* (operation): The costs related to the repair of non-conforming products and the characteristics quality that required.
   - *Reconsideration*: The costs involved in re-examining products that are repaired;
   - *Internal failure analysis*: The costs related to the analysis of causes of failure and then to identify these reasons for treating them and avoiding them in the future.
   - *Maintenance of faults*: The costs related to the repair and control of production equipment and the removal of material that cause defective appearance in products.
4. External failure: Costs that arise after the delivery of products or defective services to customers (Heizer and Render 2001) Or the costs spend by the economic unit on defective products after shipment to customers (Horngren *et al.* 2015). The costs of external failure consist of a set of elements, which can be classified, in the following order (Jackson *et al.* 2009, Horngren *et al.* 2015).
   - *Guarantee*: The costs related to the maintenance and repair of products sold to customers and returned to the economic unit for processing them during the warranty period.
   - *Customer complaints*: It costs that result from complaints by customers to decrease the level of quality.
   - *Sales returns*: Defective or non-standard products are returned by customers for the purpose of replace them with other good products.
   - *Loss of sales*: Costs incurred as a result of loss of market share due to the provision of products of poor quality and in the form of the customer's dissatisfaction with the failure of the service or product to meet its needs and expectations.

The concept of entrepreneurial orientation as the strategy that motivates the organization to adopt the initiative and the desire to enter the new markets in order to obtain clear technological progress and create wealth that enables it to grow and progress, entrepreneurial orientation strategies (innovation, risk, proactive) today are one of the most important drivers that drive organizations to enter new markets or offer new and unique products. This is one of the most important reasons and justifications for organizations to adopt the entrepreneurial orientation approach (Lumpkin and Dess 1996) The entrepreneurial orientation approach has taken pioneering activities through a pioneering perspective. When the organization the organization adopts, leadership orientation, it focuses simultaneously to fiend opportunities in its external environment and on its ability to exploit these opportunities through its leadership activities. So the pioneering approach is to guide the organization to integrate its activities and achieve opportunities, and to advance success in the competitive environment (Naciri 2015, Dess *et al.* 2007) In terms of efforts by individuals, or difference, or the efforts of the organization to find new opportunities or exceptional solutions to existing problems, and it is, the degree of innovation in the cognitive pattern of the individual, the way in which individuals handle from it information and in the light of which they make decisions and deal with problems. It is representing the leading orientation of policies and practices that form the basis of the organization's leading activities and decisions. It can also be seen as a process of strategic decision-making

strategy which decision-makers in the organization with objectively to determining the organization's basis objective, and maintaining its vision and creating a competitive advantage.

1.4. The Importance of Entrepreneurial Orientation

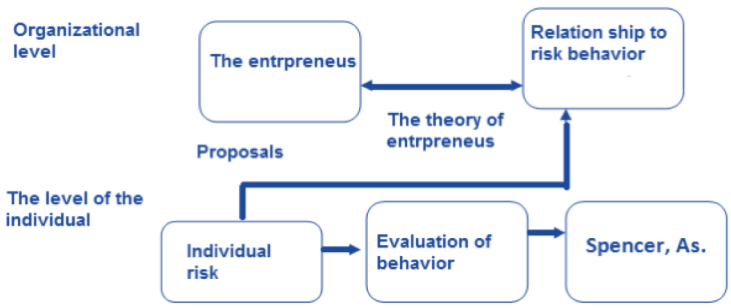
Studies and research in the field of strategic management indicate that the leadership approach is a key element in achieving organizational success and helps to achieve superior performance. Organizations that adopt the concept of leadership approach are performing much better than other organizations that operate in the same. In this field, the organization is able and from this orientation to employ changes in its products as appropriate with the new variables and mechanisms of markets and monitoring new opportunities and benefit from them before other organizations. Therefore, the leading approach enhances the organization's ability and ability to proactively capture environmental opportunities and achieve better performance. Superiority over competitors (Gathungu *et al.* 2014). He added (Zainol and Daud 2011). The leading approach is one of the most important strategies that help organizations to achieve growth based on a strategy that targets and satisfies the needs and desires of customers. The leading approach helps the organization to establish new business that includes new risk and helps to transform the organization to become a leader through change in the field of performance standards (Fox 2005).

Dimensions Leadership Orientation

Invention. The success of organizations today depends on several requirements, one of them is be creative and educated organizations. Therefore, scientific efforts in the field of innovation need wise management in which efforts are invested individually, collectively and organizationally, on one side and creating an environment conducive to the work through which innovative ideas are developed into distinct products and services and unique and methods characterized by creativity, innovation and originality on the other side (Awang *et al.* 2010). Some believe that creativity shows fundamental abilities in the organization's strategy In the twenty-first century, The capacity that enables the organization to find something new depends on the use of intangible knowledge assets creativity arises from the generation of new knowledge by relying on prevailing knowledge, it may require from the organization to produce better products or services to meet its declining sales, especially when the pace of change in its environment increases, as innovation becomes a necessary cost for doing business, and permanence the organization's survival in the forefront (Baldarelli 2020).

The adoption of risk. Alderman (2011) suggests that risk represents a framework for orientation leadership which means the organization's desire to adopt the adventure without knowing the potential results, which may include investment in new technology or entry into new markets that unknown as well as the financial risks that the organization may face (Al-Hadrawi and Al-Kalabi 2013). Risk adoption is often associated with the fast strategies decision-making of an organization that helps improve its performance. Therefore, organizations that cannot adopt the concept of risk, they will not be in line with new creations as well as be slow response to the new changes in comparison with other organizations, and this causes its poor performance (Dess *et al.* 2007). Fox (2005) shows that there are no specific limits of risk behaviour between organizations and leaderships for new projects. Whenever the risk was less the person leading to being a normal person is, whenever the risk increases, he will become a leader. The adoption of risk is to be relevant to decision-making and it is based on the principle of adventure. As illustrated by the for Figure 2.

Figure 2. The general framework of the pilot risk mod evaluation of behaviour



Proactive is represent by a strategy that emphasizes looking ahead, and constantly searching for new opportunities and experimentation with a quick response to the ongoing environmental transformations, and the tendency to practice activities that affect the environment.

It also includes focusing on the future by finding ideas and anticipating problems and trying to prevent them or reduce them. To maintain on adaptation and perseverance through the implementation of new operations or the launching of new products (Fox 2005). It also indicates the proactive to readiness of the organization and its ability to expect demand in the future as this is one of the most important features of the leading organizations, which include the desire of senior management to be the organization is always the first in response to the needs of customers and their wishes according to what is better and new. Leading organizations aspires to be able to respond quickly to maximize market use by competing organizations and not wait for others to achieve the tasks. Therefore, these organizations tend to bear the risk of entering new markets in uncertain circumstances (Alderman 2011).

2. Methodology

2.1. Purpose of Materials and Methods

The fast changes and developments in the contemporary business environment have led to the up growth of a huge number of new products in addition to increasing the competitive offers to customers and the opening of markets to each other, which should the economic units to meet these challenges to adopt new tools and methods in order to achieve its objectives and maintain its customers And then stay and continue in a way that supports its competitive position. On this basis, the problem can be shaped by the following questions:

- How far do the sample understand the dimensions of the cost of quality (examination, evaluation, internal failure, external failure) and the dimensions of the leading approach (creativity, proactive, risk taking)
- How well the cost of quality effects on the cost of the direction leadership of organizations.

The importance of the research stems from the importance of quality costs which come in response to the needs and desires of customers and the ability of economic units to manufacture products and provide services with the best quality and the least cost, and the importance of the leading approach, which is one of the most important modern administrative approaches, which is based on three main elements are creativity, proactive, and the adoption of risks. As the connection between the two concepts can be reflected in the increase in the value of products and services of economic units and in a way that reflects on its competitive position and then on its continuation and survival, as result there are two main, hypotheses of research:

H1: There is a significant statistical correlation between the costs of quality and leadership orientation, with the following hypotheses divided:

- There is a statistically significant correlation relationship for the examination, in orientation and leadership dimensions;
- There is a statistically significant correlation relationship for evaluation in and leadership dimensions;
- There is a statistically significant correlation relationship to the internal failure in the leading trend in its dimensions;
- There is a statistically significant correlation relationship to the external failure in the leading trend in its dimensions.

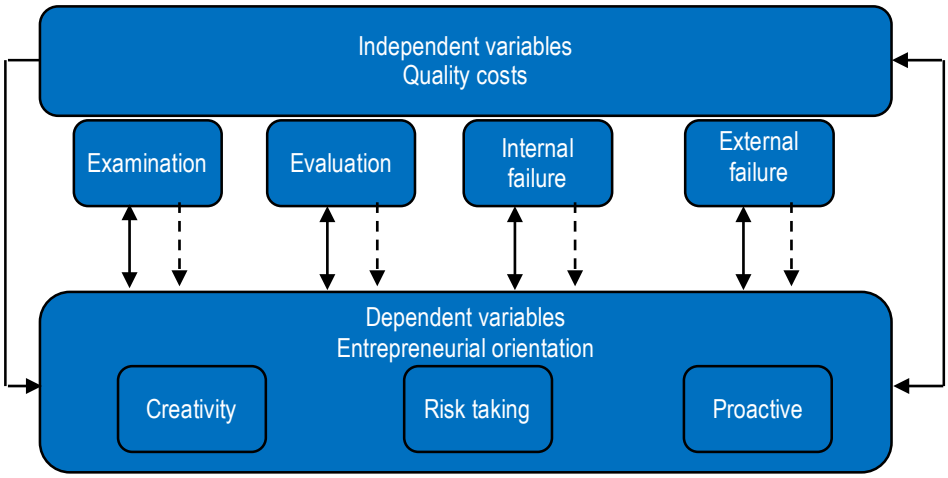
H2: There is a significant effect relationship between the costs of quality and leading orientation and the following hypotheses are divided:

- There is a significant effect of the test in the pilot approach;
- There is a significant effect of evaluation in the pilot approach;
- There is a significant effect of internal failure in the leading trend;
- There is a significant effect of external failure in the leading trend.

3. Research Framework

The study provides comprehension and understanding on the effect of the dimensions of the cost of quality (examination, evaluation, internal failure, external failure) and the relationship between corporate governance and earnings management. Thus, the entrepreneurial orientation (creativity, risk taking proactive, conceptual model of this study as presented in Figure 3) will be used as a guide for testing the study hypothesis.

Figure 3. Research framework



- The first axis: presenting the results and analysing them in light of the answers of the sample.

Presenting the Reality of Quality Costs

Four sub-dimensions (examination, evaluation, internal failure and external failure) measure this variable. Table 1 shows the computational variables and standard deviations that reflect the view of the sampled sample for this variable, as shown in the Table 3.63 higher than the standard mean of 3 and the general standard deviation 0.684, which indicates the company's interest in quality costs. Here is a diagnosis of the reality of the sub-variables:

1. *Examination*: Table 1 shows a general mean of the sub-variable (examination), which reached 3.71, which is higher than the satisfactory mean of 3 and with a high standard deviation 0.634, which explains that the company's members are keen to conduct the tests for raw materials and testing products with a view to connecting to a high quality product.

The paragraph 1 has been achieved, higher mean its value was 3.90 which is higher than the value of the satisfactory mean 3 and by standard deviation 0.531. This indicates the company's keenness to provide a high quality product through good planning and design, one of the first steps is then work on reducing costs, as for paragraph 2 has achieved the lowest level of response, with a mean value of 3.37 which is higher than the satisfactory mean of 3 and a standard deviation of 0.652. This confirms the importance of preparing and preparing the requirements of the production process in advance to ensure the quality of the product.

Table 1. Arithmetic mean and standard deviation of the explanatory variable (quality costs) and sub-variable (examination)

Series	Paragraphs	Arithmetic mean	Standard deviation
1	Planning and designing the product to achieve the quality of the first time and then reduce the cost of quality to a minimum	3.90	0.531
2	Ready and prepared production processes in advance time to ensures smooth flow of production with high quality and on time	3.37	0.652
3	Contracting with accredited suppliers contributes to implement the quality of inputs and then reducing costs	3.86	0.721
Total after examination		3.71	0.634
Total quality costs		3.63	0.684

2. *The audit:* Table 2 shows that this dimension achieved a general mathematical average of 3.48, which is higher than the premise mean of 3 and by a standard deviation 0.577, while on the level of questions has achieved in paragraph 6 mathematical mean 3.71, which is higher than the value of the premise mean of 3, and by a standard deviation 0.576, indicating the lack of dispersion of the sample answers and agreement of the company's keenness on the continuous review of the production process To promote strengths points and handling the errors. As for paragraph 5, it achieved the lowest level of response, with a mean value of 3.27, which is higher than the premise mean 3 and a standard deviation of 0.717. This indicates that the company's interest in introducing employees to training courses with new skills and abilities was not high level.

Table 2. Arithmetic mean and standard deviation of sub-variable (evaluation)

Series	Paragraphs	Arithmetic mean	Standard deviation
4	The company is keen to develop Special equipment for production lines to reduce Lost and waste in raw materials.	3.48	0.438
5	The company evaluates quality training courses aims to provide employees with the necessary skills to reduce the defect resulting from lack of experience.	3.27	0.717
6	The company is keen to review the requirements of the production process and prepare them to achieve production efficiency	3.71	0.576
Total Rating		3.48	0.577

3. *Internal Failure:* Table 3 shows that this dimension achieved an overall computational average of 3.87, which is higher than the satisfactory mean of 3 and with a standard deviation of capacity 0.675. This indicates that the company carried out a series of procedures to avoid internal failure. On the the level of questions has been achieved by paragraph 7 the highest mean 4.05, Which is higher than the value of the maximum satisfactory mean of 3 and the standard deviation 0.710, which confirms the study of the company for reasons that cause the bad of its product, paragraph 8 has achieved the lowest arithmetic mean, valued at 3.77 and higher than the he satisfactory mean of 3.

Table 3. Arithmetic mean and standard deviation of sub-variable (internal failure)

Series	Paragraphs	Arithmetic mean	Standard deviation
7	The company is studying the reasons that lead to be Producing poor quality products	4.05	0.710
8	The company is keen to ensure that its products conform to specifications and do not damage the environment	3.77	0.667
9	The company is treating the losses that results from planning, design, and poor operations.	3.81	0.649
Total internal failure		3.87	0.675

4. *External Failure:* Table 4 shows that this dimension achieved a general arithmetic mean of 3.47, which is higher than the satisfactory mean of 3 and with a standard deviation of 0.853. On the question level, the paragraph 10 achieved an arithmetic mean of 3.83, which is higher than the value of the satisfactory mean of 3 and by standard deviation 1.019. This indicates the company's interest in providing guarantees to its customers to treat errors that may accompany their products during a given period or replace them to enhance consumer confidence in the company's products. Paragraph 12 achieved the lowest level of response, with a mean value of 3.17 and a standard deviation of 0.981, which indicates the company's keenness to provide high quality products to avoid the costs related to compensation.

Table 4. Arithmetic mean and standard deviation of the sub-variable (external failure)

Series	Paragraphs	Arithmetic mean	Standard deviation
10	The Company shall grant a warranty period for the purpose of repairing faults, replacing the idle products or refunding the value of the returned products during the warranty period	3.83	1.019
11	Satisfying customers to avoid obligations arising from quality defects and associated costs of legal responsibility.	3.42	0.560
12	Reduce the costs of compensation and repair services by providing quality products that meet the needs and desires of customers.	3.17	0.981
Total internal failure		3.47	0.853

Second: The reality shows entrepreneurial orientation

Table 5 shows a general arithmetic mean of this variable at 3.43, which is higher than the standard mean of 3, and the general standard deviation 0.640. This indicates the company's interest in adopting the leading orientation dimensions. Here is a diagnosis of the reality of the sub-variables:

Creativity: Overall, the creativity achieved in the arithmetic mean of 3.55, which is higher than the mean 3 and a standard deviation 0.680, indicating the existence of signs of creativity in the company investigated through the efforts of the company seeks to adopt creativity in its work.

The highest mean of the paragraph 13 with a mean 4.16 that is higher than satisfactory mean of 3 and a standard deviation 0.732, indicating that creativity has a major role and successful in the company and to achieve leadership appropriately, The lowest value came from the paragraph 15, with a mean 2.95, less than the satisfactory mean of 3 and a standard deviation 0.831 indicating that there is a need to promote a clear approach in creating competition among employees to create creative ideas, especially among those with creative abilities.

Table 5. The arithmetic mean and the standard deviation of the explanatory variable (the entrepreneurial orientation) and the sub-variable (creativity)

Series	Paragraphs	Arithmetic mean	Standard deviation
13	Creativity plays an important role in the success of our company through the implementation of Pioneer investment projects an appropriately.	4.16	0.732
14	The organization does not have an administrative side that sponsors creative work and qualifies creators.	3.92	0.542
15	The management of the company encourages competition and creates a constructive conflict between employees who have creative abilities.	2.95	0.831
Total creativity		3.55	0.680
Total entrepreneurial orientation		3.43	0.640

Risk

Table 6 shows that after the risk, a total arithmetic mean of 3.34, higher than the satisfactory mean of 3, and a standard deviation 0.593 have been achieved, indicating that the company has an approach to adopting risk in executing its projects. And the highest value in the dimension risk come after the paragraph 17 with a mean 3.99, which is higher than the satisfactory mean of 3 and a standard deviation 0.642, indicating that some of the projects carried out by the company and do not succeed and does not reflect negatively on its pioneering approach This gives it a strong motivation to be prepared for any project even if it does not succeed, it will not frustrate it.

The lowest value of paragraph 18 and with arithmetic mean of 2.73, which is less than the satisfactory mean of 3 and a standard deviation of 0.608 Indicates the lack of dispersion of the answers of the research sample and their agreement that the company does not follow the trial method of and the error on its procedure a and its executive operations, which is unacceptable as the company follows the scientific methods and techniques in the management of its projects.

Table 6. Duplicates, their percentages, the mean, and the standard deviation of the sub-variables (Risk).

Series	Paragraphs	Arithmetic mean	Standard deviation
16	Do not hesitate to run the company in implementing some new projects that carry a high level of risk'	3.23	0.412
17	The lack of success of some projects does not reflect negatively on the company's leadership.	3.99	0.642
18	The management of the company follows the method of attempt and error on its Process and executive procedures in most cases.	2.73	0.608
Total risk		3.34	0.593

Proactive

Table 7 shows that dimension proactive that achieved a total mean 3.41 and a standard deviation 0.648 which indicates that the company has a proactive thought in dealing with various environmental variables. The results shown in Table 20 show that the highest value represented by paragraph 19 is a mean 3.86, higher than the satisfactory mean of 3 and a standard deviation 0.598. Which indicates the lack of dispersion of the answers of the research sample and their agreement that the company often working on introducing new technology to develop its leading performance. The lowest value is represented by paragraph 21 with a mean 3.49, which is higher than the satisfactory mean of 3 and a standard deviation 0.504. This shows that proactive thinking avoids the company for getting into several problems.

Table 7. Duplicates, their percentages, the mean, and the standard deviation of the sub-variables (Proactive).

Series	Paragraphs	Arithmetic mean	Standard deviation
19	The company pioneered the introduction of new technology to develop its pioneering performance.	3.86	0.598
20	The company's management always expects future environmental changes before they occur.	3.56	0.883
21	The proactive approach of the company in facing the expected problems reduced the size of these problems	3.49	0.504
Total Proactive		3.41	0.648

The assumptions underlying the study.

3.1. Test the hypothesis of correlation

To validate the search hypothesis for link relationships between the dimensions of assigning quality and the exclusion of leadership and testing, the main hypothesis first that says (there is a significant correlation between the cost of quality and the entrepreneurial orientation, and its subsidiary assumptions, using a simple linear correlation coefficient (Spearman). The Table 8 shows the correlations assumed by the first main hypothesis, the value of the correlation coefficient between quality costs and the Entrepreneurial orientation was 792**. The value of t calculated 5.642 which is larger than its maximum scale value of 2.01, with a level of significance 0.05, this confirms the existence of a significant positive correlation relationship between quality costs and entrepreneurial orientation

Table 8. Spearman values and T values calculated between the dimensions of the cost of quality and the dimensions of the leading orientation

Total leading orientation Y			Y3 Proactive		Y2 Risk		Y1 Creativity ...		Leading orientation Cost of quality
	r	T	R	t	r	t	R	t	
r = .792** t =5.642	.649**	4.411	723**	5.732	516**	3.37	633**	4.202	Examination X1
	.697**	6.122	718**	5.885	528**	6.107	571**	8.001	Evaluation X2
	.804**	5.945	801**	6.421	925**	7.991	864**	6.609	Internal failure X3
	.701**	5.763	547**	6.711	831**	5.015	.578**	4.136	
	.792**	5.642	492**	6.132	748**	7.065	473**	6.123	External failure X4
The value of *t*) with the significance level (0.05) = 2.01									Correlation relationship with a significant level(0.05)

As for the sub-assumptions, Table 8 shows the correlation matrix between the sub-variables and the following:

- The first sub-hypothesis (there is a significant correlation between the examination and the leading orientation of its dimensions (creativity, risk, proactive). As shown in the above table, there is a significant positive correlation between post-examination and Entrepreneurial orientation dimensions, with correlation coefficient .633 **, 166 **, .723 ** respectively, the calculated value of t: 4.202, 3.37 and 5.732, respectively, is greater than the scale value of 2.01 at the level of significance 0.05. Thus accepting the first sub-hypothesis.
- The second sub-hypothesis (there is a significant correlation between the evaluation and the leading direction by its dimensions (creativity, risk, proactive). Table 8 shows a significant correlation relationship with correlation coefficient ** .571, .528 **, .718 **, respectively. The calculated value of t: 8.001, 6.107, 5.885, respectively, is greater than the scale value of 2.01 at the level of significance 0.05. Thus accepting the second sub-hypothesis.
- The third sub-hypothesis that says there is a significant positive correlation between internal failure and the dimensions of the Creativity, Risk, Proactive. Table 8 shows a significant positive correlation between the internal failure and the dimensions of Leading orientation, the coefficient of correlation is .864 **, .925, .801 **, respectively. The calculated value of t: 6.609, 7.991 and 6.421, respectively, is greater than the numerical value of 2.01 at the level of significance 0.05. Thus accepting the third sub-hypothesis.
- Sub-Hypothesis 4 there is a significant correlation between external failure and the entrepreneurial orientation in its dimensions (creativity, risk, proactive). Table 8 there was a significant correlation

between the correlation coefficients 578, ** .831, ** 547 **, respectively. The calculated value of t 4.136, 5.015, 6.711, respectively, is greater than the scale value of 2.01 at the level of significance 0.05. Thus accepting the fourth sub-hypothesis.

3.2. Test the hypotheses of influence

To test the second main hypothesis that was raised in the research methodology, which states (the existence of a significant effect between the cost of quality in the lead orientation and its dimensions), from which the following sub-assumptions are derived:

- There is a significant moral examination in the direction leading effect;
- There is a significant moral evaluation in the direction leading impact;
- There is significant internal moral failure in the direction leading effect;
- There is a significant moral failure of the external orientation leading effect.

The analysis was done using Simple Regression Analysis. In this article, as it comes explain the hypothesis of the second hypothesis and its sub-hypotheses:

This hypothesis was tested using a simple regression analysis. A relational relationship was created between the actual value of the variable (the Entrepreneurial orientation), which gave the Y symbol and the main explanatory variable (quality costs) and its symbol X. Table 9 shows the variance analysis showing the significance of the model according to the test of f and it was calculated at 33.288, which is greater than the tabular value of 4.07 with a significant level 0.05 and with confidence limits 95%. This proves that the quality costs have a clear influence on the Entrepreneurial orientation. This confirms that the regression curve is good for describing the relationship between the two variables, as a value is indicated R2 which is a descriptive measure that explains the usefulness of the regression equation in the estimation of values and represents the percentage of errors in the use of the regression equation. The value of R2 586 It shows that amounts to 0.586. Of the variance in (leading orientation) It shows that the variance of 586 of the variance in the (Entrepreneurial orientation) is the variance explained by the (quality costs) that entered the model and what is estimated 414 is a variance explained by random factors that did not enter the regression model. As indicates at Table 9 the significance of 0.000 in the outputs of the statistical program, which is an indication of the impact of the cost of quality on the leading approach. Thus, the second main hypothesis of the research is achieved (there is a significant effect between work pressures and quality of service). To confirm this result, we clarify the sub-hypotheses

Table 9. Analysis of the impact of the dimensions of the costs of quality orientation in leadership

Variable resolution	The decision	The level of significance (p)	The calculated value (F)	Coefficient of determination (R^2)	Variable and interpretive dimensions
Leading trend (Y)	significance (impact)	.000	33.288	.586	Quality costs (x)
	significance (impact)	.000	29.543	.584	Examination (X)
	significance (impact)	.000	21.091	.492	Evaluation(X2)
	significance (impact)	.000	30.187	.472	Internal failure (X4)
	Significance (impact)	.000	19.163	.504	External failure X4
	N = 45		The value of (F) of the table with the level of significance (0.05) = 4.07		

The sub-hypotheses were tested using (Simple Regression Analysis), where a relational relationship was created between the value of the responder variable (the entrepreneurial orientation) It was given the Y symbol and explanatory sub-variables (examination, evaluation, internal failure, external failure) and symbols (X1, X2, X3 and X4), respectively.

Table 9 shows the value of f calculated for explanatory sub-variables, respectively 29.543, 21.091, 30.187, 19.163 which is greater than their tabular value 4.07 at a significance level 0.05, which confirms the effect of these explanatory sub-dimensions. In the transponder variable, indicating that the regression curve is good for describing the relationship between these variables. The value of the R2 is shown in Table 9 which has a value of X1 examination was 584. This means that the value of 5.84 of the variance in the (entrepreneurial orientation) is explained by the sub explanatory variable, X1 examination which entered the model, and what the value was 166

is a variance explained by other factors that did not enter the regression model. The value of the selection factor also indicates R2 which has a value of X2 evaluation 492. This means that the amount 492 of the variance in leading orientation is explained by the explanatory variable X2. Evaluation which entered the model and what amount 508 is a variance explained by other factors.

The value of the determination factor is shown R2, which has a value of X3 (internal failure) 472, means that the value of 472 of the variance in the (leading trend) is explained by the explanatory variable X3. Enter the model, and that and that amounted to 528 is the difference explained by other factors, and the value of the identification factor R2 of the variable X4 (external failure) 504. That means what amount of 504 of the variance in the entrepreneurial orientation is a difference explained by the explanatory variable X4 (external failure) which entered the model, and that the amount of 496 is a variance explained by other factors did not enter the regression model as shown in Table 9. The results of the statistical system showed a significant 0.000 for all dimensions this confirms the effect of the explanatory variables sub (examination, evaluation, internal failure, external failure) in the response variable (leading trend). Based on the above tests, it is possible to say that the subsidiary assumptions have been achieved (examination, evaluation, internal failure, external failure) in the response variable (entrepreneurial orientation). Based on the above tests, it is possible to say that the subsidiary assumptions have been achieved.

Conclusion

- The results of the research showed the company's keenness to pay attention to the costs of quality (inspection, evaluation, internal failure, external failure) and reduce it to strengthen the leading direction;
- The results showed the company's interest in testing that required to the internal raw materials in the production process, dealing with reliable suppliers and paying attention to the good design of the product in order to reduce costs;
- The company is working on the development of special equipment for the process production and the development of human cadres for reduced the special costs of waste of resources and lack of experience;
- The company's interest towards the concept of entrepreneurship (pioneering) through its own creative cultural ideas that encourages adventure and delving into the unknown to deal with new opportunities, and the ability to extrapolate environmental variables and find appropriate solutions to them proactively;
- The results showed the need for the company to create a spirit of competition among working individuals in order to motivate them to show their creative ideas and innovative;
- The results showed that all correlation and effect relationships are positive with significant statistical indicative for quality costs and entrepreneurial orientation variables.

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Factors Militating Against Efficient Procurement Processes in Small and Medium Enterprises

Sefiu Olawale ALABI
Maritime and Logistic Management Department
Australia Maritime College, University of Tasmania, Australia
soalabi@utas.edu.au; alabisheffy@gmail.com

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Abstract:

Procurement process is regarded as one of the critical factors in a successful supply chain management of an organization. It is one of the series of activities perform by an organization to promote the effective utilization of her scare resources in the supply chain and indeed the hallmark of an organizational success. Efficiently following the procurement processes and promoting strong adherence to the principles in an organization has been identified in the literature review as a way of successfully manage the organizational scare resource and increase the overall profit. While the processes of procurement in some of the sampled enterprises for this research were clearly highlighted for staff to follow, the extent of compliance is significantly low.

Therefore, this study looks at how some of the independent variables, procurement procedures and planning, staff competence, organizational structure, information technology and allocation of resource impact the efficient procurement process which is the dependent variable. Secondary data was mainly used in this research and 97 employees representing the sample frame of 125 staff handling procurement processes in the 25 selected enterprises were used for evaluation. A systematic review of the literature was also carried out to distinguish the factors that accelerate or impede procurement processes along the supply chain of the selected small and medium businesses in Launceston, Australia and these identified factors was evaluated to provide implications for the managers and procurement team.

Keywords: supply chain; Small and Medium businesses; procurement process; procurement efficiency.

JEL Classification: L26; M21.

Introduction

The present competitive business world where organizations are faced with challenges of managing their scares resources has put continuous pressure on businesses to seek all opportunities that enhances the management of available capabilities (Berisha and Pula 2015). For organization to excel in their service deliveries to customers and surpasses their competitors, a high quality of product, at lowest price and made available in a minimum time is desirable (Barsemoi, Mwangagi, and Asienyo 2014).Therefore, the supply chain of such organization needed to be well-managed and has capability to reduce cost while enhancing customer service with a good quality of product at a low price (Fawcett, Ellram and Ogden 2007).

Procurement is one of the segments of supply chain and it is one of the processes that enhance efficient management of the supply chain of an organization (Cheptora, Osoro, and Musau 2018a). According to Damas (2013), procurement processes are a series of activities executed by an organization to enhance effectiveness in the process of managing her supply chain capabilities, it is therefore the basis of any small business owners. Efficiently managing the procurement processes leads to viable purchases and receiving of superior materials when properly implemented (Kakwezi and Nyeko 2019). Procurement goals have gone beyond quality, technical risk reduction and cost reduction, but also into collaboration with suppliers in providing technical expertise that enhances the business (Sanderson, Lonsdale, Mannion, and Matharu 2015). Several factors such as the level of professionalism, staff competency, budget resources, the structure of the organization (centralized or decentralized) internal control policies, procurement ethics and regulation are some of the factors that have impact on procurement performance in small and medium enterprises (Wanyonyi and Muturi 2015). Procurement is the hallmark of an organization, and its approaches would determine the success or otherwise of any business entity (Fawcett *et al.* 2007). According to Omanji and Moronge (2018), the inefficient procurement process has been attributed to incompetent staff, traditional procurement processes, unwillingness to accept e-procurement, lack of proper regulation and quality assurance policies and corruption sometime may occur in procurement processes.

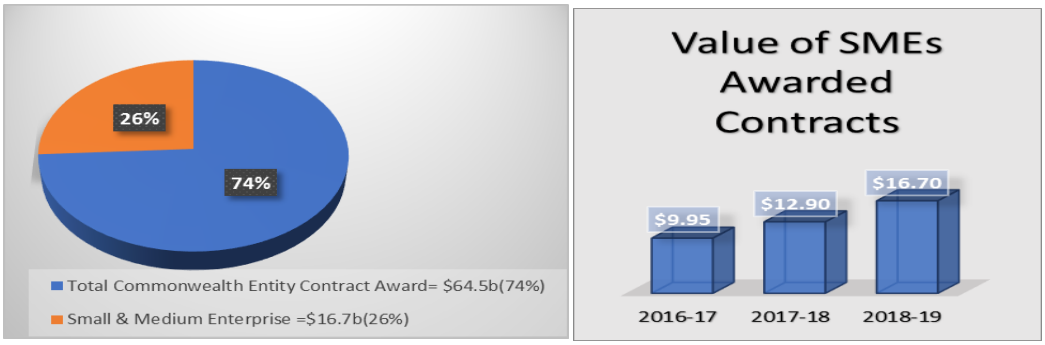
The Small and Medium Enterprises Participation and Procurement Processes in Australia

Small and medium-sized enterprises play a significant role in Australia economic growth and job creation(Acs and Audretsch 1988). Bhattacharya and Bloch (2004) and Rosenbusch, Brinckmann and Bausch (2011) investigate determinants of innovation for SMEs in Australia companies using data from Business Longitudinal survey and researched by the Australia Bureau of Statistic (ABS), the studies revealed that firm size, international trade and procurement, research and development enhance the contribution to the economy from the SMEs. In spite of the development in ecommerce business technologies, research conducted indicates that the e-commerce is not being adopted as readily by the SMEs in the procurement processes as it would have been expected (Ballantine, Galliers and Stray 1996). The fast-evolving nature of e-business and technological development are new to many SMEs, hence challenges such as managing the increase flow of information, security, high cost of acquiring the skill are prevalent among the small businesses (Ballantine, Levy and Powell 1996).

However, Small-to-Medium Enterprises participation in economic growth of Australia are encourage by given consideration to market that reduce the burden and time for SMEs to participate (Waldersee 2012), encourage innovative response and allow SMEs to compete with larger entrepreneurs. SMEs are also encouraged to be open to joint ventures or consortia to enable partnership with other players. The use of suitable procurement process, keeping contract document simple and in plain English and ensure the contract terms and insurance requirements are reasonable and the risk are proportionately addressed are some of the procurement procedures in the SMEs (Treasury 2006). SMEs are considered an origin of immense innovative practices and contribute greatly to the development of the entrepreneurship (Vasilescu 2008)

The Australia Government is committed to supporting SMEs in overcoming any of her challenges through government procurement processes and procedures and by adhered to the Commonwealth Procurement Rules (CPRs) which includes at least 10% by value of all procurement from SMEs (Murray 2011). For instance, and as an indication of the government commitment, 35% of contract valued up to $20 Million came from SMEs in 2018 (Gourdon and Messent 2019). There exist a range of policies and frameworks to support SMEs in the Government procurement and bidding processes, including *the indigenous Procurement Policy* which is a mandatory procurement-connected policy that mandated firms to contract with indigenous businesses, predominately SMEs. *The Australian Industry Participation* is another mandatory procurement connected policy that allows full and fair opportunity for Australia SMEs to compete for contract while *the supplier pay on time Policy* focuses on facilitating timely payment to suppliers.

Figure 1. The total value of contract awarded to SMEs Increased from $12.9 billion in 2017 to $16.7 billion in 2018-19. representing a 29.1% increment



Source: Statistics on Australian Government Procurement Contracts, 2019, Australia Government, Department of Finance, accessed 25 January, 2020.

1. Literature Review

According to Giunipero *et al.* (2006), Hines (2006), and Porter (1998), procurement is defined as the acquisition of services, goods, knowledge and capabilities that are required by businesses from the right source, at the right time, in the right quality, at the right quantity and at the appropriate time to manage and maintain the company's immediate and strategic activities. In the same vain, Mangan *et al.* (2008) defined procurement as the process involved in recognizing and obtaining goods and services, it includes sourcing and identify potential suppliers to deliver an item as specified. The search was conducted in academic database of google scholar and the following terms were used for the search; Procurement processes in SMEs, purchasing procedures in SMEs and Buying processes in SMEs and the potential paper were identified based on the relevance to the research.

1.1. The Procurement Procedures and Planning

Firms need standard procurement processes which cover every aspect of procurement cycle including supplier selection, negotiation of contract, placement of order and payment (Kariuki and Kwasira 2014) and procedural process of procurement ensures efficiency and orderliness in any procurement department (Hamza, Gerbi and Ali 2017). Kuloba (2016) affirm that every firm is expected to develop procedure to enable its personnel implement plans and policies designed to meet the organizational objectives. Procurement planning and procedures are critical and form the major function that enhances successive procurement activities (Berisha and Pula 2015).There is need to help SMEs companies to improve on their competitive advantage and further contribute to the economy, and to discover the benefits of SMEs and their achievements, numerous quality improvement strategies have been implemented in recent past (Danis and Kilonzo 2014). However, procurement is yet to receive the required attention from SMEs and experiences indicate that SMEs need a change in procurement planning and procedures but not really on investment in capital resources (Fee, Erridge and Hennigan 2002). An appropriate procurement plans and procedures should describe the process in detail (Kihara and Ngugi 2013) hence, it is an opportunity for all stakeholders to meet and design an appropriate operations processes.

1.2. The Staff Competency

According to Armstrong and Baron (1995), competency is the application of skills and knowledge as well as the required behavior in getting things properly done by following the right rules, policies and procedures, competency shows adequacy of the required knowledge and skills which enable someone to act in a particular role (Novack and Simco 1991). According to Russell (2004), in adequate procurement skills and knowledge is a disservice to an organization and consequently lead to decline in the financial health. Many organizations do not employ the right and competent staff to oversee the procurement process and this resulted to additional investment incurred in development and training (Sultana 2012), and qualifications are essential for value-based management (Johnson, Klassen, Leenders and Fearon 2002). Some of the data from the literature reveal that the greater the competitive pressure from business atmosphere, the more strategic measure to develop purchasing process (Ellegaard 2006). Krajic (1983) suggested a contingency strategy in which procurement strategy is aligned with the complexity of the procurement situation. For instance, when the complexities of procurement in an organization is high, it should be reflected in the strategy and position of the procurement in such organization structure, and thus require competent staff to handle (Olsen and Ellram 1997). Today's procurement processes are characterized by employee who does not have any certification or tertiary training in procurement processes and have not been adequately sensitized on the criticality of their function (Sanderson *et al.* 2015).

1.3. Organization Structure

According to study conducted by Chandan (2006), procurement operating procedures, rules and regulations for performance standard are set for staff to make them understand the expectations from them. The procurement department in an organization often reflects the organizational structure of the business, communication patterns, the size of the department and the extent of centralization impact the underlying structure (Kiage 2013) and the function is critical to the long-term success and efficiencies of an organization (Kihara and Ngugi 2013). For a small business, the procurement process generally has flat informal organizational structures (Mor, Bhardwaj, Singh, and Nema 2019), and a department with only a few employees would have no formal hierarchy, everyone takes responsibility for procurement decisions and executes procurement duties (Ndolo and Njagi 2014). Typical procurement department evolves in a less flat with a relatively simple organization where the procurement department has a manager with the employees and shows a high degree of centralized procurement and information flow from the top to the employee (Stake 2017). However, a highly emergence procurement department adopts a network of organizational structure where procurement standard, policies and operating procedure flow from the head office to each departmental location (Perkins and Gunasekaran 1998).

1.4. Information Communication and Technology

The introduction of information technology into the procurement process was meant to ease some of the difficult aspect of the process, track data, reduce common problems and generally make procurement activities function efficiently (Castorena, Enríquez and Adame 2014). ICT plays a prominent role in fostering SMEs procurement process in this present technological age, and its importance has been a central of discussion in business especially to mitigate risk of financial performance in SMEs (Cheptora, Osoro and Musau 2018b). However, several studies show that this important technology has not been fully utilized in SMEs enterprises to gain the inherent potential in the use of ICT especially in the manufacturing area of the economy (Vachani 2005). Small business procurement

activities evolved from the manual order system to nowadays e-procurement thereby ease the management of the multitude of data in procurement processes (Yalamalle and Suresh 2013), activities such as inventories, orders, contracts, finance and so on are tracked and updated in real time (Olusegun and Akinbode 2016). Less time and space are now needed to manage the crucial procurement process, information that could fill a room when kept in hardcopies are now available on computer (Nzau and Njeru 2014), staying up to date and prompt decision making is assured with technology (Janda and Seshadri 2001). According to Rusek (2006), digital information and the advance of the internet have improved the efficiency of the procurement activities in the small and medium sector of the economy and the advent of technology has also streamline the procurement processes by making the process faster with more accuracy.

1.5. Allocation of Resource

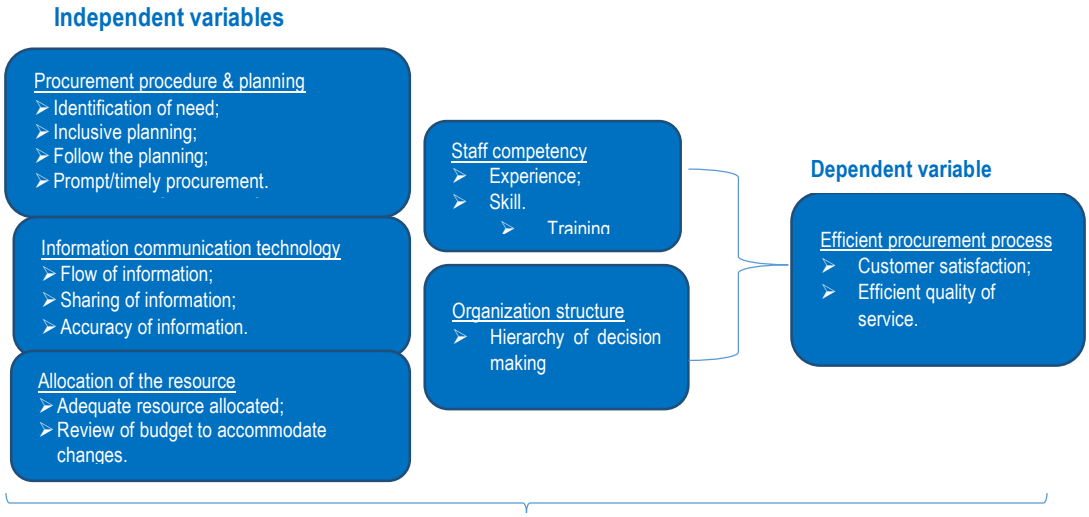
Allocation of resource is the procedure and strategy used by the organization to determine where scarce resources should be used in the production of goods or service delivery. The allocation of the available resource or asset in the best way possible to execute a given task or project is vital in any organization either small or big businesses. Organization allocates available asset and resources in such a matter that would minimize cost and maximize profit margin using strategic planning and operational policies and procedures that make the business achieve the set objectives (Maréchal and Morand 2012). Allocation of resource and asset of an organization is the startup of the strategic approach to formulate goals and vison for the future. The growth in the SMEs sector of the economy depend on the potential of investment and innovation (Islam 2016) and investment requires capital and access to finance. The consistently complaint of lack of fund from SMEs sector is a constraint that often endangers the economic growth of countries (Nzau and Njeru 2014). Financial access is not only critical, but the efficient allocation is also important for SMEs growth and development (Vachani 2005) The early emergence of SMEs revealed that the sector rely on internal source of finance, savings from owners, funds from sales of assets and retained earnings which presently cannot cope with the trend of the economic growth (Wanyonyi and Muturi 2015)

2. Research Methodology

The conceptual framework shown below explains the relationship between the variables in this research. The efficient procurement process is a dependent variable and can only occur when all the independent variables (Allocation of resource, information and communication technology, organization structure, staff competency and procurement procedure and planning) are properly and adequately harness, therefore if all these factors are aligned in the procurement process it will make the process efficient (Mufutau 2013). Investment in staff to enhance their competency may likely create competitive advantage for an organization and consequently increase the quality of services delivery. Hence, the efficient procurement process which is dependent of other factors could be defined as the task accomplished by the employee and resulted in customer satisfaction through diligent procurement processes. Therefore, this research seeks to ascertain the effect of the above factors on the efficient procurement process in the SMEs in Launceston city of Tasmania, Australia.

2.1. The Conceptual Framework

Figure 2. Conceptual framework



Source: Author's design

2.2. Data Collection Method

The study adopted a descriptive research design. The descriptive approach centered on describing, analyzing and interpreting the condition that existed using balanced research design (Dulock 1993). The target population for this research was 25 selected small-to-medium business enterprises operating within Launceston with each haven minimum of 5 employee handling the procurement processes, and this make the selected population to be 125 employees.

The study mainly concentrated on using secondary data because of the cost effectiveness advantage offer by it (Shultz, Hoffman and Reiter-Palmon 2005). The sample frame was taken from the selected population of 125 staff handling the procurement processes in 25 selected business enterprises. According to Morgan (1970), for 125 population, sample size 97 is required for the study. Therefore, 97 employees from these selected enterprises represent the sample size. Data for the sample size were collected from written material which includes relevant websites, books, e-journal and relevant past studies on SMEs. A closed-ended questionnaire and Likert scale was used to measure the responses from the respondents.

2.3. Method of Data analysis and Presentation

Descriptive and inferential statistics were used for data analysis. Statistical Package for Social Sciences (SPSS Version 20) was utilized as the main descriptive statistical tool to analyze the data and determine the extent of relationships between the independent and dependent variables. Inferential statistics (correlations and multiple regression analysis) were used to give a measure of the relationships between two or more variables and establish if there was any relationship or there exist a cause-effect relationship between the variables.

3. Empirical Findings

Many research models have been formulated to analyze and explain performance measurement and various modalities that organizations can adopt to enhance performance at strategic and functional level (Adomako-Ansah 2012). This research plays a vital role on the evaluation of factors militating against procurement performance measurement initiative. Hence, this study centered on the concept of performance of organisational resources, internal control theory and resource-based concept. This study therefore sought to access factors militating against performance measurement in SMEs in Launceston city of Tasmania, Australia. The first approach was to investigate the extent to which procurement procedure and planning affect performance measurement and then extend the investigation to other factors to determine the extent of their influence on efficient procurement processes in the SMEs of the city being investigated.

3.1. Preliminary Analysis

Table 4.1 represents the summary statistics of the series of Eff.P (efficient procurement), the dependent variable, followed by dependent variables, SC (staff competency), ICT (information communication technology) and RA, (resource allocation) in local SMEs in Launceston. The mean for indicators indexes of Efficient Procurement (the dependent variable), followed by independent variables, SC Staff Competency, ICT information communication technology and RA, the Resource Allocation are: 15.98969, 16.36082, 40.92 and 16.36082 respectively for SMEs in Launceston. The standard deviation for dependent variable (Efficient Procurement) and independent variables (SC - Staff Competency, ICT - information communication technology and RA - Resource allocation) are 2.796929, 3.159594, 6.154049 and 3.159594 respectively for the sample. The result also indicates that the data are normally distributed since the values for skewness and kurtosis are within the normality range ±3.00 and ±10.00 for skewness and kurtosis Kline (1998). In addition, the result of group normality test presented in the Table 1 indicates that the data are normally distributed.

Table 1. Results of descriptive statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max	Skewness	Kurtosis
Eff. P	97	15.98969	2.796929	9	20	-0.879	1.204
SC	97	16.36082	3.159594	6	20	-0.174	-0.773
ICT	97	40.92000	6.154049	23	50	-1.360	2.171
RA	97	16.36082	3.159594	6	20	-0.174	-0.773

Note: Mean values presented first and standard deviation, Minimum, Maximum, Variance, Skewness, Kurtosis and Observation, ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.
Source: Author's estimations.

3.2. Multiple Regression Analysis

The relationship between SC - staff competency, ICT - information communication technology and RA - Resource allocation and Eff.P - efficient procurement has been acknowledged by both theories and research literature in many countries of the world. However, the result from the Table 2 confirmed the existence of correlation among the independent variables. Meanwhile, low correlation enables us to predict the absence of multicollinearity problem and the independent variables. In other words, the study found the evidence of no collinearity problem between the explanatory variables since none of the bivariate correlation exceeds 0.7 therefore there is no multicollinearity problem.

Table 2. Results of correlation analysis

Variables	Eff.P	SC	ICT	AR
Eff. P	1.0000			
SC	0.0120	1.0000		
ICT	0.1517	0.9437	1.0000	
RA	0.7165	0.0906	0.0808	1.0000

Note: Eff.P is the efficient procurement (the dependent variable), followed by dependent variables, SC - staff competency, ICT - information communication technology and RA – resource allocation. The correlation matrix is used to measure the strength and direction of the linear relationship between the two and more variables. In the practical method, the correlation coefficient can range from -1 to +1, with -1 indicating a perfect negative correlation, while +1 indicating a perfect positive correlation, and 0 indicating no correlation at all.

Source: Author's estimations.

3.3. Collinearity Statistics

It is extremely recommended that the test of Multicollinearity is examined on the variables before the testing of the proposed model (Hair, Black, Babin, and Anderson 2013, Tabachnick, Fidell and Ullman 2007). This indicates the existence of relapse in the correlation matrix where the independent variable is high and significantly correlated with another independent variable. Also, multicollinearity is the extent to which a variable can be explained by the other variables in the analysis (Tabachnick *et al.* 2007). Because of collinearity, it is difficult to ascertain the effect of any single variable. This study included the use of Variance Inflation Factors (VIF) to examine multicollinearity, and VIF value greater than 5 indicates multicollinearity. In this study, the VIF values were below the standard criteria, indicating no multicollinearity issue while heteroskedasticity-consistent standard error was used to correct the heteroskedasticity problem. Autocorrelation was corrected using the white diagonal method. The Table 3 shows the evident of no heteroscedasticity and auto-correlation.

Table 3. Multicollinearity Test for Exogenous Latent Constructs

Items	VIF
Eff. P	2.537
SC	2.347
ICT	2.763
RA	3.096

Note: Eff.P is the efficient procurement (the dependent variable), followed by dependent variables, SC - staff competency, ICT - information communication technology and RA – resource allocation.

Source: Author's estimations.

3.4. Coefficient of Estimation

Having examined the significance and relevance of the path coefficients, the explanatory power of the structural model was determined by the coefficient of determination R-square values (Hair, Sarstedt, Pieper, and Ringle 2012). Another essential criterion for measuring structural model in the PLS-SEM is the use of R-squared values or the coefficient of determination (Hair Jr, Sarstedt, Hopkins and Kuppelwieser 2014, also Hair, Hollingsworth, Randolph and Chong 2017, Hair *et al.* 2012). According to literature, R-square is the indicator that shows the amount of variance examined in the endogenous variable by its exogenous variable. (Chin 2010) the quality of the variables included in the model (Hair *et al.* 2012). However, many criteria can be employed as guidelines for assessing the level of R-square. For example, Cohen (1988) criterion opines that R-square value which equals to 0.26 or more is considered to be substantial, 0.13 moderate, and 0.02 weak. Meanwhile, Chin (1998) criterion states that R-square value which equals to or more than 0.67 is substantial, 0.33 moderate, and 0.19 weak.

Table 4 depicts the R-squared values of the endogenous (staff competency, information communication technology and resource allocation) latent variables on its impact sum together on efficient procurement in SMEs of the city being investigated.

Table 4. Dependent Variable (Eff.P)

Variables	B	Std. Error	Beta	Lower Bound	Upper Bound	Tolerance
(Constant)	3.284	2.433		-1.551	8.118	
SC	0.609	0.165	0.436	0.282	0.936	0.394
ICT	0.083	0.081	0.136	-0.079	0.244	0.307
RA	0.065	0.177	0.048	-0.286	0.417	0.323

Note: Eff.P is the efficient procurement (the dependent variable), followed by dependent variables, SC - staff competency, ICT - information communication technology and RA – resource allocation.

Source: Author's estimations.

Table 5. Main Effect on Dependent Variable (Eff.P)

R	R Square	Adj R Sq	Std. Error	F Change	Sig. F Change	Durbin-Watson
0.712a	0.607	0.580	2.72426	19.642	0.000	1.668

Source: Author's estimations.

Table 5 depicts that Staff competency positively influence efficiency procurement to a significant extent, which confirms the Hypothesis of the study as the majority of the procurement efficiency index are positive. The coefficient of R square is 0.607 which indicates 50% influence of Staff Competency, information communication technology and the Resource allocation on efficiency procurement. Additionally, F-statistics (19.64, $p<0.001$) shows that the model is significant. This confirmed the significance of all the three dimensions on efficient procurement of SMEs in the city of Launceston. Furthermore, with regards to the individual significance of determinant of efficient procurement, the coefficients of SC - staff competency, ICT - information communication technology and RA - resource allocation are positively related to students' loyalty in UAE's private local higher institution (Alhadhrami 2013). This result indicates that SC, ICT and RA summed together induced Eff.P for SMEs in Launceston. This indicates that SC, ICT and RA induced efficiency procurement by 0.609, 0.083 and 0.065 respectively. The findings indicate that SC, ICT and RA are good variables for decision making among SMEs in Launceston.

Table 6. Summary of hypotheses tested for the model

S/No	Variables	Hypothesis	Predicted Sign	Actual Sign	Statistical Sign.
1	SC	H1	+	+	Support
2	ICT	H2	+	+	Support
3	RA	H3	+	-	Support

Note: Eff.P is the Efficient Procurement (the dependent variable), followed by dependent variables, SC - staff competency ICT - information communication technology and RA – resource allocation.

Source: Author's estimation.

Conclusion, Implications and Recommendation

The aim of this research was to determine factors militating against efficient procurement processes in small-to-medium scale enterprises in Launceston city of Tasmania. The study established that staff competency has the greatest impact on the procurement performance measured in terms of efficient service delivery in the selected SMEs as compared to procurement procedure and planning, ICT, allocation of resource and organizational structure with ICT being the least factor affecting the efficient performance of procurement activities in those selected SMEs.

The implication is that inadequate training, low level of education as well as insufficient understanding of procurement ethics have the tendency of undermine the other identified factors and could make SMEs not able to achieve the set goals. Information and communication technology, resource allocation, procurement procedure and planning cannot efficiently influence procurement process without a competent staff (Mor *et al.* 2019).

In view of this, the selected SMEs required the competent hands to properly manage all her procurement activities to harness all capabilities.

Limitation and Future Research Direction

It is very important that some of the limitations of this research are mentioned to further assist in the future studies as well as providing future direction in this area. First in the constraints encountered was limited time available to

complete this work which does not provide enough room to further go deeper in the study. The second limitation was the sample size from twenty-five organizations which is quite small and may reduce generalization, hence limiting the use of the results for significant relationship. For future direction, the current study investigated five independent variables (procurement procedure and planning, staff competency, allocation of resource, Information and communication technology (ICT) and organization structure) which according to this research are part of the variables that determine efficient procurement process. Future research is recommended to examine other factors (*e.g.* supplier collaboration) that may impact procurement processes in SMEs. Also, this study investigated the impact of these five variables on efficient procurement processes on SMEs in Launceston area of Australia, further research in this area is recommended to establish whether these results would be similar to other SMEs in other locations.

Recommendation

In spite of the constraints and limitation faced by this research, the study could still be adapted and referenced, hence the following recommendations are proposed.

- Awareness of staff through training is imperative to achieve excellent competencies in the procurement process in Launceston SMEs.
- Appropriate and competent procurement staff should be involved at the earlier stage of procurement planning, participatory procurement annual plan and frequent review where necessary to align with the current market trend are recommended.
- Adequately equipped and sensitized staff are paramount for procurement process efficiency; therefore, Launceston SMEs stand to benefit if resources are allocated for procurement department to encourage training that will improve the skill of the procurement staff.
- It is also recommended that procurement processes and procedure be adequately followed at all level of management by all these SMEs in other to enhance the efficient performance.
- The study recommend that the use of ICT should further harness as an inter-linked to procurement function to make the process more efficient.

Conclusion

The study concluded that staff competence and resource allocation were the factors that mostly impact the efficiency of the procurement processes in the selected SMEs. Some of the elements that were used to measure the competencies of the staff handling procurement processes in the selected SMEs are the negotiation skill, creativity, analytical skill, training, motivation and deployment of the right employee based on skill set, understanding of procurement procedure. The resource allocation was investigated in relation to the adequateness, flexibility of the budget to absorb economic variability, awarded of tender base on availability of resource and the appointment of competent staff to man the resource allocation. The research indicated that a unit increase in the staff competence resulted to an increase in the efficiency of the procurement process likewise a unit increase in the allocation of resources raise the level of the procurement efficiency.

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Information and Communication Technology, Transportation Infrastructure, and Their Effect on Inward Foreign Direct Investment in the ASEAN

Patcharee PREEPREMMOTE
Business Administration Department, Faculty of Science and Arts
Burapha University[1],Thailand
patcharee_p@buu.ac.th; p.preepremmote@gmail.com

Thanaphon PHUKSENG
Information Technology Department, Faculty of Science and Arts
Burapha University, Thailand
thanaph@buu.ac.th

Thutchanan SANGWAN
Logistics and Cross- Border Trade Management Department
Faculty of Science and Arts, Burapha University, Thailand
thutchanan.sa@buu.ac.th

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Abstract:

The purpose of this study is to investigate the roles of information and communication technology (ICT) and transportation infrastructure in influencing inward foreign direct investment (FDI) in the ASEAN for the period from 2000–2018 using panel analysis techniques involving pooled ordinary least squares (OLS), fixed and random effect. Specifically, ICT and transportation infrastructure together with other determinants of FDI such as economic growth, openness, tax barriers, and labor force capacity are applied to analyze their effects on inward FDI.

The results of this study are consistent with the literature, whereby macroeconomic factors such as economic growth, trade openness, and the labor force have a positive impact on inward FDI. The results also suggest that ICT has a significantly positive impact on inward FDI in the ASEAN. In terms of transportation infrastructure, road quality is the main factor attracting FDI into ASEAN countries. The results of this study can be used as guidance for policymakers on FDI, and encourage the government to pay greater attention to the development of both transportation infrastructure and ICT. The quality and availability of infrastructure in the host country definitely attracts FDI.

Keywords: foreign direct investment; information and communication technology; transportation infrastructure; ASEAN.

JEL Classification: F40; O16.

Introduction

The Association of Southeast Asian Nations (ASEAN) is one of the world's fastest-growing regions. Foreign direct investment (FDI) inflows have been one of the most important factors behind the strong economic growth achieved by Thailand, Malaysia, and Singapore (ASEAN Secretariat News 2019). These countries primarily provide tax incentives and cost advantages to foreign investors. The literature indicates that FDI inflows are determined by market size, degree of openness, and the role of institutions. Besides, other factors such as the labor force, tax rate, transportation infrastructure, and ICT are correlated with FDI inflows. Moreover, many studies discuss the macroeconomic factors influencing FDI inflows into ASEAN countries. However, none of the existing research articles determine the impact of transportation infrastructure and ICT on attracting FDI in ASEAN countries.

This paper aims to elaborate on the role of transport infrastructure and ICT for inward FDI into the ASEAN. The results of this study can be expected to provide a guideline for government agencies in host countries when designing policies to attract FDI into their countries. The remainder of the paper is organized as follows. Section 2 provides an overview of the transportation infrastructure and ICT situation in the ASEAN; section 3 presents an

[1] Moo1 Chon Pratan Road, Kamong Sub-district, Tha Mai District, Chanthaburi Province 22170

empirical literature review; section 4 outlines the methodology and data. The results and conclusions are provided in sections 5 and 6, respectively.

1. Literature Review

Most researchers believe that economic factors are important in attracting FDI, including market, resource, efficiency and strategic asset seeking, regulations, and business (Nunnenkamp 2001, USAID 2005, Okapanom and Sricharoen 2016). However, many previous articles highlight the importance of physical infrastructure as one of the determinants for attracting FDI inflow. Infrastructure covers many dimensions, ranging from roads, ports, railways, and telecommunications. Countries with good physical infrastructure such as highways, ports, and ICT are likely to increase their productivity and attract more FDI (Coughlin *et al.* 1991, Wheeler and Ody 1992, Khadaroo and Seetanah 2010, Abu Bakar *et al*. 2012, Pribadi *et al.* 2019). Moreover, infrastructure facilities, such as communications, transportation, and energy supply determine production and transaction costs, thus influencing incentives for the attraction of FDI into a country. In contrast, Gold *et al*. (2019) found that infrastructure had a significantly negative impact on FDI in Africa. Infrastructure factors are often mentioned in literature, although they refer to a variety of aspects.

ICT encourages FDI either by reducing the search time and related costs or through increases in efficiency and productivity. ICT can also increase productivity and FDI by cutting the cost of holding inventories through "just-in-time" inventory management by supporting closer integration between demand and production. Just-in-time management can lead to significant reductions in production costs by permitting a direct link between customers and producers. ICT also influences FDI indirectly through its effects on other related determinants. For example, a good ICT infrastructure also enhances the attractiveness of countries to export-oriented FDI. ICT provides the logistical support to facilitate exporting, contributing to a country's attractiveness to foreign investors seeking to establish a presence to serve regional or global markets (Economou 2008).

Moreover, ICT can also improve transparency in host countries and reduce corruption, which acts as an impediment to FDI. Likewise, Latif *et al*. (2018) studied the dynamics of ICT, FDI, globalization, and economic growth in BRICS countries (Brazil, Russia, India, China, and South Africa), emerging economies with ICT infrastructure (consisting of five indicators: a landline telephone, mobile phones, Internet services, Internet users, and fixed broadband). These researchers found that FDI increases with the development of ICT; better ICT attracts more FDI in BRICS countries. This is consistent with the research conducted in Egypt by Fakher (2016), who found that a more developed ICT infrastructure attracts FDI, further strengthening economic growth. This is in the same direction as the research by Gholami *et al*. (2005), who studied the relationship between ICT and FDI in 23 major countries with heterogeneous economic development for the period 1976–99. They found a causal relationship between ICT and FDI in developed countries, meaning that a higher level of ICT investment leads to increased FDI inflow. Accordingly, ICT may contribute to economic growth indirectly by attracting more FDI. In addition, Kok and Ersoy (2009) discovered that telephone mainlines had a strong positive effect on FDI; this factor thus being the best FDI determinant in their analysis. Economou (2008) introduced that a 10% increase in the growth of Internet users or Internet hosts is correlated with a 2% increase in FDI flows.

In relation to inward FDI, the logistics sector, which includes transportation infrastructure, has been mentioned in various literature. Halaszovich and Kinra (2018) revealed that investments (FDI inflows and stocks) are more concerned with domestic transportation, especially by road, but less concerned with ports, which aligns with the sample case in this current study on Asia. Correspondingly, Bagchi (2014) investigated how supply competence attracts FDI by proposing three major factors, namely the supply environment, supply infrastructure, and absorptive capacity.

However, Luttermann *et al*. (2017) presented contrasting results, in that the logistics infrastructure has a positive influence on export and import volume, but not the factors attracting FDI. Khan *et al*. (2017) examined the long-run, causal relationship between environmental logistics performance indicators (ELPI) and growth-specific factors in a panel of 15 selected globally ranked logistics countries during the period from 2007–2015. The results indicate that logistics competence and infrastructure drive economic growth and add sectoral value, while energy demand and FDI inflows are both prerequisites for sustainable regional agriculture. Önsel Ekici *et al*. (2016) found that national inland transportation systems are important in the location choice for FDI and trade relations. Wang *et al*. (2016) evaluated the influencing criteria for attracting FDI by including legal and institutional factors, the market size of supporting industries, human resources, infrastructure facilities, technological development and innovation, domestic supply capacity, international cooperation and competition, and other criteria. While Çelebi *et al*. (2015) demonstrated the mediator effect on FDI in the relationship between LPI and GDP and found it to be statistically significant. Kampan (2017) recommended that to attract FDI in ASEAN countries, the efficiency of

customs and investment policies, security, safety as well as infrastructure development, especially road transportation systems, needs to be improved.

According to previous literature on ICT, the telecommunications sector has been identified as telephone and Internet networks. While transport infrastructure has been categorized according to modes of transport, namely ports, airports, roads, and railways, all of which are of major concern to investors.

2. Some Stylized Facts about Inward FDI, ICT, and the Transportation Infrastructure Situation in the ASEAN

FDI inflows into the ASEAN increased for the third consecutive year in 2018, reaching an all-time high of US$ 155 billion (Table 1). The region's share of global FDI inflows also rose to 11.5% in 2018, with Singapore being the largest investor across the region, followed by Japan. Increased investment from China, the Netherlands, Germany, Switzerland, and Australia further contributed to higher inflows (UNCTAD 2019). This FDI trend is expected to continue, given the dynamic industrial developments and improvement of the investment and business environment in the region, especially concerning transportation infrastructure and ICT.

Table 1. FDI inflow into the ASEAN, 2015–2018 - unit: billions of dollars

Country	2015	2016	2017	2018
Brunei Darussalam	0.20	- 0.20	0.50	0.50
Cambodia	1.70	2.30	2.70	3.10
Indonesia	16.10	3.90	20.60	22.00
Lao PDR	1.10	1.10	1.70	1.30
Malaysia	10.20	11.30	9.30	8.10
Myanmar	2.80	3.00	4.00	3.60
The Philippines	5.60	8.30	10.30	9.80
Singapore	59.70	73.90	75.70	77.60
Thailand	8.90	2.80	8.00	13.20
Vietnam	11.80	12.60	14.10	15.50
Total	118.10	119.00	146.90	154.70

Source: ASEAN Secretariat, ASEAN FDI database (2019).

Table 2 reveals the investment in ICT in various sectors such as hardware, software, and IT services. Singapore has the highest IT spending per person and the biggest proportion of its investment comes from the government, especially for private and public clouds. The governments of Malaysia and Indonesia emphasize cloud computing, especially for supporting SME. While the Philippines also invest in cloud computing, supported by private companies such as Microsoft and Datacraft. However, government ICT investment projects mainly focus on the education sector, public health, and customs. The Vietnamese government is more concerned with ICT solutions for enterprise resource planning (ERP). Lastly, the growth in the hardware market of Thailand is driven by the demand for mobile technology, and it is government policy to give tablets to primary school students to adopt technology to enhance the efficiency of the education sector.

Table 2. ICT investment in the ASEAN

Country	Unit: dollars					
	Hardware	Software	IT Services	Total	IT Spending 2016	Average Spending/Person
Indonesia	4.2 bn	687 mn	989 mn	5.9 bn	11.5 bn	24
The Philippines	2.2 bn	4.1 mn	996 mn	3.6 bn	4.9 bn	35
Thailand	4.2 bn	893 mn	1.8 bn	6.9 bn	9.3 bn	103
Malaysia	2.7 bn	873 mn	1.6 bn	5.2 bn	N/A	179
Singapore	2.9 bn	944 mn	2.6 bn	6.4 bn	9.6 bn	1,207
Vietnam	1.8 bn	222 mn	474 mn	2.53 bn	4.9 bn	28

Source: IMC Institute (2012).

According to the master plan for ASEAN Connectivity 2025, there has been considerable investment in infrastructure projects to strengthen and enhance the capability of the economic and transport corridor. However, ASEAN member countries still face budgetary constraints and inadequate resources in their implementation. Nevertheless, technical support from the World Bank and funding support from the ASEAN-Australia Development Cooperation Program Phase II have helped to identify and prioritize potential infrastructure projects at the regional

level. Hence, 19 potential projects have been selected by seven countries as shown in Table 3 (ASEAN Secretariat News 2019).

In terms of transport, ASEAN connectivity and economies have been driven by domestic transport, cross-border trade, and labor movement within the region. The AEC Blueprint 2025 has resulted in the launch of the ASEAN Transport Plan, with an emphasis on air, land, and maritime transport as well as the relevant support facilities.

For air transportation, the strategic plan aims to strengthen and enhance the ASEAN to create a single aviation market, focusing on infrastructure improvement and air traffic management efficiency. For land transportation especially, road and rail infrastructures have enhanced the efficiency of intermodal and multimodal transport, for example with the ASEAN Highway Network and Singapore-Kunming Rail Link (SKRL). However, more than 80% of global trade is driven by maritime transport. The establishment of the ASEAN Single Shipping Market (ASSM) is designed to focus on enhancing efficiency and align with International Maritime Organization (IMO) conventions.

Table 3. ASEAN transportation infrastructure projects by country

Country	Road	Railway	Airport	Port
Indonesia			1	2
Myanmar	4			
Brunei Darussalam	1			
Cambodia	1			
Lao PDR	2			
Thailand	1	1		
Vietnam	2			

Source: ASEAN Secretariat (2019).

3. Methodology

3.1. Data

This study uses panel data from certain ASEAN countries, namely Cambodia, Indonesia, Lao PDR, Malaysia, the Philippines, Singapore, Thailand, and Vietnam from 2000–2018. The data for dependent variables, inward FDI, and the variables for identifying the ICT and transportation infrastructure (or explanatory variables), namely broadband Internet subscribers, mobile phone subscribers, quality of railroad infrastructure, quality of port infrastructure, quality of air transport infrastructure, and quality of roads were obtained from various sources, including the World Development Indicators from the World Bank, Asian Development Bank (ADB), and ASEAN Secretariat.

3.2. Model Specification

The following equations (1) and (2) analyze the effect of ICT and transportation infrastructure on FDI inward using market size, openness, tax barriers, and labor force capacity.

$$FDI = b_0 + b_1GDPG + b_2OPEN + b_3TAX + b4LF + b_5BROABAND + b_6MOBLIE + e_1 \quad (1)$$

$$FDI = b_0 + b_1GDPG + b_2OPEN + b_3TAX + b4LF + b_7AIR + b_8PORT + b_9RAIL + b_{10}ROAD + e_2 \quad (2)$$

where FDI: Foreign direct investment inward, billion USD; GDPG: Economic growth: the rate of change in real GDP; OPEN: Trade openness: exports plus imports as a percentage of GDP; TAX: Taxes on international trade, as a percentage of total revenue; LF: Labor force, million people BROADBAND: Fixed broadband Internet subs; cribers per 100 people; MOBILE: Mobile phone subscribers, per 100 people; AIR: Quality of air transport infrastructure, 1(low)–7(high); PORT: Quality of port infrastructure, 1(low)–7(high); RAIL: Quality of railroad infrastructure, 1(low)–7(high); ROAD: Quality of roads, 1(low)–7(high); e: Error term; b_0, b_1, … , b_{10}: Coefficient

The empirical method adopted for estimation is the panel data approach. Panel data analysis has several benefits such as increasing reliability, regardless of the given sample size, boosting the degree of freedom, coping with multicollinearity among independent variables, reducing the effects of variable bias even with unbalanced panel data, and providing more complex analysis in comparison to stand-alone time-series or cross-sectional data analysis (Hsiao 2000). Panel data analysis not only captures the behavior of variables but also provides greater estimation efficiency and more information on the variables (Greene 2008). Furthermore, it allows greater flexibility when modeling differences in behavior across individuals within a group compared to ordinary least squares (OLS)

regression analysis. However, heterogeneity and selection bias may occur if the panel data analysis model is not chosen correctly (Gujarati and Porter 2009). There are three important models for panel data analysis:

- pooled OLS regression;
- the fixed effects model;
- the random effects model.

4. Results and Discussion

The descriptive statistics for the main variables prior to empirical analysis are presented in Table 4. The table shows the mean and standard deviations, as well as the maximum and minimum levels of the variables and number of observations. The Hausman test is a common approach in choosing a fixed effect or random effect model (Green 2008). The null hypothesis of the test indicates that the preferred model is the random effect. A fixed effect model is appropriate for estimating the effect of transportation infrastructure on inward FDI stock (Table 6). While the random effect model is the better choice for estimating the effect of ICT and transportation infrastructure on FDI inflow (Tables 5–6). The random effect model is also used to estimate the impact of ICT on inward FDI stock.

Table 4. Summary of descriptive statistics

Variables	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
FDI_INFLOW	9,524.802	4,535.395	77,646.130	-4,550.370	15,577.820	152
FDI_STOCKIN	133,046.500	49,353.150	1,481,033.000	588.348	248,905.500	152
GDPG	5.807	6.050	14.530	-1.510	2.381	152
OPEN	144.893	124.330	437.330	37.420	95.297	151
LF	33.048	22.735	131.960	2.120	35.104	152
TAX	9.216	5.315	25.500	0.050	7.631	96
BROADBAND	4.968	1.360	27.380	0.000	7.431	139
MOBILE	53.991	19.460	435.190	0.010	80.408	151
AIR	4.830	4.360	6.910	2.800	1.126	97
PORT	4.243	3.900	6.830	2.000	1.327	97
RAIL	3.335	2.985	5.900	1.600	1.381	70
ROAD	4.192	3.740	6.660	2.090	1.304	97

Table 5 presents the analysis results on the role of information communication technology (ICT) and transportation infrastructure in influencing FDI inflows based on panel data from 2000–2018. The regression result shows that macroeconomic factors such as economic growth, trade openness, and labor force have a positive impact on FDI inflow and FDI inward stock. Economic growth, which refers to the market size of a host country, has a major and statistically significant positive impact on FDI inflow into the ASEAN. The results seem to support the argument that foreign investors tend to be more attracted to the country with a higher growth rate of GDP because it indicates a larger potential demand for their products. In addition, the results also demonstrate that the openness level of the country has a positive and statistically significant effect on FDI inflow and FDI stock inward, which supports the hypothesis that a country with more liberalized economic reforms attracts FDI. The results also show that the labor force has a significant positive effect on FDI inflow. Therefore, the labor force and the skill level of the labor force in the host country are still in need of improvement.

The empirical analysis shows a positive effect on the key variables of ICT on inward FDI in the ASEAN. The estimated coefficient for fixed broadband Internet subscribers (BROADBAND) and mobile phone subscribers (MOBILE) are at the positive and significant level of 1%. ICT is a fundamental infrastructure and a necessary factor for development of a country's productivity, to attract FDI and ensure competitiveness. From the investor perspective, the readiness of ICT infrastructure has an influence on FDI decision-making because projects are easy to implement and can start immediately without spending time and budget initiating an ICT system. Therefore, the quality of ICT infrastructure plays an important role in attracting FDI into the ASEAN. Similarly, the Thailand Board of Investment (2017) found that good communication was to be the main factor for investors deciding to expand or maintain investment levels. While Tantivisethsak and Na Ubon (2018) suggest that Cambodia's telecommunication infrastructure development, measured by the increase in the number of Internet users, can increase FDI from China. Currently, ASEAN member countries have been actively promoting an enabling environment for investment in the digital economy. Moreover, the ASEAN has also been developing national digital plans, as well as adopting policies and measures to facilitate and encourage both domestic and foreign investment (Hwee *et al*. 2018). ICT has been utilized to promote the transformation of the ASEAN into a single market, leading

to cost reduction for conducting business, achieving economies of scale and scope, and enabling synergies toward sustainable business models within the ASEAN.

In terms of transportation infrastructure, roads can be considered as the main factor for attracting FDI in the ASEAN. The quality of roads (ROAD) has a significant positive effect on inward FDI stock and inflow in ASEAN countries. While the quality of ports and air infrastructure has a significant negative effect on inward FDI stock. These results correspond with those of Halaszovich and Kinra (2018) and Önsel Ekici *et al*. (2016), in that national transport, especially roads, is key to the decision-making of foreign investors, since the quality of roads and geographical distance are their main focus. Gopalan *et al*. (2019) suggested that quality of roads was the most essential determinant of Greenfield FDI inflows to ASEAN. Moreover, transportation is obviously one of the biggest logistics costs and has a direct effect on overall business costs. According to the important characteristics of the AEC Blueprint (2008), establishment of the AEC was aimed at encouraging the ASEAN to become a highly competitive economic single market as well as a production base. Many infrastructure development projects have been proposed to facilitate the free flow of goods, services, investment, and capital among the ASEAN. The current transportation infrastructure development situation in the ASEAN means that road infrastructure projects are the main focus of ASEAN connectivity planning to attract inward FDI to support and facilitate investors. However, although the port infrastructure in each country has received substantial investment to expand container capacity, it has also had a positive influence on international trade, encouraging foreign investors to trade in exports and imports instead of making direct investment.

Table 5. Results of factors determining FDI inflow in the ASEAN from 2000–2018, using pooled OLS, fixed effect, and random effect

Independent variables	Dependent variable: FDI Inflow					
	(1)	(2)	(3)	(4)	(5)	(6)
	Pooled OLS	Fixed Effect	Random Effect	Pooled OLS	Fixed Effect	Random Effect
	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
Constant	-9740.29 (-4.0450)***	-55936.67 (-4.0160)***	-9726.74 (-3.9364)***	-17322.74 (-1.4729)	-11925.99 (-0.7042)	-15779.00 (-1.1931)
GDP Growth	516.66 (2.7256)***	353.39 (1.6637)*	519.67 (2.6278)**	603.33 (2.2092)**	635.68 (2.1941)**	594.17 (1.8149)*
OPENNESS	52.37 (6.0573)***	79.78 (2.8365)***	52.42 (5.8665)***	61.94 (0.9627)	21.30 (0.2754)	53.59 (0.7656)
Labor Force	63.90 (2.3895)***	1448.79 (3.8665)***	63.83 (2.3213)**	155.44 (2.7649)***	114.26 (0.3076)	146.25 (2.3646)**
TAX	-15.97 (-0.1655)	-27.61 (-0.1427)	-17.63 (-0.1790)	81.20 (0.3239)	511.17 (1.0363)	52.74 (0.1898)
BROADBAND	673.81 (4.7030)***	761.43 (4.7818)***	669.65 (4.5746)***			
MOBILE	34.54 (3.9277)***	65.17 (2.3352)**	34.55 (3.8117)***			
AIR				-912.56 (-0.3708)	-2326.15 (-0.6590)	-652.76 (-0.2325)
PORT				-2900.62 (-0.6748)	-2035.08 (-0.3583)	-2828.97 (-0.5904)
RAIL				1458.608 (1.0033)	2205.86 (0.5920)	1428.13 (0.8876)
ROAD				4824.5660 (1.6600)*	4201.08 (0.9488)	4483.89 (1.6959)*
R-squared	0.7411	0.7826	0.7426	0.6963	0.7056	0.6949
Adjusted R-squared	0.7224	0.7519	0.7240	0.6356	0.6074	0.6339
F-statistic	39.6001	25.5193	39.9083	11.4641	7.1889	11.3906
Prob (F-statistic)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hausman Test			0.9343			0.9883

Notes: *t*-statistics are reported in parentheses. ***, **, * indicates significance at 0.01, 0.05, and 0.10.

Table 6. Results of factors determining inward FDI stock in the ASEAN from 2000–2018, using pooled OLS, fixed effect, and random effect

Independent Variables	Dependent Variable: Inward FDI Stock					
	(7)	(8)	(9)	(10)	(11)	(12)
	Pooled OLS	Fixed Effect	Random Effect	Pooled OLS	Fixed Effect	Random Effect
	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
Constant	-40144.82 (-3.2205)***	-174679.40 (-1.9865)*	-40144.82 (-3.0647)***	44555.68 (0.4279)	-87928.05 (-1.0851)	44555.68 (0.6875)
GDP Growth	56.71 (0.0578)	-1211.68 (-0.6973)	56.71 (0.0550)	46.05 (0.0190)	2550.12 (1.8397)*	46.05 (0.0306)
OPENNESS	359.23 (8.0256)***	424.55 (2.3090)**	359.23 (7.6374)***	285.65 (0.5014)	-309.85 (-0.8374)	285.65 (0.8057)
Labor Force	406.35 (2.9351)***	4340.75 (1.7673)*	406.35 (2.7931)***	1333.31 (2.6785)**	9344.17 (5.2587)***	1333.31 (4.3036)***
TAX	-780.22 (-1.5621)	-858.64 (-0.5798)	-780.22 (-1.4865)	-5636.47 (-2.5392)**	588.92 (0.2495)	-5636.47 (-4.0799)***
BROADBAND	11105.14 (14.9731)***	12670.35 (9.3336)***	11105.14 (14.2488)***			
MOBILE	522.61 (11.4786)***	316.33 (1.9444)*	522.61 (10.9233)***			
AIR				-2648.46 (-0.1215)	-28728.27 (-1.7011)*	-2648.46 (-0.1953)
PORT				-73725.28 (-1.9370)*	33847.64 (1.2454)	-73725.28 (-3.1123)***
RAIL				-11106.84 (-0.8629)	-16776.84 (-0.9411)	-11106.84 (-1.3864)
ROAD				91667.89 (3.5622)***	36065.28 (1.7024)*	91667.89 (5.7235)***
R-squared	0.9435	0.9681	0.9435	0.8570	0.9595	0.8570
Adjusted R-squared	0.9394	0.9527	0.9394	0.8284	0.9460	0.8284
F-statistic	230.8681	62.8539	230.8681	29.9630	71.1047	29.9630
Prob (F-statistic)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hausman Test			0.7622			0.0000

Notes: *t*-statistics are reported in parentheses. ***, **, * indicates significance at 0.01, 0.05, and 0.10.

Conclusion

Empirically, the aim of this study was to investigate the effect of ICT and transportation infrastructure on inward FDI using panel data from 8 ASEAN member countries during the period from 2000–2018. The empirical results suggest that macroeconomic indicators such as economic growth, trade openness, and the labor force have a positive impact on inward FDI, while tax has no significant impact on FDI attraction. According to the study results, ICT infrastructure is a key factor in encouraging FDI because of its positive effect on production and cost-effectiveness. Investors are concerned about the quality of the ICT infrastructure since it plays an important role in attracting FDI into the ASEAN. The results also suggest that transportation infrastructure is associated with inward FDI because transport cost is seen as one of the biggest logistics costs and has a direct impact on business competitiveness. Road quality has a significant positive effect on inward FDI. While the quality of port and air infrastructure has a significant negative effect on inward FDI stock. Since overland transportation is the main means of transport, the ASEAN have developed more interconnected transportation routes.

In fact, the ASEAN remains focused on infrastructure development projects to facilitate the free flow of goods, services, investment, and capital among ASEAN member countries. ICT infrastructure is strongly supported because it facilitates investment in the digital economy. Moreover, the ASEAN has also been developing national digital plans and adopting policies and measures to facilitate and encourage both domestic and foreign investment. Road infrastructure projects have become the main focus of ASEAN connectivity planning to attract inward FDI to support and facilitate investors. However, although port infrastructure development in each country has received substantial investment to expand container capacity, it has also had a positive influence on international trade, encouraging foreign investors to trade in exports and imports instead of making direct investment.

However, there remains a large infrastructure readiness gap in each ASEAN member country. There are many routes linking the ASEAN together but the liberalization of trade and movement have still not been completely

implemented due to the difference in regulations and vehicle standards of each country, meaning that transporters need to stop for inspection and change trucks at the border. Moreover, the lack of road quality is a big issue, resulting in ASEAN connectivity not being as successful as it should be. Likewise, there are also differences in the readiness and stability of ICT infrastructure among the ASEAN. Furthermore, each country focuses on a different aspect of the ICT sector. Hence, governments should harmonize their policies and support each other. Finally, policymakers should prioritize essential ICT infrastructure (including fiber connections and mobile networks) to provide universal and low-cost Internet access. However, private players are unlikely to take full responsibility for such development, and the public sector should drive this effort forward.

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Paradox of Corporate Board Diversity Benefits of Quoted Nigerian Firms: Financial Report Reliability-Timeliness Quality Perspective

Cosmas Ikechukwu ASOGWA
Department of Accountancy, Renaissance University Enugu, Nigeria
cosmas.asogwa.pg77375@unn.edu.ng

Osmund Chinweoda UGWU
Department of Accountancy, University of Nigeria, Nsukka, Nigeria
ugwuosmund@gmail.com

Honesta Chidiebere ANORUE
Department of Business Education, University of Nigeria Nsukka
Honesta.anorue@unn.edu.ng

Favour Amarachi MOGHALU
Department of Business Education, University of Nigeria Nsukka. Nigeria
favour.moghalu@unn.edu.ng

Samson Ige ABOLARINWA
Department of Management, University of Nigeria, Nsukka
Samson.abolarinwa.pg83137@unn.edu.ng

Anthonia Uju UZUAGU[1]
Department of Business Education, University of Nigeria, Nsukka
anthonia.umeji@unn.edu.ng

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Abstract:

Board diversity attracts resources for higher corporate performance. But, it can also promote uncertainty that creates diversity paradox often at the expense of investors. This study examines the board diversity timeliness effect and the earnings reliability paradox using evidence from 74 Nigerian quoted firms for the period between 2000 and 2018.

The study used secondary data and ex-post research design while data were analyzed with both multiple and multivariate regression tools in a two-stage model. We found that board size, audit, and board leadership diversity positively and significantly affect timeliness. However, the timeliness effect is insignificant for professional diversity (coefficient = 0.0599; p-value > 0.05). Gender diversity yielded negative significant effect on timeliness. In diversity paradox, we found a significant trade-off and diversity paradox between timeliness and reliability as gender diversity, professional diversity and audit diversity of corporate boards increase. However, board size diversity and board leadership diversity move in positive direction thus mitigating the paradox in board diversity. Thus, we recommend that board should be selective in modeling board diversity. Focus should be on board leadership and board size diversity.

Keywords: leadership; diversity; corporate governance; gender; paradox; professional skills; reliability; timeliness quality.

JEL Classification: M41; M48; G34.

Introduction

Corporate board diversity has continued to attract shareholders' and researchers' interests with some arguing that several past corporate failures had a link with poor diversity in boards (Lemus 2014, Wong, Cho, Lo 2015). The faulty governance structure must have permitted fraud and financial statements' manipulations (Nindito, Avianti, Koeswayo and Tanzil 2019). Firms are thus being urged to embrace the benefits of board inclusiveness including achieving financial statements' reliability and timeliness properties. Board diversity could enhance firms' absorptive

[1] Corresponding author

capabilities-an idea Mubarok and Widodo (2019) believe it could lead to higher corporate innovation performance. As a motivation, corporate investors place premiums on stocks of firms that are diversifying their boards (Zhang and Wiersema 2009). However, it is not yet clear whether higher level of corporate diversity could decrease reliability quality of financial statements. Higher board diversity could increase earnings persistence because it possesses the potential of minimizing agency problem. At the same, it can be expected that diversity could lead to higher publication time lag that could reduce timeliness character of financial statements. It is important to understand this potential relationship to achieve balance in diversity benefits.

Therefore, this study examined the effect of corporate board diversity on financial statement timeliness and reliability. The study ascertains if an enhancement of firms' reporting timeliness through board diversity leads to reliability quality trade-off. The essence of the investigation is to understand the level of board diversity that could increase timeliness but would not harm financial statement reliability. Several studies have investigated the effect of corporate board diversity on the timeliness of firms' financial statement for example Alsmady (2018), Clatworthy and Peel (2010). However, though the studies found a link between timeliness and board diversity, it was not clear in the study if the increasing timeliness through board, gender or professional diversity leads to reliability of financial statements trade-off. This present study tried to establish a balance between timeliness and reliability through corporate diversity mechanism.

The idea that diversity has a potential trade-off has been examined in other related profession. For example, in Social Psychology, uncertainty-identity theory indicates that an abnormality could occur between society's desire for diversity and people's preference to associate with like-minded colleagues (Hackett and Hogg 2014). In general, such anomaly is a diversity paradox. Diversifying corporate boards is beneficial but such firms could also suffer from diversity paradox. When one group of board members with idiosyncratic attitudes takes decisions in the boards, the ideas might be disliked by the other like-minded opponent board members. Unless the group like-minded opponents are in the minority, they may succeed in debating and prolonging good ideas unnecessarily. In an escalated condition, some good ideas may entirely be stopped.

From accounting perspective, diversity paradox could occur and the effect substantial. For example, diversity paradox could affect the reliability-timeliness quality of financial statements. Reliability and timeliness are both fundamental and enhancing qualitative characteristics of financial statements respectively and ought to be well-balanced to mitigate the risk of trade-off. In this regards, board diversity could lead to good ideas that would result in producing reliable financial statements. Increment in good ideas following board expansions could help in detecting errors and discovering frauds. Financial statements with less reported errors are highly persistent, predictable and reliable, which are good for forecasting future cash flow with some degree of certainty.

However, as firms diversify to achieve reporting reliability and financial statement completeness, more time would be taken, conflicts of opinions could escalate and items methodological treatment divergences may emerge, which may lead to delay in financial statement publication. Such delay impacts financial statements timeliness usually negatively. If financial statements lose timeliness, they lose their usefulness (Ewert and Wagenhofer 2015). Achieving reliability and losing timeliness is not good for investment decision. Consequently, as board diversity paradox increases, it could influence how shareholders make decision with reported financial statements. Often, such paradox effect could lead to adverse portfolio selection, which has far reaching effect on shareholders' wealth growth. Balance in diversity is likely an ideal model for mitigating the potential paradox, and achieving corporate and societal sustainability.

Despite the paradox reality and need for a balance, there has been a significant emphasis and rhetoric on the value enhancing nature of corporate board diversity (Baatwah, Salleh and Stewart 2019, Ntim 2015) in which case industry leaders, researchers and market participants seem to place a premium on firms with board diversity models (Alqatan 2019, Niu and Chen 2017). Some literature associates previous corporate failure to poor board diversity (Lemus 2014, Wong *et al.* 2015) and thus believes that higher performance and sustainability could be achieved by corporate board diversity (Alqatan 2019). Research supports the fact that ideas that could mitigate risk of corporate failure are often shared in an inclusive effective board. Diversified corporate governance board enhances shareholders' trust and positively impacts firms' stock prices in the market (Zhang and Wiersema 2009), which explains why shareholders vote for firms with good diversified boards. By placing a premium on the stocks of board- diversifying firms, investors keep demanding that boards should maintain diversity model.

In terms of performance, the general belief is that diversified boards would be able to attract boards of wider experience through human resource and social capital network, which in turn would promote financial statement reliability. Reliability could be achieved because by bringing expertise in the boards through social and human capital networking, serious error likely to harm the firms' sustainability could be easily identified. In addition, complicated fraud could be intercepted and uncovered where it has occurred. It is also suggested that diversified

boards bring innovation and creativity which enable firms to withstand competitive pressure and become relevant in the industry. Diversified boards increase firms' intellectual capital, which has positive effect on performance (Boedi, Nirwanto, Subiyantoro and Kiswanto 2019) Some evidence strongly links board diversity with reporting quality and found mixed-attribute board model as a mitigation against transitory earnings and timeliness (Asogwa, Ofoegbu, Nnam and Chukwunwike 2019, Egbunike and Odum 2018, Alsmady 2018, Clatworthy and Peel 2010). Overall, board diversity is seen as a board governance model that concurrently enhances financial reporting reliability and timeliness. This may not always be so: There could be diversity paradox potential between achieving reliability and timeliness.

Unfortunately, the above interesting studies which emphasis the benefits of diversity failed to acknowledge and investigate the reality of board diversity benefit paradox-a case whereby as firms try to maximize all the benefits of board diversity including financial statement reliability, timeliness quality of financial reports could get traded-off. Similarly, as firms try to achieve higher timeliness value of financial report, reliability quality of the financial statements may decrease significantly at the detriment of potential investors. Achieving timeliness of financial statements is very vital and could be easily realized with less diversified boards. If accounting information lacks timeliness, the financial statements can be of less or no relevant to the users. Evidence shows that financial information potentially loses relevance with age and extended delays in the availability of financial statement information render the information less useful for economic decision making (Clatworthy and Peel 2010). Less diversified boards could reduce the degree of board argument and thus enables quick publication of financial statements. In designing diversified boards, this paradox needs to be taken into consideration to avoid paying diversity hidden cost which could lead to corporate failure.

The rest of the study is organized into three sections namely section 2, section 3 and section 4. Section deals with review of the related literature. In section 3, we focused on the research methodology and design. Finally, in section 4, the result was discussed.

1. Review of Related Literature and Hypothesis Development

1.1. Theoretical Review and Board Diversity

One of the key theories explaining the link between corporate governance and board diversity is the agency theory. In this theory, the principals and the agents have different interests which would lead to the conflict of interests (Jensen and Meckling 1976). To mitigate this conflicting interest, the principals have to hire the second party to control the agents. The idea is that the second party (the boards) would run the business to the best interest of the shareholders. The shareholders believe that as the member of the boards increases, their interest would be better represented with reduced information asymmetry (Ramzi 2009). Such increment in the board membership enhances board diversity and would most likely solve agency problems (Rowley Shipilov and Greve 2017). However, increase in board representation to solve agency problem can result in financial statements' timeliness trade-off because of many opinions which would have to be accommodated and the lengthy arguments that may follow (Liu, Wei and Xie 2014). However, agency theory majorly links the principals and the agents and does not provide explanation for the boards' behavior that influences firms' performance and financial statements' quality.

Board diversity also has an underlying foundation in the resource dependency theory of corporate governance, which emphasizes that organizations should be allowed to tap a variety of available community resources and experiences in order to run their businesses more effectively. Resource dependency theory defines the effect of resource acquisition on the behavior of firms (Hillman, Withers and Collins 2009). In this sense, the theory suggests that in order to acquire societal resources, the organizations must have links with their environment (Pfeffer 1982). Thus executives serve as a nexus between the organizations and the external resources. In boards that diversify, they can tap the resources to advance their goals. Thus, to diversify in terms of gender, professions, and nationality, firms must have a link with the societies' resources (Alqatan 2019). Such a society resource dependent firms will promote greater insight into markets, customers, employees, accounting issues and investment opportunities for better business performance (Hillman *et al*. 2009). Thus, firms could only diversify if they depend on their environment.

Further explanation of the link between corporate board diversity and timeliness of financial statements is that based on human capital theory. Human capital theory is based on the assumption that formal training is helpful and vital in the improvement of productive capacity of the population (Gibbons and Waldman 2004). This means that educated population is a productive and efficient population as such class of people can increase their cognitive stock of economically productive capability. Thus having boards with diverse members such members from different nationalities and educational background brings directors with special human capital as explained by Burgess and Tharenou (2002). The consequence is always better corporate governance that would result in better financial

performance and reporting quality (Adams and Ferreira 2009). Similar to resource based theory; desire to attract larger boards with high quality human capital may result in the boards with controversial persons. The potential controversy would likely tamper with the financial statements' timeliness relevance.

Another important theory that has explained the need for board diversity is the social capital theory. This theory can be seen according to Sealy and Vinnicombe (2007) as all the assets or resources that groups or entities gain and accrue as a result of long standing networking, institutional relationship and shared contract. The benefit can be direct, or indirect, real or intangible. Social capital is a social network advantage and assets. This theory backs diversity because it is through social networking that an organization can bring in directors with social capital (Niu and Chen 2017). Firms of gender diverse vision would most likely perform higher than single gender board. This is because according to Luckerath-Rovers (2011), both genders have different social capital wealth that can impact firms' performance and reporting behavior differently.

1.2. Empirical Review

This empirical review cuts across corporate governance, board diversity and all reporting quality proxies thus, we did not limit the review to only timeliness quality effect. Research on corporate governance and earnings quality is always being considered from different governance mechanisms and proxies of earnings quality such as predictability, persistence, discretionary accruals, value relevance and timeliness. First, the study reviewed literature that dealt with governance mechanisms and timeliness quality. Second, the study reviewed literature that has to do with corporate governance and earnings quality.

Alsmady (2018) examined the board of directors' characteristics and ownership type on the timeliness of financial reports. The study examined CEO duality, board size, the proportion of women on the board, the proportion of CEOs on the board, foreign ownership, and non-foreign ownership as key directors' attributes and board characteristics. The authors studied 68 annual reports of firms listed on Amman Stock Exchange between 2011 and 2015. The study found that the proportion of women in the board has significant effect on the timeliness of financial report. The study found that the company age and size have negative effect on timeliness of firms' financial statements. The author found that foreign ownership has positive effect on timeliness, while the non-foreign ownership has a negative effect on financial statements' timeliness. However, the study found that management ownership has no significant effect on financial statements' timeliness.

Clatworthy and Peel (2010) used a large sample of UK private companies to investigate whether corporate governance characteristics impact upon the timeliness of financial reporting information. After they have controlled for various firm characteristics, they found that corporate diversity enhances financial reporting timeliness. Their analysis showed that the presence of a professionally qualified accountant on the board, the proportion of women on the board, the size of the board and the presence and quality of an auditor all enhance financial reporting timeliness.

Dyer and McHugh (1975) investigated the determinants of the reporting lag for 120 Australian companies listed on the Sydney Stock Exchange. The study found evidence that among other things larger companies are associated with higher delays due to the economies of scale in preparing financial statements. However, they found no evidence that more profitable companies are associated with timelier reporting due to bad news taking longer to be disclosed. Whittred (1980) study discover that companies in Australian that received 'first time' audit qualifications are significantly associated with longer reporting lags compared to firms that have clean audit reports. The study also found that the more serious the qualification is the longer the reporting delay time. Owusu-Ansah (2000) study of 47 companies listed on the Zimbabwe Stock Exchange, found that corporate size, profitability and age are associated with variation in financial reporting timeliness. The study however, found no evidence of the influence of gearing on financial statement gearing on timeliness. Leventis and Weetman (2004) find that proprietary costs, information cost savings and the extent of favorable or unfavorable news disclosures contained in the information are all factors influencing reporting lag of Greek listed firms. The study found public issue of shares, change in profitability, industry concentration and the number of remarks in audit reports to factors significantly influencing financial reporting timeliness. In terms of multinational and domestic companies, evidence from Lee, Mande and Son (2008) shows that the audit delay is more significant for multinational firms because of their more complex business nature.

Having dealt with above literature that directly investigated the impact of corporate governance on timeliness, we shall focus this section on the generally study of corporate governance diversity on earnings quality. These other proxies of earnings quality emphasize the effect of corporate mechanisms on the reliability of financial statements.

Man and Wong (2013), Xie, Davidson and DaDalt (2003) and Ramzi (2009) the effect of corporate governance on earnings quality. Their empirical evidence shows that board size limits the ability of the board to monitor effectively managers' practices and then limit their accounting information bias. Specifically, Xie *et al*. (2003) and Peasnell, Pope and Young (2005) found that that having a larger board is associated with less earnings management because it encourages diversification of board members and ideas. Their conclusion is that board diversity increases earnings quality. However, Mashayekhi and Bazaz (2008) and Klein (2002) found a contrary empirical result. They showed evidence that larger board size results in weaker earnings quality. Their evidence changed with higher independent directors and frequencies of board meetings as such mechanisms improve earnings quality. However, it seems the effect depends on the measure of earnings quality. For example, when earnings quality is measured by discretionary accrual, Mashayekhi and Bazaz (2008) found that board size positively affects earnings quality inconsistent with (Klein 2002). Ismail (2011) discovered that board size is positively associated with nonfamily firms and negatively associated with the board size.

Yasser and Almanu (2015) provide evidence that unitary or dual leadership structure has no impact on public listed companies' performance and reporting quality. They also found that female CEOs negatively impact on firms' performance and reporting quality in Malaysia and Pakistan consistent with Hili and Affes (2012)'s France evidence that earnings persistence is not enhanced by the presence of women directors on the board. Similarly, Damagum, Oba, Chima and Ibikunle (2014) found evidence that the presence of women in the board did not lead to financial reporting credibility in Nigeria. However, Gavious, Segev and Yosef (2012) found that earnings management decreases when either CEOs or the Chief financial officers are women and found positive relationship between the ratio of female to male in the board and firms' value. Consistently, Kreder (2016)'s US evidence shows that the relationship between gender and the quality of earnings is positive and that as the proportion of women in the board increases, the credibility of financial reporting improves.

Baatwah *et al.* (2019) used a sample of Malaysian firms and found that the audit committee chair with accounting experience is associated with a reduction in audit delay, which could enhance credibility in reporting though the evidence was more pronounced when the chair is a shareholder of the firms. Nelson and Devi (2013) investigation show that the presence of non-accounting experts and accounting experts is significant to minimize accrual manipulations. Hutchinson, Percy and Erkurtoglu (2008) used Australian sample and found that board independence and audit committee independence negatively influenced performance-adjusted discretionary accruals. Marzuki, Abdul Wahab and Haron (2016) found that the revised Malaysian Code on Corporate Governance enhances earnings conservatism and that audit committee financial expertise and independence positively influenced earnings conservatism. They also found that board financial expertise mix affects conservatism. Iyengar, Land and Zampelli (2010) analysis shows that significant negative association exists between reported earnings quality and the proportion of CEO incentive pay and that board independence does not seem to be associated with earnings quality, thus suggesting that the emphasis on board independence as an effective monitoring device may be misplaced. Suyono and Al Farooque (2018) found that 'institutional ownership, managerial ownership and independent boards have a significant deterrent effect on earnings management, which invariably could translate into reporting quality. Lu, Christensen, Hollindale and Routledge (2018) found in UK that compliance with the code improved investee companies' earnings quality. Demirkan and Platt (2009) investigation shows that corporate governance affects managers' decisions to use discretionary accruals and thereby artificially influence company financial reports. They found the effect of governance index on accrual to be positive as strong governance appears to minimize the incidence of mid-range firms engaging in accruals management. Habib and Azim (2008) Australia evidence shows that firms with strong governance structure exhibit higher value-relevance of accounting information and provide support that significant regulatory reforms regarding corporate governance around plays a key role in ensuring credible financial reporting. Yasser and Al Mamun (2016) found with Asian-Pacific evidence that the relationship between CEO duality attributes and earning management is not significant and is not associated with firm financial reporting quality. They found that unitary leadership pattern has no significant effect on companies in the Asia-Pacific. Baatour, Othman and Hussainey (2017) found that the effect of multiple directorships on accrual-based earnings management and real earnings management in Saudi Arabia is positive on earnings quality while the effect is insignificant on discretionary accrual. Jouber and Fakhfakh (2014) used a panel of 1,500 American, Canadian, British, and French firm-year observations found that firms from countries within the Anglo-American corporate governance structure, which provides greater protection of shareholder rights, and enhances strict enforcement of law scores high on board oversight and tend to maintain lower degree of discretion over earnings. Chambers and Payne (2011) found that accrual persistence increased significantly in the post-SOX period and that post-SOX the firms audited by Big-N auditors with lower-independence yielded the highest improvement in accrual persistence. Alzoubi, (2016) sample of 62 companies listed on the

Amman Stock Exchange showed that insider managerial ownership, institutional ownership, external block holder, family ownership and foreign ownership yield greater effect on financial reporting quality. Egbunike and Odum (2018) found that board size and board composition positively and significantly affected earnings quality in Nigeria for selected manufacturing firms. They found that the proportion of non-executive directors was negative and significant; while, CEO duality was significantly positive. Siagian and Tresnaningsih (2011) found that both discretionary accrual and earnings response coefficients improved significantly after firms acquire independent directors and independent audit committees in Jakarta. Yo (2009) used a pooled-OLS and found that earnings quality depends on the background of outside directors in Korea. According to the researcher, there is negative relationship between outside directors having high profile background and earnings quality for instance politicians, and lawyers. This relationship also holds for outside directors, who are professors and foreigners. However, his result shows that outside directors, who are finance expert and former employees are positively associated with earnings quality. Liu, Harris and Omar (2013) found that the separation of the office of CEOs, and the board chairperson positively associates with discretionary accounting.

Based on the broad review, it was found that most researchers focused on the effect of diversity on firms' earnings quality and performance. There was no study that dealt with the effect of board diversity on financial information timeliness in Nigeria and the extent diversity enhances reliability by trading off timeliness quality of financial statements. Moreover, we found evidence that the effect of board diversity on earnings quality is context specific, which means that it can depend on the setting of the study. As such, evidence in developed countries cannot substitutes for evidence in the developing countries thus making this study very important for investors in developing countries.

1.3. Statement of Hypotheses

1.3.1. Board Size Diversity and Timeliness

The board in corporate governance is charged with the responsibility ensuring that the organization is run in the best interest of the investors and other relevant stakeholders. Thus, they minimize agency conflict and reduce agency cost. One of the key roles of the board is to ensure that firms issued out financial reports that are free and fair. Such a statement would be regarded as quality and when it was published within the expected time, it would be normally regarded as timely. Generally, earnings quality depends on corporate board size, which also implies that timeliness of financial statements could depend on board size diversity. In this case, as the board size increases earnings quality in terms of timeliness could increase. Corporate governance best practices codes encourage firms' effectiveness through board diversity. The argument of the agency postulation is that managerial incentives to bias accounting report for selfish interest could be limited by the presence of the several third parties in the form of monitoring boards. Increasing board size is an effective corporate governance mechanism for achieving such effectiveness including reporting quality (Man and Wong 2013). Increasing board effectiveness through board diversity is backed by resource dependency theory. In connection with board size earnings quality relations, the theory maintains that the presence of board members connects the business with its environment and reduces business operational risks. Thus, the expansion of the corporate board would connect talents from the environment that could encourage higher performance, reporting quality and timely reporting (Rowley *et al.* 2017, Hillman *et al.* 2009, Sealy and Vinnicombe 2007). It can thus be implied that monitoring effectiveness increases with the board diversity. As such, evidence shows that corporate organizational board plays the monitoring roles that could influence accrual quality (Kukah, Amidu and Abor 2016). In addition, compliance will increase with large efficient boards as they make sure that managers follow the established control measures in running the business affairs.

It can also be argued larger board size could play key role in the reduction of fraudulent behaviour of managers (Imoniana, DeFeitas, and Perera 2016). This is because the chances of fraud detection would increase and the professional diversity increases with board increment. Empirical evidence has also supported the idea that the ability of the board to monitor effectively to limit the accounting information bias depends on the size or composition of the board (Man and Wong 2013, Ramzi 2009). Xie *et al*. (2003) highlight that having a larger board is associated with less earnings management. This is because diversifying in term of board membership brings useful skills and monitoring ideas that could help in running the business in a more effective way than when the business is directed by just one or few people (Yusoff and Idris 2013). However, Lehmann (2016) maintains that even the strongest boards in terms of board size can be associated with low earnings quality. In this regard, it is argued that increasing the board membership may result in having many external board leaders who may not rise to the challenge of the firms because they do not have the real knowledge of the firms like the managers. Mashayekhi and Bazaz (2008) used discretionary accrual, earnings predictability and earnings persistence as dependent variables, and found that a larger board size results in weaker earnings quality and an increase in the

number of independent directors and frequency of board meetings add value to firms' earnings quality status. In the same way, Mashayekhi and Bazaz (2008) found that a significant positive correlation occurred between board size and financial performance. The researchers confirm the argument that a larger corporate board representation yields more valuable resources to organizations. Consistent with this, Xie *et al*. (2003) make case that big boards in terms of representation are well equipped in terms of knowledge mix. The consequence is that better monitoring is being enhanced. Mashayekhi and Bazaz (2008) suggest that larger board size makes monitoring less efficient because corporate communication will be less efficient, which translates into poor accounting information. Nkanbia-Davies, Gberebge, Ofurum and Egbe (2016) found that there was a positive relationship between board size and accrual quality, which indirectly impacts timeliness quality. There exists positive relationship between board size and accrual quality (Peasnell *et al*. 2005). However, Klein (2002) shows that board size and independent do not influence abnormal accruals positively. Ismail (2011) follow a partial multi-proxy approach and discover that board size is positively associated for nonfamily firms' earnings persistence and earnings value relevance. Egbunike and Odum (2018) also confirmed this empirical evidence when they found that board size and board composition positively and significantly influenced income quality in Nigeria for selected manufacturing firms. Based on this, we postulate the following hypotheses:

H1: Board size diversity does not affect timeliness of financial statements significantly.

1.3.2. Board leadership Models, Professional Diversity and Timeliness Quality

Board leadership structures play a vital role in influencing firms' level of earnings quality. However, this effect is limited by attributes of board leaders in terms of professional experience. Resource-dependency theory highlights that, firms can tap societal resources to influence their performance. This brings about diversification in the boards of companies. In this case, board can be enriched by members with special skills such as accountants, lawyers, religious leaders, engineers and those with innovative minds. These leaders have certain objectives for entering the boards. Sometime their desire conflicts with overall goal of firms and the investors, thus increasing agency conflicts. As the board size increases, attributes compositions keep changing. On one hand, such a change could enhance control mechanisms by increasing the monitoring intensity. On the other hand, such diversification could bring in members with moral lapses and opportunistic tendencies, which could negatively impact on governance effectiveness thus leading to poor credibility in financial reporting.

This study postulates that the effect of board duality on earnings quality including on timeliness are a function of leadership characteristics and professionalism. It is reasonable to argue that if the board chairman is a financial expert and a chartered accountant; duality might influence accrual management negatively, thus improving the overall firms' earnings quality including timeliness. This is because the board chairperson would still be in a position to bridge any likely knowledge gap that would arise for not being actively involved in the corporation accounting system. We argue that playing insider role would likely give one insight into firms' accounting processing system. Board chairpersons are not usually insiders and thus, may not have the first class information on the accounting processes. CEOs are normally experienced in the financial systems. They also play the insider deals and occupy a privileged position of preparing financial statements. As such, they can use both their position and expertise attributes to manipulate financial documents in their favour (Ramzi 2009), which would affect timeliness. However, since, the board chairpersons are resource experts in financial reporting; there is a high likelihood of detecting reported accounting abnormalities and manipulations usually associated with the opportunistic management. In this case, it might not be surprising that board leadership structure such CEO duality could improve firms' earnings quality in terms of timeliness.

However, if the board chairpersons are not experts in financial reporting relative to authoritative and experienced CEOs, such a separation could result in accrual management that would undermine earnings reporting timeliness. This is because the board chairman is likely going to play a novice role in financial reporting processes, which could lead to delay. Therefore, although the CEOs would not be able to play a domineering influence in the board meetings, the board chairpersons are likely going to submit to their financial professional expertise. And since the board chairpersons are not experts in the corporate accounting systems, the material irregularities in the reported earnings would likely not be detected and mitigated easily. As such, professional diversity might still not play an earnings management constraining role in these kinds of organizations. Therefore, overall, it is plausible to postulate that the dominant attributes of corporate leaders in terms of their profession significantly affect firms' earnings timeliness. Thus, we hypothesize the following:

Hypothesis 2: Boards' professional skill diversity has significant effect on firms' financial statements' timeliness.

Hypothesis 3: Board leadership diversity significantly affects financial statements' timeliness.

1.3.3. Gender Diversity and Earnings Timeliness Quality

The growing impact of women in the workforce has kept the researchers busy to understand the leadership style of women (Pounder and Coleman 2002). There is a growing willingness of women to take up corporate organizational leadership while some countries are making their presence in the board a compulsory. Yet, the impact of their leadership style earnings quality has not been fully examined especially with regards to how their presence can affect timeliness quality of reported earnings. Women have idiosyncratic skills and this could define their leadership styles. Generally, a skill that is required for board member directors in the board of audit committee can be called leadership. Thus, it is the ability to lead. Research shows that a difference in the style of leadership could lead to a different way of managing. Such a difference could influence the earnings quality of firms. However, different types of leadership could depend on several different characteristics of leaders. In this regard, Pounder and Coleman (2002) described in a review about the characteristics of men and women that could influence their leadership styles. Park (1996) research shows that men are aggressive, independent, objective, logical, rational, analytical and decisive. On the contrary, women are emotional, sensitive, expressive, co-operative, intuitive, warm and tactful. This means that their style of could differ significantly. Osland, Synder and Hunter (1998) found that the characteristics of men are also confident, assertive, ambitious, opportunistic and impersonal. However, they showed evidence that the characteristics of women are that of receptive to ideas, talkative, gentle, emphatic and submissive.

From managerial perspective, research also shows that there are differences in managerial styles between men and women particularly due to their natural differences home management (Ponder and Coleman 2002). For instance, Helgesin (1990) states that women's central involvement in managing households, judging careers and raising children give them the skills for prioritization in leadership role. Thus, they score high in management relative to men based on the study. Specifically, Rosener (1989) found that women are more transformational in their leadership approach than men. They can promote contingent rewards, active management by exception and passive management by exception. Between directive and empowering, Eagly and Johannesen-Schimidt (2001) stated that men have directive leadership style while women are more empowering leaders in nature. In this direction, contribution of Rigg and Sparrow (1994) showed that female leaders are more people oriented. Moreover, women on the board emphasized team work. However, their evidence shows that men leaders are more authoritarian and paternalistic than women. Schubert, Brown, Gysler, and Brachinger (1999) found that men and women differ in approaches to risks. According their experimental study, men are more risk-prone towards gains, in gambling decisions, and women are more risk prone towards losses. However, the paper concludes that in terms of risky choices, there is no difference between women and men.

Following this potential leadership different, it has become clear that such behavior can affect the way female directors influence financial report timeliness. For example, being people orientated could lead to higher performance, which could influence timeliness publication of financial statements. In another perspective, their risk-prone attitude towards loss could influence their approach for discretionary reporting as women are less aggressive in terms of risk taking. Thus, their inclusion in the board could reduce the likelihood of accrual manipulation that could reduce timeliness of financial statement. However, across research, critical mass theory has not been consistent (Hili and Affes 2012, Kreder 2016). It also appears that critical mass theory of corporate governance is limited by the experience of board members (Gavious *et al.* 2012). Ye, Zhang and Rezaee (2010), examine whether the gender of top executives affects earnings quality. They found that earnings quality proxies including earnings persistence, the accuracy of current earnings in forecasting future cashflow, the association between earnings and stock returns, and the absolute magnitude of discretionary accruals do not display significant differences for firms with female and male top executives. Ye, Zhang, Cao, Wei and Namuny (2020) examined the effect of boardroom gender diversity on stock liquidity using empirical evidence from Chinese A-share market. They found that the boardroom gender diversity increase stock liquidity significantly and that the effect of boardroom gender diversity on stock liquidity is more significant in firms with more female director ownership than in firms with less female director ownership. Na and Hong (2017) examined the effect of CEO gender on earnings management. They found that the male CEOs use aggressive discretionary accruals and real activities operations in order to report small positive earnings or small earnings increases. Their analysis also shows that earnings management using real activities operation of suspect firms disappears in the female CEO group. Khuong, Thu and Thao (2017) examined the effect of top executive gender on accrual earnings management using simple analysis of Vietnamese listed firms. They found a correlation between earnings management and top executive gender, firm size and tenure. Thus, they confirm the potential effect of female executives on earnings management, which has negative

implication for earnings quality. Thus, diversifying boards in terms of gender has proven effectively because it brings in women board chairs that are creative (Kenney, Lynch, Huntress, Haley and Anderson 2012). Luckerath-Rovers (2011) found that both genders have different social capital wealth that can impact firms' performance and reporting behaviour differently. Alsmady, (2018) found that the proportion of women in the board has significant effect on the timeliness of financial report. Since there is a confirmed impact of gender diversity on firms' earnings quality, there is thus a link between board gender diversity and timeliness of financial statement reporting. We thus state the following hypothesis:

Hypothesis 2: Board gender diversity negatively affects earnings reporting timeliness.

1.3.4. Audit Committee and Timeliness Quality

Agency theory argues that in principal-agent relationship that the conflicts of interest would always occur. To avoid such conflict of interest that could lead to hidden information to mislead, shareholders demand effective governance that would play as a watchdog. One of these governance mechanisms is the audit committee. Audit committee plays a monitoring role and when the committee is effective it could constrain a lot of accounting restatements, which could influence timeliness and reliabilities of the financial report. To make the audit committee effective, it should be diversified based on the knowledge and human resource-based view. As audit committee of corporate firms diversifies, they could have members, who can get things done quickly. However, accommodation different opinions could impact the time of financial statements approval.

An important empirical question has been about the effect of gender diversity of the audit committee on earnings quality. Though specific question has not been directed towards the timeliness of financial statement, the effect of audit committee on earnings quality can be as well through light on how diversity of audit committee could influence timeliness of financial statements. Srinidhi, Gul and Tsui (2011) provide evidence that gender diversity in audit committee affects earnings quality. They argued that female directors exhibit better reporting discipline in audit committee. In the study of Thiruvadi and Huang (2011) where the effect of gender diversity of audit committee on the earnings quality of a firm was investigated, found that gender diversity increases the external governance function of an audit committee, which leads to enhanced earnings quality by decreasing earnings management. In addition, the study found that the presence of women in the audit committee reduces earnings management by increasing negative discretionary accruals. Thus, the paper concludes that the presence of female directors do have significant impact on earnings quality.

Overall, audit committee diversity can affect earnings quality. We thus make the following audit committee diversity-timeliness hypothesis.

Hypothesis 4: Board audit committee diversity significantly affects firms' financial statements' timeliness.

1.3.5. Board Diversity Reliability-Timeliness Perspective

One important approach to corporate governance solidifications has been to increase diversity in boards' membership (Baatwah *et al.* 2019, Mashayekhi and Bazaz 2008, Klein 2002). The directors' assumption is that the presence of certain individuals with certain skills and backgrounds would improve reporting quality, enhance investors' confidence and performance (Khan and Subhan 2019) while encouraging good managerial and board decision making processes (Carter, Simkins and Simpson 2003). In fact, this is an idea expressed in resource dependence theory, social capital proposition and human capital wealth theories (Sealy and Vinnicombe 2007, Hillman *et al*. 2009, Gibbons and Waldman 2004). Thus, the present corporate boards comprised individuals with different religious, ethnicity (Ntim 2015), professional, political and educational backgrounds (Yasser and Almanu 2015, Baatwah *et al*. 2019). Board diversity aimed at making corporate governance more effective also involves gender balance in the board, in which case significant board positions and decision roles are given to women (Kreder 2016). The latest view in this regard is that gender imbalance in the board is regarded as unethical practice as such boards discriminate against sex. For instance, if the proportion of male is substantially higher than that of the female, unethical board order has been set up, this is considered unethical practice. But the concern is whether such an increment delivers values, improves financial statement reliability and does not trade off-time that would affect financial statements' usefulness. Kreder's (2016) US evidence shows that the relationship between gender and the quality of earnings is positive and that as the proportion of women in the board increases in diversity, the credibility of financial reporting reliability improves consistent with the famous critical mass theory though contrary evidence has also been discovered (Hili and Affes 2012). These latter authors found that in France, earnings quality is not enhanced by the presence of women directors on the board though the study did not specifically attribute the transitory nature of the earnings to potential effect of timeliness trade-off following gender diversity.

Thus, despite these important emerging studies promoting the advantages of board diversity (Kahn & Subhan 2019, Baatwah *et al.* 2019), there is little evidence on the financial statements' reliability qualitative characteristic timeliness trade-off of diversity in corporate governance boards in Nigeria. It is not clear how the emerging diversity model of corporate governance in Nigeria affects the quoted firms' financial statements' timeliness quality in relation to reliability of the financial statements. Recent studies, though not from Nigerian perspective, have focused on the effect on firms' financial performance (Slama, Aiina and Lakhal, 2019, Kahn and Subhan 2019). While these studies made some important contribution to literature, there remains a lacuna in literature regarding how board diversity affects earnings quality in terms of timeliness. Whether diversity in governance limits decision making speed that negatively impacts timeliness of reported financial statements in Nigeria is an unfilled gap among Nigerian corporate governance researchers.

Interestingly, the fact that the past few years in Nigeria have witnessed adverse portfolio selection that suggests accounting information timeliness problem provides a good reason to examine whether increase in diversity of board members' occasions reporting delay. We thus ought to approach the acclaimed benefit of corporate board diversity with care when we take its timeliness trade-off into consideration. We argue that an increase in board diversity could reduce overall financial statements' timing utility following the timeliness trade-off, which suggests that as delay in reporting publications increases, the usefulness of the financial statement falls. In fact, while diversity in corporate governance are associated with several benefits including delivering an expert opinion and creativity (Carter *et al.* 2003, Julizaerma and Sori 2012), enhancing good portfolio selection including higher equity performance (Ntim 2015, Sarhan, Ntim, and Al Najjar 2019), and mitigating complex accounting problems (Carter *et al.* 2003), there is little evidence whether an increase in board diversity consumes unnecessarily financial statement publication time that could lead to deviation in publication dates due to large room for arguments and opinion accommodations. As expert opinions emerge and increase in the board decision making processes, we expect the time of debating an element of financial statement or an exceptional item to rise, thus leading to financial statements' reporting timeliness problem and lag. In the same manner, the time for loss recognition could increase with increase in arguments, thus leading to less timeliness in financial reporting of loss, which has earnings management implication. Evidence from Julizaerma and Sori (2012) and Liu *et al.* (2014) suggests that gender diversity for instance proves that women always come with new ideas, communicate better and make lengthy arguments in the meetings of the boards. While the new idea based on gender diversity can increase creativity that can improve performance, and financial statement reliability, women often face serious challenge (Kenney *et al.* 2012), which can lead to deviation in the publication of financial statements if their ideas are unnecessarily attacked. Moreover, the lengthy arguments could lead to deviations from the normal decision making time range. Thus, we postulate that:

Hypothesis 6: Board diversity increases financial statement reliability at the expense of financial statements' timeliness quality.

2. Methodology

This study used secondary data. As such an ex post facto research design was used. We followed a firm-year approach to determine the population of the study. We purposely selected a 9-year period between 2000 and 2018 to provide the latest evidence. There were 180 firms in the Nigerian Stock Exchange (NSE) as of February 2, 2020. However, this study used only 74 quoted firms and thus eliminated some firms. Of the 180 firms in the NSE, 82 service firms, which included 57 financial firms, 25 service firms and 24 other firms, were excluded. We purposefully excluded the firms because of their poor disclosure practices. We found that most of the firms filed their accounts with SEC for periods under consideration; their financial statements did not make some vital disclosure. For instance, some were in abridged forms and it cannot be found which kind board structure they run. The data used was sourced from NSE database and was analyzed using multiple and multivariate regressions.

2.1. Diversity Structural Model

Time series panel data analysis has been found to yield consistent quality if the fixed effect model is used. Therefore, we used fixed effect model to analyze the effect of corporate governance diversity on financial statement timeliness quality. Based on this, we model the effect using the following structural fixed effect model.

$$Timl_{it} = \beta_1 BDSDvs_{it} + \beta_2 GenDiv1_{it} + \beta_3 GenDiv2_{it} + \beta_4 ProfDiv_{it} + \beta_5 CEODiv_{it} + \beta_6 AudDiv_{it} + \beta_7 Auq_{it} + \beta_8 FZ_{it} + \beta_9 Lev_{it} + \mu_I + \gamma_i + e_{rit} \quad (1)$$

where: $Timl_{it}$ measures timeliness of financial statements on assumption that financial statement reported earlier is more useful to investors than delayed financial statement. The variable is a component of two dependent

variables namely $Timl1_{it}$ is the reporting lag of firm *i* at time *t*. To measure timeliness$Timl1_{it}$, we followed the guidelines of Conceptual Framework, which states that if financial reporting is not published six months after its signing that it could be of poor timeliness quality. Thus, reporting lag was measured in terms of deviation from normal reporting time. However, specifically, we followed example of Alsmady (2018) that measured timeliness by the difference between the fiscal year and the issuance of the annual reports. Thus, timeliness is captured by the absolute value of the difference in days between fiscal year and the issuance of financial statements divided by 365 days. μ_i is firm fixed effect. γ_i is the year effect while e_{rit} is the stochastic error;

$BDSDvs_{it}$ is the board diversity measured in terms of board size. Thus, we assume that diversity in terms of number of persons with different background is directly related to the numbers of board size. Thus, as the board size increases, the numbers of persons with different professional background as well increases;

$GenDiv1_{it}$ is a gender diversity variable one. It is featured based on critical mass theory, which argues that as the number of the women increases in the boards the effect on earnings quality increases. Thus, we measure this variable as the proportion of female board members' relative to male in the boards;

$GenDiv2_{it}$ is gender diversity variable 2. It measures the presence of women as the board chairs in firm *i* for year *t*. Thus, it takes value 1 if the board chair is a female and 0 if a female is not the chairman of the board;

$ProfDiv_{it}$ is a robust variable measuring the impact of professional diversity. It is the proportion of board members with key accounting professional and legal background. These two were selected because of key roles they play in the boards. They are regarded as board members with corporate governance driven professionals and as such would always be listened to. It was also featured in order to avoid the case where increase in the board size does not involve diversity as in the case where a specific class of professionals was heavily engaged;

$CEODiv_{it}$ is a variable that measures for board leadership diversity. It takes value 1 if the CEOs are not the same as the board chairpersons and 0 otherwise for any specific year. We measure the leadership in reality rather than in form or legality of it. Thus, if board meeting holds with the absence of board chairs consecutively we count such firms as passive duality principle firms and as such signs the value 0 to such artificial dual based firms. We do this because virtually all quoted firms do display duality to show that their governance principle is qualitative and avoid delisting;

$AudDiv_{it}$ is an audit size diversity which measures the proportion of internal auditors with professional skills; Auq_{it} is a measure of the effect of external audit on firms' timeliness. It takes value 1 if firms are audited by one of the Big 4 for year *t* and 0 otherwise; $FZ_{it}$is a control for firms' size. It is measured as the log of firm *i*'s gross total asset for year t; Lev_i is a control variable that measures the effect of leverage on firms' timeliness in reporting quality. It measured as the ratio total long-term debt to total assets.

2.2. Timeliness-Reliability Trade-Off Model

To measure the reliability timeliness trade-off effect, we use multivariate model. Thus, the following model examines how board diversity affects reliability and timeliness concurrently. We also test the relationship using correlation matrix.

$$(T,R,) = \alpha_{T,R,+}(\beta_{1T},\beta_{1R})BDSDvs_{it} + (\beta_{2T},\beta_{2R})\beta_2 GenDiv1_{it} + (\beta_{3T},\beta_{3R})GenDiv2_{it} + (\beta_{4T},\beta_{4R})ProfDiv_{it} + (\beta_{5T},\beta 5_R)\beta_5 CEODiv_{it} + (\beta_{6T},\beta_{6R})AudDiv_{it} + (\beta_{7T},\beta_{7R})FZ_{it} + (\beta_{8T},\beta_{8R})Lev_{it} + \mu_i + \gamma_i + e_{rit} \quad (2)$$

where: T equals timeliness*,* and R equals reliability measured in terms of earnings persistence, which indicates stability quality of earnings. We measure persistence based on the regression of second period earnings (r_2) on first period earnings (r_1).

Thus, we use the model:

$$r_2(Earnings_t) = \alpha + \beta(r_1)(Earnings_{t-1}, \quad (3)$$

which simplifies to:

$$PS = \frac{Cov(r_1 r_2)}{var(r_1)} = \beta\text{-}1 \quad (4)$$

where: PS equals persistence, *β* is the measure for persistence. r_1 and r_2 are the first and second period earnings respectively. *α* is the constant and *cov* equals the covariates. β_{1T}*, to* β_{8T} are the coefficients of the

independents variables associated with timeliness quality while β_{1R}, *to* β_{8R} are the coefficients of the independents variables associated with reliability quality. $BDSDvs_{it}$, $GenDiv1_{it}$, $GenDiv2_{it}$, $ProfDiv_{it}$, $CEODiv_{it}$, and *AudDiv* are measures of board size diversity, gender diversity, professional skill diversity, board leadership diversity and audit diversity respectively. They have previously been defined in section 2.2.

2.3. Endogeneity Issues

An endogenous problem could occur between corporate-related variables including board diversity and performance (Cahan, Chen and Nguyen 2015, Rahman, Rodríguez-Serrano and Lambkin 2017). To examine the potential of endogenous problem in this study, we followed prior literature, to conduct Durbin-Wu-Hausman test. The test showed that there is no endogenous as its presence is found to be negative (χ2 Durbin–Wu–Hausman test = −10.5, p = 0.678). Researchers also predicted that reverse causality could cause a severe problem in the present study environment (Cahan *et al*. 2015). AS such, we carried out a Granger causality test and we found that the effect took earnings quality - corporate board diversity governance direction (FGranger test = 0.26, p = .4572).

3. Results

Descriptive Statistics

Table 1. Descriptive statistics of the variables

Variables	Minimum	Maximum	Mean	Std. Deviation
TIMl2	0.0020	0.9547	0.464745	0.2629055
CEODiv	0.0000	1.0000	0.722973	0.4490496
BSDiv	0.6021	1.2788	0.957443	0.1532445
GenDiv	0.0000	1.0000	0.250000	0.4344830
GenDiv2	0.0020	0.9547	0.403072	0.2753621
ProfDiv	0.0000	1.0000	0.358108	0.4810721
AudDiv	0.0031	0.4615	0.205598	0.1060096
Auq	0.0000	1.0000	0.540541	0.5000460
FZ	5.4050	9.6663	7.289131	0.8448776
Lev	0.0003	7.5739	0.751359	0.9201453

Source: SPPS

In Table 1 above, the values 0 and 1 as minimum and maximum for professional diversity, gender diversity and board leadership diversity show that during the periods under study, firms experienced diversity. The Table also shows that the data is good for regression analysis as the standard deviations are not high and did not exceed 1, which is the benchmark.

Correlation Matrix

Table 2. Correlation matrix of the diversity and timeliness variables

Variable	CEODiv	BSZDiv	GenDiv1	GenDi2	ProfDiv	AudDiv	Auq	FZ	Lev	TIML2
CEODiv	1									
BSZDiv	-.111	1								
GenDiv1	-.131	.366	1							
GenDiv2	.038	-.113	-.086	1						
ProfOiv	-.136	-.021	.057	-.138	1					
AudDiv	.096	.008	-.017	.060	-.068	1				
Auq	.066	.162	.000	-.086	.038	.050	1			
FZ	-.174	.393	-.029	-.056	-.069	.009	.088	1		
Lev	-.126	.014	.087	-.117	.127	.003	.037	-.216	1	
TIML2	.128	-.010	-.147	.096	.080	.023	.145	-.090	-.020	1

Source: SPPS

Based on the above correlation Table 2, the correlation among the independent variables are very high. This implies that the regression would not have any multicolinearity problems. We found that timeliness correlates positively with different diversity variables. Therefore, board diversity could encourage timeliness. However, we found that gender diversity variables correlate negatively with timeliness, which means that diversity could limit the timeliness of financial statements' report.

Regression Analyses: Fixed Effect

Table 3. Fixed effect regression results

Variable	Coefficients	Std. Error	t-Statistic	Prob.
C	-0.014732	0.270183	-0.054526	0.9566
AudDiv	0.059877	0.232684	0.257332	0.7974
Auq	0.061326	0.045354	1.352164	0.1793
BDSDivs	0.333271	0.178596	1.866060	0.0649
CEODiv	0.084339	0.957457	1.467848	0.1452
FZ	0.001972	0.033194	0.059396	0.9528
GenDiv1	0.073124	0.094992	0.769793	0.4432
GenDiv2	-0.136183	0.059350	-2.294521	0.0238
Lev	0.027172	0.029368	0.925214	0.3570
ProfDiv	0.066291	0.055271	1.199385	0.2332
		Effect Specifications	0.059877	Rho
		Cross-Section fixed (dummy variable)	0.00000	0.0000
		Idiosyncratic random	0.25348	1.0000
Weighted Statistics				
R-Squared		0.354944	Mean dependent var	0.464745
Adjusted R-Squared		0.070361	S.D dependent var	0.262905
S.E of regression		0.253488	Akaike info criterion	0.342379
Sum squared resid		6.554110	Schwarz criterion	1.273945
Log likelihood		20.66398	Hannan-Quinn criter.	0.720872
F-Statistic		1.2472	Durbin-Watson stat	2.548129
Prob(F-Statistic)		0.180268		

Source: SPSS

Table 3 above indicates that the timeliness effect of diversity is positive and significant for some variables. up to 35% of the variations in the timeliness is accounted for by corporate governance diversity. However, the combined effect is supported at 5% significance. The Durbin-Watson is 2.54, which shows that the autocorrelation at the residual does not constitute a problem.

3.4. Random Effect

Table 4. Random Effect Regression Results

Variable	Coefficients	Std. Error	t-Statistic	Prob.
C	0.463851	0.226776	2.045411	0.0427
AudDiv	0.015384	0.006621	2.318103	0.0215
Auq	0.072839	0.042877	1.698780	0.0916
BDSDivs	0.179636	0.079662	2.256289	0.0395
CEODiv	0.054319	0.015007	3.620730	0.0187
FZ	-0.038842	0.028935	-1.342357	0.1817
GenDiv1	0.101409	0.078032	1.299592	0.1959
GenDiv2	-0.103755	0.053429	-1.941922	0.0452
Lev	-0.008240	0.024037	-0.342797	0.7323
ProfDiv	0.059960	0.044768	1.339341	0.1827
		Effect Specifications	SD	Rho
		Cross-Section Random	0.00000	0.0000
		Idiosyncratic random	0.25348	1.0000
Weighted Statistics				
R-Squared		0.087082	Mean dependent var	0.464745
Adjusted R-Squared		0.027544	S.D dependent var	0.262905
S.E of regression		0.259259	Sum squared resid	9.275731
F-Statistic		1.996231	Durbin-Watson stat	1.950049
Prob(F-Statistic)		0.043763		
Unweighted Statistics				
R-Squared		0.087082	Mean dependent var	0.464745
Sum squared resid		9.275731	Durbin-Watson Stat	1.950049

Note: Cross-section random effects test equation

Similar to the fixed effect, the random effect as shown in Table 4 above indicates that the timeliness effect of diversity is mostly positive and significant for some variables. The analysis shows up to 8.7% of the variations in the timeliness being accounted for by corporate governance diversity. The combined effect is supported at 5% significance, which suggests that the focus of discussion should be group and individual variable based. The Durbin-Watson is 1.95, which shows that the autocorrelation at the residual does not constitute a problem.

3.5. Fixed-Random Effect Hausman Test

Table 5. Correlated random effects-Hausman test

Test Summary			Chi-Sq. Statistic	CHI-Sq. d.f	Prob.
Cross-section random			22.278	9	0.0098
Cross-section random effects test comparisons					
Variable	Fixed	Random	Var(Diff.)	Prob.	
AudDiv	0.059877	0.015384	0.014504	0.7118	
Auq	0.061326	0.072839	0.000219	0.4361	
BDSDivs	0.333271	0.179636	0.004516	0.0222	
CEODiv	0.084339	0.054319	0.000879	0.3113	
FZ	0.001972	-0.038842	0.000265	0.0121	
GenDiv1	0.073124	0.101409	0.002934	0.6016	
GenDiv2	-0.136183	-0.103755	0.000668	0.2095	
Lev	0.027172	-0.008240	0.000285	0.0359	
ProfDiv	0.066291	0.059960	0.001051	0.8451	

Note: Cross-section random effects test equation

The comparison between random and fixed effect models shows that the random effect is consistent with the corporate board diversity analysis. The Chi-Sq. Statistic equals 22.278 with p-value equals 0.0098. Thus we conclude that the use of random effect model gave a better result. As such, the discussion of the results was based on random effect model.

3.6. Diversity Reliability-Timeliness Trade-off Effect Analysis

Table 6. Diversity trade-off effect

Parameter	Model 1 (Timeliness)	Model 2 (Reliability)	Diversity Trade-off Effect Direction	Wilks' Lambda Value	Partial Eta Squared
Intercept	0.475	16.396	-	0.970	0.030
CEODiv	0.056	4.335	Negative	0.967	0.009
BSZDiv	0.178	30.031	Negative	0.987	0.008
GenDiv1	-0.096	-9.674	Negative	0.962	0.021
GenDiv2	0.102	-1.574	Positive	0.988	0.012
ProfDiv	0.058	-5.446	Positive	0.953	0.012
AudiDiv	0.038	-21.576	Positive	0.994	0.000
Auq	0.069	1.685	-	0.982	0.017
FZ	-0.041	-4.064	-	0.976	0.014
LEV	-0.009	-.166	-	0.976	0.001

Source: SPSS

Table 6 shows the trade-off relationship between timeliness and reliability of earnings report. The Wilks' Lambda for individual diversity variables are strong showing an average of 90% model fit. The partial eta squared is significant for all the variables, which shows support for all reliability-timeliness trade-off effect.

4. Discussion of Results

The discussion would be based on two aspects namely the diversity effect of timeliness and the reliability-timeliness trade-off effect. Thus, we brought the random effect table to focus the discussion.

Table 7. Random effect regression results

Variable	Coefficients	Std. Error	t-Statistic	Prob.
C	0.463851	0.226776	2.045411	0.0427
AudDiv	0.015384	0.006621	2.318103	0.0215
Auq	0.072839	0.042877	1.698780	0.0916
BDSDivs	0.179636	0.079662	2.256289	0.0395
CEODiv	0.054319	0.015007	3.620730	0.0187
FZ	-0.038842	0.028935	-1.342357	0.1817
GenDiv1	0.101409	0.078032	1.299592	0.1959
GenDiv2	-0.103755	0.053429	-1.941922	0.0452
Lev	-0.008240	0.024037	-0.342797	0.7323
ProfDiv	0.059960	0.044768	1.339341	0.1827
		Effect Specifications	SD	Rho
		Cross-Section Random	0.00000	0.0000
		Idiosyncratic random	0.25348	1.0000
Weighted Statistics				
R-Squared		0.087082	Mean dependent var	0.464745
Adjusted R-Squared		0.027544	S.D dependent var	0.262905
S.E of regression		0.259259	Sum squared resid	9.275731
F-Statistic		1.996231	Durbin-Watson stat	1.950049
Prob(F-Statistic)		0.043763		
Unweighted Statistics				
R-Squared		0.087082	Mean dependent var	0.464745
Sum squared resid		9.275731	Durbin-Watson Stat	1.950049

Note: Cross-section random effects test equation.

4.1. Discussions

Based on the analysis as shown in Table 7 above, we found that the board size diversity significantly and positively affected timeliness quality of financial statement (coefficient = 0.1796; p-value<0.05). Therefore, we reject the hypothesis that *board size diversity does not affect timeliness of financial statements significantly.* We found evidence that board size increases, timeliness can be achieved. This is contrary to the postulation that increase in board size can bring differences in opinion that can lead to delay in financial statement reporting, which impacts negatively on timeliness quality of financial statements (Julizaerma and Sori 2012, Liu, Wei and Xie 2014). Rather, we found that as diversity of board increases, creativity and innovation which could reduce the length of financial statements' reporting period could occur. Our analysis fully supports resource dependency theory, which defines the effect of resource acquisition on the behavior of firms (Hillman *et al.* 2009) as performance advancement. Consistent with the theory, we that achieve timeliness, firms' should diversify by acquiring societal talent resources. It also implies that firms should maintain links with their environment (Pfeffer 1982) in order to attract resources that would enhance reporting creativity and innovation that would ensure timely financial statement reporting. Thus, we found evidence that board diversification and executives serve as a nexus between the organizations and the external resources for organizational financial reporting innovation consistent with the evidence that diversifying boards with regards to nationality, education, gender, experience and backgrounds implies that the directors have considerable wealth of knowledge and skills (Alqatan 2019). This suggests that the board diversity will promote greater insight into markets, customers, employees, accounting issues and investment opportunities for better business performance (Hillman *et al.* 2007) consistent with the reported positive impact. Generally, board size diversification enhances earnings quality as confirmed by several empirical literatures (Egbunike and Odum 2018, Lu *et al.* 2018, Jouber and Fakhfakh 2014).

Based Board gender diversity and earnings reporting timeliness analysis, we found evidence that gender diversity yields negative effect on firms' reporting timeliness (coefficient -0.1037; p-value <0.05). Therefore, we accept the *board gender diversity negatively affects earnings reporting timeliness.* This evidence is consistent with the argument that resource dependency theory could attract people on board with argumentative spirit that could reduce the ability of the board to publish financial statements timely despite evidence that a well represented boards for instance multiple directorship and gender diversity enhances firms' risk management (Hillman *et al.* 2007). Social capital networking argues that board diversity aimed at making corporate governance more effective also involves gender balance in the board. This proposes that board positions and decision roles should be given to women (Kreder 2016). In fact, the latest view in this regard is that gender imbalance in the board is regarded as

unethical practice because such boards discriminate against sex. While this argument can be context specific, we show that board gender balance does not deliver values in terms of timely reporting of financial statements. Though Kreder's (2016) US evidence shows that the relationship between gender and the quality of earnings is positive and that as the proportion of women in the board increases in diversity, the credibility of financial reporting reliability improves consistent with the famous critical mass theory, we found support for the evidence as discovered by Hili and Affes (2012) that based on France, earnings quality is not enhanced by the presence of women directors on the board. Thus, our analysis does support the view that firms of gender diverse vision would most likely perform higher than single gender board in respect of timely reporting despite argument according to Luckerath-Rovers (2011) that both genders have different social capital wealth that can impact firms' performance and reporting behavior differently, perhaps positively.

Evidence based board leadership diversity and financial statements' timeliness showed that board leadership models affect firms' earnings quality. In some firms' boards there are multiple directors. This means that the board leadership is diversified. Our analysis shows that board leadership diversity positively affects financial statements' timeliness (coefficient -0.0543; p-value < 0.05)**.** Therefore, we accept the hypothesis 3 that *board leadership diversity significantly affects financial statements' timeliness* consistent with Baatour *et al.* (2017) and inconsistent with Yasser and Al Mamun (2016). We found that for a unit change board leadership diversification, reporting timeliness improves by 5.45%. This means that boards with a diversified leadership structure could achieve creativity and reporting innovation that enhance reporting timeliness. This supports resource dependency, human capital and social capital networking hypothesis (Sealy and Vinnicombe 2007). Social capital network benefit of diversity argues that all the assets or resources that groups or entities gain and accrue as a result of long standing networking, institutional relationship and shared contract can enhance firms' performance direct, or indirect. The benefit can be real or intangible. Social capital is a social network advantage and assets, which board leadership diversity, can depend on to achieve timeliness. Thus, this theory backs diversity because it is through social networking that an organization can bring in directors with social capital (Niu and Chen 2017) consistent with our finding.

Audit committee plays a key role in firms' internal control system. Thus, their diversity is expected to enhance firms' reporting quality. We found evidence that diversity in audit committee positively and significantly affects timely reporting (coefficient = 0.0153; p-value < 0.05). Based on this evidence, we accept the hypothesis 4 that *Board audit committee diversity significantly affects firms' financial statements' timeliness***.** Therefore, as firms' audit committee becomes diversified, 1.53% of timeliness is most likely to be achieved. This also supports resource dependency, social capital networking and human capital theories (Niu and Chen 2017, Sealy and Vinnicombe 2007) where firms' tap the wealth of experiences and social assets available in their environment to advance their goals. Our analysis thus, implies that audit committee with diversity would most likely enhance timeliness through innovation and creativity that would resolve issues quickly, which encourages fast financial statements' publications. Empirical research also found that audit committee diversity enhances earnings quality (Baatwah *et al.* 2019). Baatwah *et al.* (2019) using Malaysian firms found that the audit committee chair with accounting experience is associated with a reduction in audit delay (increases timeliness quality), which could enhance credibility in reporting though the evidence was more pronounced when the chair is a shareholder of the firms. This evidence is consistent with our finding.

Boards' professional skill diversity and firms' financial statements' timeliness yields significant effect. Boards with mixed professional skills have been found to enhance reporting quality. We test this evidence from the perspective of diversity. We found evidence that increase in professional diversity of corporate boards positively affects financial statements' reporting timeliness. However, the effect is not statistically significant (coefficient = 0.0599; p-value > 0.05). We found that as firms' boards continue to increase diversity in profession, firms' ability to overcome delay in financial statements' report decreases by 94%. Therefore, we partially reject the hypothesis 5 that *boards' professional skill diversity has significant effect on firms' financial statements' timeliness.* We conclude that though the effect is positive, it is not statistically significant at 5%. This evidence is bizarre given several reports that professional skills significantly affect earnings quality (Asogwa *et al.* 2019, Nelson and Devi 2013), Inconsistent with our study, Nelson and Devi (2013) investigation show that the presence of non-accounting experts and accounting experts is significant to minimize accrual manipulations. However, this last hypothesis authenticates our postulations that expansion of boards could bring in members with awkward or argumentative spirit, which could reduce the speed conflict resolution. In Social Psychology, Hackett, and Hogg, (2014) argues that uncertainty-identity theory highlights that an anomaly could occur between society's desire for diversity and people's preference to be with like-minded colleagues, which leads to a diversity paradox.

4.2. Corporate Board Reliability- Timeliness Trade-Off Effect

We consider diversity paradox as a situation where increase in financial statements' reliability quality reduces timeliness of financial statements. We use multivariate analysis to examine this effect. Based on Table 7 above, we found that board leadership diversity does not trade-off timeliness and reliability. Thus, board leadership diversity enhances both earnings reliability and timeliness of financial statements' report (coefficients 0.056 and 4.35; eta value >0.05). This implies that board leadership diversity can be pursued without concern for the diversity paradox. With regards to gender diversity, we found that as reliability increases, timeliness of reported financial statements decreases (coefficients 0.102 and -1.574; eta partial value<0.05). This means that the trade-off is statistically significant and pursuit of gender diversity should be done with care as it may enhance reliability at the expense of timeliness and vice versa. Gender diversity paradox exists as women have been found to make longer argument in the boards (Julizaerma and Sori 2012, Liu *et al.* 2014). Consistent with our finding, Julizaerma and Sori (2012) and Liu *et al.* (2014) found that gender diversity encourages new ideas from women and makes for better communication by women. However, they found that women make lengthy arguments in the meetings of the boards. Thus, while the new idea based on gender diversity can increase creativity that can improve performance including financial statement reliability, women often face serious challenge (Kenney, Lynch, Huntress, Haley and Anderson 2012), which can lead to deviation in the publication of financial statements if their ideas are unnecessarily attacked. As such, the lengthy arguments could lead to deviations from the normal decision making time range, which is the diversity paradox. We also found a positive reliability-timeliness trade-off for professional skills diversity (coefficients 0.058, and -5.446; partial value < 0.05). Therefore, as professional skills diversity increases, either of the response variables could be traded off such that as one increases the other decreases significantly.

Based on the analysis, we accept the hypothesis that board diversity increases financial statement reliability at the expense of financial statements' timeliness quality**.** As such, we conclude that as reliability of financial statements increases through diversity timeliness quality of financial statements gets impaired.

Conclusions and Policy Implications

Corporate board diversity plays a vital role in ensuring financial statements' timeliness reporting quality. We found a confirmatory evidence that as board size diversity, professional diversity and audit committee diversity increase, firms reports financial statements timely consistent with evidence that diversity enhances reporting credibility (Asogwa *et al.* 2019, Baatwah *et al.* 2019, Egbunike and Odum 2018). Our finding also confirmed the human capital and social capital networking theories, which propose that firms' environments opens greater opportunities and resources for firms to access and that through networking with different people with wealth of experience creativity and innovation that can encourage issues resolution speed can be achieved. This possibility translates into higher timeliness of financial reporting (Niu and Chen 2017, Sealy and Vinnicombe 2007). Following this evidence, firms should pursue diversity in boards and professional skills. We found that gender diversification does not enhance timeliness. As such, firms should exercise care in trying to diversify boards to promote gender equality. The idea that women are creative and as such should be allowed to actively participate in the board may not be good for timeliness quality of financial statements. This is despite the idea that firms of gender diverse vision would most likely perform higher than single gender board in respect of timely reporting (Luckerath-Rovers 2011). We conclude contrary to Luckerath-Rovers (2011) that both genders have different social capital wealth that can impact firms' performance and reporting behavior differently, perhaps positively.

We conclude that there is significant reliability-timeliness trade-off for the effect of gender diversity, professional skills diversity and audit committee diversity. As such, as firms' advance reliability through gender diversity, it is important to watch the timeliness trade off, which is the paradox of diversity, Boards that increase professional skill diversity also suffers from timeliness trade off that is significant. As such, we recommend a balance between pursuing reliability and timeliness through corporate board diversity.

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Assessing the Impact of Infrastructural Development on Manufacturing Value Added and Employment in Africa Emerging Economies

Richardson Kojo EDEME
Department of Economics, Faculty of the Social Science
University of Nigeria, Nsukka-Nigeria
richard.edeme@unn.edu.ngkojodynamics@yahoo.com

Ngozi Patricia BUZUGBE
Department of Humanities, School of General Studies
Delta State Polytechnic, Ogwashi-Uku, Nigeria
buzugbengozi@gmail.com

Nelson C NKALU
Department of Economics, Faculty of the Social Science
University of Nigeria, Nsukka-Nigeria
nelson.nkalu@unn.edu.ng

Winnie O ARAZU[1]
Department of Economics, Faculty of the Social Science
University of Nigeria, Nsukka-Nigeria
winnie.arazu@unn.edu.ng

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Abstract:

This study empirically investigates the impact of infrastructural development on manufacturing value added and employment in Africa emerging economies over the period 1980-2018. This study employed pooled mean group estimation, which efficiently estimated non-stationary panel datasets with cross-sectional dependence and unobserved heterogeneity. Our empirical estimates indicate an increase of 1% in access to electricity would contribute to manufacturing value added (MVA) and employment growth by 0.02% and 0.03% respectively.

Our results show that the coefficient of the ICT is positive and statistically significant in influencing MVA and employment. Again, the results show that foreign direct investment has positive relationship with both MVA and employment at 5% level of significance as indicated by the coefficient. Likewise, our results reflect a positive association with MVA and employment in the economies Transport infrastructure has negative effect on MVA and employment. Our estimates suggest that on average, a 1% increase in transport infrastructure will lead to about 0.018% and 0.076% decrease in MVA and employment respectively. Regarding the impact of macroeconomic factors, we found that level of development has negative effect on MVA and employment, an indication that the growth generated by Africa countries does not support employment. The findings of the study reveal that electricity and ICT infrastructure, along with other macroeconomic factors are important drivers MVA and employment in Africa emerging economies. However, the capacity of infrastructure to enhance MVA appears to have weakened, hence the palpably weakness to generate employment.

Keywords: infrastructure; manufacturing value added; employment; Africa's emerging economies; pooled group estimation.

JEL Classification: C32; L60; L86.

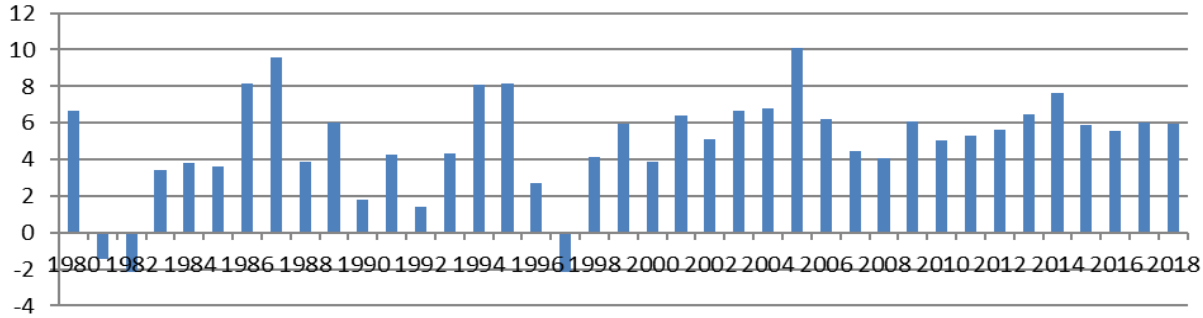
Introduction

It is widely held view that infrastructural development provides the basic foundation that precipitates industrialization for any nation. Recent research suggests that the industrial sector, especially the manufacturing, is the key engine of growth because of its potential to improve productivity and job creation. Rodrik (2012), Jie and Shamshedin (2019) rightly notes that very few countries have been able to grow, accumulate wealth, and reduce poverty and inequality without investing in the manufacturing industries. The desire for the structural transformation of African

[1] Corresponding Author

countries has led to massive investment in infrastructure in order to drive the economy and make significant progress in generating increased manufacturing productivity, create employment and strive towards the attainment of the sustainable development goals (World Bank 2019). Unfortunately, growth in manufacturing value added (henceforth referred to MVA) has be irregular with negative growth in some years. As illustrated in Figure 1, MVA witnessed negative growth in 1981, 1983 and 1997. The highest positive growth of 9.86% ever recorded in 1987, which however plummeted to 3.85% the following year. Although MVA improved marginally to 5.99% in 1989, it declined to 1.79% in 1990. In 2000, 2001, 2002, 2003, 2004, 2005, MVA stood at 3.88%, 6.39%, 5.11%, 6.69%, 6.82%, 10.09% and 6.24% respectively. Between 2007 and 2012, average growth in MVA was 5.09% while it grew averagely by 6.15% between 2013 and 2018.

Figure 1. Manufacturing value added in Africa (annual % growth, 1980-2018)



Meanwhile, as indicated by African Development Bank (2019) most Africa countries witnessed growth in the last two decades, very high level of unemployment, especially for the youths still prevails in the continent. This has led to the question whether in emerging economies; the infrastructure has contributed to manufacturing performance. The concern is that, infrastructural development not only aid manufacturing value-added but can potentially contribute to employment and stabilization of macroeconomic variables. In emerging economies, the potential of the manufacturing sector to generate employment is high because large proportions of the population are employed in agricultural and traditional sectors (Signe 2018).

In its general connotation, infrastructure refers to capital-intensive and non-capital facilities that enhance productive activities and quality of life. Its definition has also been restricted to include systems and facilities that have traditionally been provided by the government. However, following World Bank (2000), the definition of infrastructure has been extended to include inter-related technology and information stock that drives production. Although a vast literature emphasizes that infrastructure contributes to economic growth and critical in the production process, productivity, there is paucity of research with respect to infrastructural development-manufacturing value added-employment linkages, especially for emerging Africa economies. Mahyideen, *et al.* (2012) asserts that infrastructure is a critical factor in the growth process and enhances the production of goods and services in a more efficient manner. Infrastructural development is of crucial importance for manufacturing productivity. Improved productivity provides opportunity for relatively cheap commodities which invariably create employment. In addition, faster productivity growth has the potency to dampen unemployment rate without necessarily increasing the rate of inflation (Satya *et al.* 2004, Abiad *et al.* 2016, Stupak 2018).

The relationship between infrastructure and manufacturing performance is well documented in economic development literature. At several levels, infrastructure is required for industrial development to improve income and levels of productivity. It is widely held view that investments in infrastructure have immediate and lagged effect on job creation due to its spillover effects on other economic opportunities. For the USA economy, Abiad *et al.* (2015) provide evidence that investment in infrastructure generally decreases unemployment rate both in the short and long-term. Similarly, infrastructural investment increases labor demand in the short, medium and the long term. Bivens (2017) opine that efficient transport infrastructure provides economic and social benefits by improving productivity and access to market, ensuring balanced regional economic development, creating employment, promoting labor mobility and connecting communities. It has also been argued by Yazdan and Hossein (2013), Sepehrdoust (2018) that ICT can influence manufacturing productivity through various channels such as the production of goods and services to value in the economy. This group of researchers further contends that ICT improves efficiency and productivity which ultimately provide employment opportunities. As enunciated by Luger, Butler and Winch (2013), while infrastructure through the services it supplies supports manufacturing activity in various ways, innovations in infrastructure also stimulate innovations in manufacturing. It is therefore evident that public infrastructure in an input for manufacturing industries and beneficial to sustained employment.

The relationship between infrastructural development and manufacturing performance has become very important subject of discourse, especially in Africa and despite an increasing interest there has been limited research quantifying these benefits in emerging Africa economies. This paper extends and contributes to literature on the effect of infrastructural development on manufacturing value added and employment in several ways. Firstly, we show why infrastructural development is imperative to manufacturing output and employment and hence the need to improve the infrastructure substantially. Secondly, the paper empirically analyzed the impact of infrastructural development on MVA and employment in eight Africa emerging economies (henceforth referred AEE8) using data for the period, 1990-2018. These economies have existing and emerging manufacturing sector with greatest potential to undergo manufacturing-led structural diversification. Thirdly, we employed augmented mean group (AMG) estimator estimator proposed by Eberhardt and Teal (2012), which has the capacity to efficiently estimate non-stationary panel datasets with cross-sectional dependence and unobserved heterogeneity not accounted for by previous studies. This study is also important as it will provide a lead towards the attainment of Sustainable Development Goal of building resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.

1. Literature Review

One strand of literature that evaluated the impact of different infrastructure on manufacturing growth and productivity using specific country variables agrees that infrastructure is the set of interrelated structural elements that provide framework that supports development structure. One of such studies was conducted in Pakistan by Soneta *et al.* (2012) and found that transport, electricity and gas distribution has insignificant effect on manufacturing output in the study relied on time series regression model based on data collected from 1981-2009. Another study, Rietveld, Kameo *et al*. (1994) examined the impact of roads, telecommunication and electricity on the development of manufacturing industries and found positive and significant impact of infrastructure on manufacturing sector productivity. In Mexico, Castañeda *et al*. (2000) researched on the impact of highway and electricity on manufacturing output and finds that 10 percent growth in highways increases manufacturing output by between 0.62% and 0.96%. Sahoo *et al.* (2010) studied the effect of electricity, energy power, telephone, road, railway and port on manufacturing output and found that public infrastructure has positive and significant effect on manufacturing productivity growth. Hulen, Bennathan and Srinivasan (2003) study focused on the impact of electricity on manufacturing productivity in India. It was found that the effect of electricity on manufacturing depends largely on the degree of network, which is more pronounced in relatively underdeveloped areas. In a related study, Soneta (2012) shows that 10 percent increase in the stock of electricity increases manufacturing output by about 1.9% - 2.9%. Collaborating this, Bivens, (2017) asserts that efficient transport improves productivity, market accessibility, regional growth and employment opportunities.

Another strand of literature employed firm level data to analyze the relationship between infrastructure and manufacturing productivity. Such studies include Battasso and Conti (2010) who estimated the impact of roads on manufacturing productivity. Overall results exhibit that roads has significant impact on manufacturing productivity in the absence of barriers from government. Deng (2003) provided an update of the survey focusing on estimating the contribution of transport infrastructure to productivity. The study concludes that strong network externalities of transport infrastructure may result in nonlinearity of the relationship between transport. The absence of spatial concerns in infrastructure's impacts is an important source of inconclusive results. Also, Yeaple and Golub (2007) studied the effect of infrastructure on industrial growth and international specialization, adopting production equation, specialization, infrastructure equation and panel data of 18 developed and developing countries and 10 manufacturing industries from 1979-1997. The study finds significant effect of infrastructure on industrial productivity and explains international disparities in comparative advantage among nations. Mamatzakis (1999) argue that transport reduces cost of production in the manufacturing sector and private demand. The cost saving impact of improvement in public infrastructure varies from 0.02% in food industry to 0.78% in wood industry. Satya *et al.* (2004) examines the effects of public infrastructure on the performance of 12 two-digit manufacturing industries in Canada.

The estimated coefficients provide strong evidence of the importance of public infrastructure on manufacturing productivity. Goel (2003) primarily focused on the impact of infrastructure on the productivity of registered manufacturing sector in India using capital, labor and intermediate input and assumed infrastructure to be a quasi-fixed. Estimated results suggest that infrastructure provision accentuates manufacturing productivity and lowers cost of production. Chitkara and Nagpal (2017) adopts a non-parametric index number approach to investigate the connection between manufacturing sector development and public infrastructure in India states and found that the development of the manufacturing sector is strongly correlated with the conditions of infrastructure.

Some empirical studies also found that the condition and performance of infrastructure potentially affect economic output and employment (Stupak 2018). For the USA economy, Abiad *et al.* (2015) finds that improvement in public infrastructure generally decreases unemployment rate both in by 0.11% in the short term and 0.35% in the medium term. In the same vein, an increase in infrastructural investment would increase labor demand by 1.13% in the short term, 1.07% in the medium term, and 0.08% in the long term while Mcguckin *et al.* (1998) used survey data from 1993-1988 to show that ICT improves manufacturing productivity at two different points in time. Md and Alam (2014) finds that ICT had significant impact on output and labor productivity. Cronin *et al.* (1993) also emphasize that ICT infrastructure is also related to total productivity. Anyanwu (2017) conclude that ICT exerted positive and significant effect on manufacturing value added in the case of North Africa. With data from cross-section of countries, Canning (1999) finds that electricity and transport have almost the same marginal impact on manufacturing productivity as total capital, while ICT exhibit higher marginal effect. Rud (2000) finds that electricity accounts for about 15% of the variation in manufacturing output across states in India. Another study in this regard was conducted by Abri and Mohamoudzadeh (2005) and found that ICT and industrial productivity were positively correlated. Seitz and Licht (1995) use data from 11 west Germany states and found that public infrastructure improves competitiveness by reducing production and transport cost. In Middle East countries, Yazdan and Hossein (2013) study finds that ICT had insignificant effect on productivity growth. On the contrary, Steenkamp and Rooney (2017) finds that infrastructure has positive and significant effect on manufacturing output in the case of middle-income countries. Mesagan and Ezeji (2016) examine the effect of economic and social infrastructure on manufacturing sector performance in Nigeria. The result shows that ICT had positive impact on manufacturing performance while electricity had insignificant negative effects on manufacturing value added. Adopting the Autoregressive Distributed Lag (ARDL) model and the Toda-Yamamoto causality test Effiom and Okoi (2018) examined the relationship among human capital, technological development, infrastructure, and the performance of the manufacturing in Nigeria between 1970 and 2015. Result had it that human capita development, infrastructure and technology has no effect on manufacturing performance.

Some studies have discussed the importance of foreign direct investment (FDI) in creating employment in both developed and developing countries (Abor and Harvey 2008, Adamu and Embugus 2012, Onimisi 2014, Strat *et al*. 2015, Abbas and Xifeng 2016). In 2008, Abor and Harvey analyzed the empirical effect effect of FDI on employment creation and wages in Ghana and finds that FDI has positive and significant positive effect on employment. In another study focusing on China, Du and Ishizuka (2014) found that FDI has contributed significantly to the development of manufacturing capacity of China. Using data from 1991-2012 from the latest 13 members of the EU, Strat *et al.* (2015) provides strong evidence that FDI is beneficial in employment creation. In Nigeria, Onimisi (2014) examine the impact of FDI and employment using data from 2002-2012. The author find that FDI negatively affects employment. In another study focusing on Zanzibar Stone Town, Abbas and Xifeng (2016) revealed that FDI has positive effect on employment. For OECD countries, Baldwin (1995) findings indicates that domestic factors have generally accounted for changes in total employment than changes in demand for imports. More importantly, the increased effects of export to generate employment is usually dampened by increased imports.

The significant role of FDI in supporting manufacturing performance is also indicated in some recent studies. Okoli and Agu (2015) assesses the impact of FDI flow on the performance of the manufacturing firms in Nigeria. Adopting the OLS estimate with FDI modeled as a quadratic function to account for its turning point and the VECM to ascertain both the long run and the short run causalities, findings suggest that FDI inflows has positive effect on the manufacturing value added which is only feasible in the long run. In a similar study for Nigeria, Idoko and Taiga (2018) examine the effect of FDI on manufacturing value output between 1981 and 2015 with the Vector Auto Regression (VAR) technique and Johansen Co-integration test. The empirical results from the impulse response function and variance decomposition test indicates that FDI has a positive but insignificant effect on the manufacturing output. Authors also finds a long-run relationship between FDI and the manufacturing output. A more recent study by Jie and Shamshedin (2019) employed Vector Autoregressive model (VECM) to discusses the effect of FDI in industrialization in Ethiopia, using data from 1992-2017. Although the study demonstrate that FDI has a positive and significant impact on industrialization, its impact is more pronounced in the long-run.

Other variant of studies, such as Sodipe and Ogunrinola (2011), Oloni (2015) have observe that a negative relationship exists between economic growth (proxied by GDP growth) and employment, especially in developing countries. This affirm that economic growth does not support employment. Olusaji (2016) also discovered that there is no causality from GDP to employment. However, using panel data from Eastern European Countries, Soylu, Çakmak and Okur (2018) finds that 1% rise in GDP reduces unemployment rate by 0.08%.

Apparently, the literature review has shown that several studies have examined the influence of infrastructure on manufacturing productivity in both developed and developing countries, with varied results. While some studies contend that infrastructural facilities tend to be associated with higher manufacturing output, others show that the effect of infrastructure on manufacturing output is minimal. Several studies appear to confirm negative relationship between infrastructure and manufacturing productivity. None of these studies have examined the effects of infrastructural development on MVA and employment in AEE8. This provides a point of departure from the existing studies.

2. Methodology

A basic way to portray the role of infrastructure in manufacturing is through an input production function, a refinement of the standard Cobb-Douglas production function represented as:

$$Q = F(K, L. G) \quad (1)$$

where: Q is aggregate output, K is aggregate stock of fixed capital and L is the stock of labor force.

Overall, the estimation of the effects of infrastructure on manufacturing performance has demonstrated the adoption of three approaches: production function approach, cost-function approach and vector auto regression (VAR) function. In all, the production function is most appropriate especially for cases where infrastructure is not disaggregated (Zegeye 2000, Luger *et al.* 2013). In relation to the first approach, the channels through which infrastructure affect manufacturing performance represented in a production function expressed as:

$$Q_i = A_i(t)\, f_i(K_i, L_i, G_i) \quad (2)$$

where: Q_i denotes output, A_i (t) shift in the production function ascribed to technical progress, K_i, private capital, L_i labour and G_i government public input (roads, highways, among others).

Supposing that the function assumes the simple Cobb-Douglas form, then equation (2) can be written explicitly as:

$$Q = A_i(t)\, K^{\lambda k} L^{\lambda l} G^{\lambda g} \quad (3)$$

Taking the natural logarithm of both sides, equation (3) becomes:

$$ln_Q = \lambda_0 + \emptyset_t + \lambda_K ln_K + \lambda_l ln_L + \lambda_g ln_G + U \quad (4)$$

Based on theoretical framework posited above and following the work of Yazdan and Hossein (2013), Steenkamp and Rooney (2017), the modified relationships for our empirical estimation can be written as:

$$manv_{it} = \alpha_i + + \beta_{1i} lnelect + \beta_{2i} lntrans_{it} + \beta_{3i} lnfdin_{it} + \beta_{4i} lnlev_{it} + \epsilon_{it} \quad (5)$$

$$manemp_{it} = \alpha_i + \beta_{1i} lnelect + \beta_{2i} lntrans_{it} + \beta_{3i} lnfdin_{it} + \beta_{4i} lnlev_{it} + \epsilon_{it} \quad (6)$$

where: $manv$ is manufacturing value-added, $manemp$is employment in the manufacturing sector employment, $elect$ is electricity infrastructure, $trans$is transport infrastructure, $ictx$ is information and communication technology (ICT), $fdin$ is foreign direct investment, dev is Level of development, β_1, β_2, β_3, β_4 are estimated coefficients related to the explanatory variables, i = 1, ... N; t = 1, ...T).

To test a long-run cointegration, different methods such as Fully Modified Ordinary Least Square (FM-OLS), Panel Dynamic Ordinary Least Squares (PD-OLS) and pool mean group estimation (PMGE) can be utilized. However, our study utilized PMGE proposed by Pesaran *et al.* (1999), Eberhardt and Teal (2012). The model assumes that while long-run relationships among in the variables are identical but coefficients and error variances differs across the groups. According to Mahyideen *et al.* (2012), Phajsansilp (2015), Othman *et al.* (2018), PMGE combine pool and averages while allowing the intercept, short-run coefficient and error variances to differ across the groups, especially in studies where countries involved have lower degree of heterogeneity. The framework has the ability to capture both the long-run and short-run relationship among the variables and the convergence parameter. The process inherent in PMGE is illustrated as:

$$y_{it} = \beta_i x_{it} + u_{it} \quad (7)$$

where: $u_{it} = a_{1i} + \lambda_i f_t + \varepsilon_{it}$; $x_{it} = a_{2i} + \lambda_i f_t + \delta_i g_t + \omega_{it}$

In equation (7), y_{it} and x_{it} are observables, β_i is the country-specific slope on the observable regressor and u_{it} contains the unobservable (α_{1i} and f_t) and the error term ε_{it}. α_{1i} is the group fixed effects, which capture time-invariant heterogeneity across groups. f_t is the unobserved common factor with heterogeneous factor loadings λ_i, which can capture time-variant heterogeneity and cross-section dependence. g_t with factor loading δ_l is added to show that x_{it} is affected by other factors other than the ones which affect y_{it}. The unobserved common factor (f_t) which affects the error u_{it} could lead to endogeneity problem. Given that *ft* and *gt* can be nonlinear and nonstationary, there is apparent implication for cointegration. These perceived problems can be conveniently handled with the application of PMGE. In the estimation of PMGE the following procedures are involved: use first difference ordinary least squares to generate a pooled regression model augmented with year dummies (Dum_t). The year dummy coefficients are estimated and the time dummy coefficient approximates the unobserved common factors that are potentially driving the variables in each panel unit is determined. The estimates are finally generated as averages of the individual country estimates. Since our study consists of large T (38 years) and small N (8 countries), it is instructive to determine the suitability of the application of PMG estimation.

Data on eight Africa emerging economies from 1980–2018 based on the indicators included in our analysis were generated from World Bank's (World Development Indicators) (WDI) and African Development Bank's (Africa Infrastructure Development Index) (AIDI). The countries covered by the study are: Botswana, Ghana, Kenya, Mozambique, Nigeria, Tanzania, Uganda and Zambia as emerging economies in Africa. In line with the specific objectives of the study, the dependent variables are manufacturing value-added (total volume of goods manufactured within an economy, proxied by manufacturing value-added, % annual growth) and employment in the manufacturing sector. The explanatory variables are electricity infrastructure (access to electricity in rural areas as % of population), transport infrastructure (transport composite index), information and telecommunication technology (ICT composite index; percentage of individuals using the internet, fixed-broadband internet subscriptions, active mobile-broadband subscriptions, percentage of individual using computer, mobile-cellular telephone subscriptions per 100 inhabitants). We also included other control variables such as foreign direct investment (foreign direct investment, net inflows (% of GDP) and level of development (GDP growth, annual %). The descriptive statistics of the variables used in the estimations which reports the sample mean, median and standard deviation are presented in Table 1.

Table 1. Descriptive statistics of the variables used for empirical estimation

Variable	Mean	Standard deviation	Minimum	Maximum
manv	5.14	7.21	10.90	19.22
manemp	2.01	9.88	0.99	23.45
elect	506	191	001	5688
trans	5.02	2.11	0.39	18.44
ictx	2.21	4.09	0.20	23.44
fdin	1,735.91	1,323.45	1,200.02	2,792.92
manv	5.14	7.21	10.90	19.22

Source: Author's based on data generated from WDI and AIDI

2.1. Baseline Results

The Levin-Lin-Chu (2002), Im-Pesaran-Shin (2003), ADF-Fisher and the PP-Fisher tests with null hypothesis of no unit root tests were conducted. However only the Im-Pesaran-Shin (2003) test result was summarised in Table 2.

Table 2. Panel Unit Root Test

Variable	Level		First Difference		Order of integration
	Im-Pesaran-Shin Statistic	Im-Pesaran-Shin *p-value*	Im-Pesaran-Shin Statistic	Im-Pesaran-Shin *p-value*	
manv	-5.6454	0.9237	-3.0005	0.0001	I(1)
manemp	2.3284	0.5332	-9.5006	0.0000	I(1)
elect	5. 5783	0.0881	-9.7006	0.1000	I(1)
trans	-9.54805	0.0000			I(0)
ictx	-2. 2497	1.2122			I(0)
fdin	-1.7322	0.0896			I(0)
dev	-2.8732	0.6789			I(0)

Source: Authors' estimation

The results in Table 2 shows that the null hypothesis of unit root for the panel cannot be rejected. All the variables are stationary in the first difference, suggesting that the panel variables are integrated at level I (0) and I (1) and none of the variables are I (2) or a higher level of integration. In this study therefore, nonstationarity of dataset poses no problem for the AMG estimator. The Pedroni residual cointegration results in Table 3a and 3b shows that five out of the six test statistics are significant

Table 3a. Panel Cointegration Result for Model 5

Statistics	Within-Dimension (Panel)				Between-Dimension (Group)	
	Statistic	Probability	Weighted Statistic	Probability	Statistic	Probability
v-Statistic	-3.0489	0.9990	-2.9894	0.0628		
rho-Statistic	2.6653	0.9997	2.5631	0.8909	3.0338	0.0074
PP-Statistic	-3.6250	0.0000	-7.2616	0.0000	-11.8212	0.0012
ADF-Statistic	-4.8159	0.0000	-5.835538	0.0000	-3.2031	0.0000

Note: Included observations: 304; Cross-sections included: 8.
Source: Authors' estimation

Table 3b. Panel Cointegration Test Result for Model 6

Statistics	Within-Dimension (Panel)				Between-Dimension (Group)	
	Statistic	Probability	Weighted Statistic	Probability	Statistic	Probability
v-Statistic	-1. 2045	0.8585	-3.4120	0.9982		
rho-Statistic	4. 7304	1.0000	3.0449	1.0000	6.8120	0.0000
PP-Statistic	-9. 8980	0.0000	-5.7304	0.0000	-11.8215	0.0000
ADF-Statistic	-3.2031	0.0000	-3.0388	0.0000	-2.7304	0.0001

Note: Included observations: 304; Cross-sections included: 8
Source: Authors' estimation.

The PP-Statistic and ADF-Statistic are significant for both the panel within dimension and group between dimension. Given that their probability values are less than 0.05. We reject the null hypothesis and conclude that the variables are cointegrated. Thus a long run relationship exists between variables in the model. Table 4 presents the Breush-Pagan LM, Pesaran scaled LM and Bias-corrected scaled LM residual cross-section dependence test results.

Table 4. Residual Cross-Section Dependence Test

Residual Cross-Section Dependence Test	Model 5		Model 6	
	Statistic	Probability	Statistic	Probability
Breush-Pagan LM	189.0014	0.0000	585.8374	0.0000
Pesaran scaled LM	11.2029	0.0000	32.14583	0.0000
Bias-corrected scaled LM	6.0469	0.0000	31.56891	0.0000

Note: Total panel observations: 304; Cross-sections included: 8.
Source: Authors' estimation.

For both models, we reject the null hypothesis of no cross-section dependence in residuals since the probability values are less than 0.05. This outcome further support and justify the use the PMGE for panel data sets with cross-sectional dependence. The PMGE occupies an intermediate position between the mean group and dynamic fixed effect, where it allows the intercepts, short-run coefficients and error variances to differ freely across groups but constrains the long-run coefficients to be similar across groups (Othman *et al*. 2018). Table 5 reports the results of the pooled means group (PMG) estimation. Coefficient estimates of MVA equation are presented in Column 1 while coefficient estimates of the employment equation are presented in Column 2.

Table 5. Result of the Pooled Means Group estimation

Variable	Manufacturing value added	Employment
Lnelect	0.021*** (0.064)	0.027*** (0.075)
Lntrans	-0.018*** (-0.34)	-0.076** (-2.09)
Lnictx	0.030 (0.101)	0.014 (0.075)
Lnfdin	0.090** (2.41)	0.061** (2.04)

Variable	Manufacturing value added	Employment
Lndev	-0.232** (-0.105)	-0.241**(-0.135)
Constant	-43.4963 (-0.50)	-23.1981 (-0.50)
Wald Chi^2 test	18.49	13.69
Prob > Chi^2	0.0025	0.0348
Number of countries	8	8
Number of observations	304	304
Root mean squared error		

Note: z-values are in parenthesis, ***=1% significant level, ** = 5% significant level, * = 10% significant level
Source: Authors' estimation

The PMG estimation results in Table 5 suggest a positive relationship between electricity infrastructure and MVA and employment. The respective magnitude of the MVA and employment is about 0.02 and 0.03 at 1% significant level. This indicates that for emerging economies in Africa, a 1% improvement in access to electricity leads to 0.02% increase in MVA and employment by 0.03%. This is contrary to the finding of Soneta *et al.* (2012) that electricity has negative effect on manufacturing output in Pakistan. Our results show that the coefficient of the ICT is positive and statistically significant in influencing MVA and employment, conforming to the findings of Anyanwu (2017). We can conclude that increase in access to ICT tend to accentuate improvements in MVA and employment in Africa emerging economies. Again, the results show that foreign direct investment has positive relationship with both MVA and employment at 5% level of significance as indicated by the coefficient.

The result is in line with most empirical studies which show that FDI is important in fostering employment in the manufacturing sector (Du and Ishizuka 2014, Abbas and Xifeng 2016). With respect to the role of FDI, the result shows that it has positive association with MVA and employment in the economies in conformity with Okoli and Agu (2015), Idoko and Taiga (2018), Jie and Shamshedin (2019). However, Abbas and Xifeng (2016) suggest that although increase of trade openness is a growth opportunity for a country, domestic resources can also be deployed in adequate quantities to produce goods for export. Also, domestic production capabilities have to be already in place in order to respond to international competition.

Transport infrastructure has negative effect on MVA and employment. As seen in Table 5, our estimates suggest that on average, a 1% increase in transport infrastructure will lead to about 0.018% and 0.076% decrease in MVA and employment respectively. This is contrary to the findings of Battasso and Conti (2010), Soneta *et al.* (2012) and Bivens, (2017) that transport infrastructure aids manufacturing output. Bivens (2017) transport improves productivity, market accessibility and employment opportunities. The negative relationship found in emerging economies may be attributable to the fact investment in infrastructure that aid manufacturing follows a similar pattern in the emerging economies. The network externalities of transport infrastructure may result in nonlinearity of the relationship.

The absence of spatial concerns in infrastructure's impacts could also be important source of the relationship. We next assess the impact of level of development (represented by percentage growth in GDP) on MVA and employment. Our results indicate that level of development is negative. This shows that the level of development generated by Africa countries does not support employment. Our result resembles that of Sodipe and Ogunrinola (2011), Oloni (2015) and Olusaji (2016). Our outcome however contradicts the findings of Soylu, *et al.* (2018) that economic growth reduced employment in Eastern European countries.

Conclusion

This study aimed to empirically assesses the impact of infrastructural development on manufacturing value added and employment in Africa emerging economies, which are Botswana, Ghana, Kenya, Mozambique, Nigeria, Tanzania, Uganda and Zambia for a period of 38 years (1980-2018). Using pooled mean group (PMG) estimation, we have examined how various indicators of infrastructure (electricity, transport and ICT) affect manufacturing value added (MVA) and employment.

In our analysis, we have also included macroeconomic variables, namely, foreign direct investment and level of development. Our empirical estimates indicate an increase of 1% in access to electricity would contribute to MVA and employment growth by 0.02% and 0.03% respectively. Our results show that the coefficient of the ICT is positive and statistically significant in influencing MVA and employment, Again, the results show that foreign direct investment has positive relationship with both MVA and employment at 5% level of significance as indicated by the coefficient. Likewise, our results reflect a positive association with MVA and employment in the economies

Transport infrastructure has negative effect on MVA and employment. Our estimates suggest that on average, a 1% increase in transport infrastructure will lead to about 0.018% and 0.076% decrease in MVA and employment respectively. Regarding the impact of macroeconomic factors, we found that level of development has negative effect on MVA and employment, an indication that the growth generated by Africa countries does not support employment. The findings of the study reveal that electricity and ICT infrastructure, along with other macroeconomic factors are important drivers MVA and employment in Africa emerging economies (AEE8). However, the capacity of infrastructure to enhance MVA appears to have weakened, hence the palpably weakness to generate employment. Based on the research, we emphasize that, to improve MVA and employment, electricity and ICT infrastructural development should be prioritized in the industrialization policies of AEE8.

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Agricultural and Organic Farming Production in the Analysis of Social Well-Being in the European Union Countries

Agnieszka STANIMIR
Department of Econometrics and Operational Research
Faculty of Economics and Finance
Wroclaw University of Economics and Business[1], Poland
agnieszka.stanimir@ue.wroc.pl

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Abstract:

The study aim is to determine the relationship of factors associated with production of organic food and the quality of life (QoL) of Europeans. The QoL and organic agriculture are not one-dimensional variables related to behavior, reactions and relationships, regarding individuals, households, producers and farmers. In addition, these factors interact with each other. We intend to determine whether the QoL of Europeans is perceived by them only in terms of ownership, or whether issues related to the assessment of the condition and status of agricultural and organic farming production affect the perception of QoL in a non-material psychological aspect. The study mainly assessed the QoL in relation to subjective well-being based on self-assessment of Eurobarometer respondents (life satisfaction measured on 5-point Likert scale). The data for the study comes from the EUROSTAT and Eurobarometer databases for EU-countries in three groups. The analysis uses correspondence analysis and Hellwig's ordering method as main tools to detect relationships and similarities between the countries. In the study we checked whether the assessment of QoL is done by shaping individuals' opportunities in life, not only with respect to the state of ownership but also the impact of objective factors, such as agricultural production volume.

Keywords: quality of life; well-being; organic agriculture.

JEL Classification: C3; D1; I3; Q5.

Introduction

Organic as a label more and more often appears not only in case of food products but also others whose production requires use of products from organic agriculture. Using Cambridge Dictionary sources, we state that the term organic can be used to describe food products, production methods and agriculture as long as artificial chemicals. The word also frequently appears on clothing labels, indicating that the fabric, was created under the conditions of organic growth. On the basis of these definitions, it is also possible to introduce an organic lifestyle which aims to eliminate unnecessary chemical ingredients from food and strives for broadly understood environmental protection. If we use the term organic in this way, we will naturally reach the definition of social well-being which will have to embrace assessment of organic friendly life and consumption.

The aforementioned problem disposed us to define the research area where we can examine the relationship between social awareness related to organic food, farming, products, production and consumption of these goods as well as subjective assessment of well-being. The aim of the study is therefore to check how socio-economic factors determining the well-being of individuals imply views on organic consumption and the perception of organic food, farming, products and production and whether they are related to the volume of consumption and production of these goods. Further development of the research goal is to check whether organic production is conditioned by a high degree of well-being of the inhabitants of EU countries.

1. Organic Lifestyle and Higher Well-Being

1.1. Organic Agriculture

The criterion that defines the concept of organic production in the European Union is Regulation of the European Parliament and of the Council Regulation (Regulation 2018). According to this regulation: "Organic production is

[1] Komandorska 118/120, 53-345 Wroclaw, Poland

an overall system of farm management and food production that combines best environmental and climate action practices, a high level of biodiversity, the preservation of natural resources and the application of high animal welfare standards and high production standards in line with the demand of a growing number of consumers for products produced using natural substances and processes."

This definition covers both the aspect of consumption (consumer demand) of organic goods as well as the supply side of the production process of these goods. The cited regulation also gives names for domestic organic products, *e.g.* ecological, biological. Products labelled as organic, ecological or biological must be made in accordance to the rules described in the Regulation. This regulation protects consumers' rights by specifying requirements for organic product markets and, on the other hand, by defining the organic production process.

If we consider only food markets, then, as Matt *et al.* (2011) point out, consumer confidence in conventional products is decreasing and alternative food producers are being sought. This is the main reason for the development of organic product markets. Consumers are increasingly aware of the negative impact of such elements of conventional production as artificial fertilizers or chemicals for plant protection, and the so-called quality and flavor enhancers (preservatives, synthetic flavors) not only on their health but also on the environment.

As Bartóková (2018, 1909) writes "organic farming can be described as an agricultural production which uses organic production methods and places the highest emphasis on environmental and wildlife protection". Based on the Reganold and Wachter (2016) study on the comparison of organic and conventional farming, we learn that organic farming achieves significantly better results in the following areas of sustainability: soli quality, ecosystem services, reduction of workers' exposure to pesticide, minimalization of pesticides use. It leads in such areas as energy use, biodiversity, water pollution, profitability, employment. In two areas organic and conventional farming are similar: total costs and nutritional quality. In two areas, according to Reganold and Wachter (2016), conventional farming achieves better results than organic: higher yields and lower costs.

1.2. Subjective Quality of Life and Well-Being

The Organization for Economic Cooperation and Development OECD definition (2011, 2017) indicates that quality of life is about human well-being. It is measured by social indicators. These are non-monetary attributes of individuals, shaping their life chances, varied in cultural and social cross-section. This definition as most of other about QoL refer to the level achieved by both subjective and objective factors. Nowak (2018, 73) indicates that "the quality of life ... can be considered as a subjective assessment of a person and objective on the basis of statistics describing an individual ... The quality of life should be examined at both the individual and social level".

The statistical offices of the EU and member states also propose their own definitions. The EUROSTAT (2020) definition focuses on: material conditions, professional activity, health, education, leisure and social interaction, economic and private security, government and basic rights, general life experiences. Additionally, EUROSTAT (2020) study includes the assessment of the natural and living environment, which, combined with the assessment of subjective perception of life, response to stimuli and feeling of happiness, accurately matches the problem posed in the study. Thus, the definition and way of measurement of Europeans' quality of life takes into account not only their well-being but also the aspects associated with environmental protection and organic agriculture.

All the quoted definitions treat a quality of life as a multidimensional phenomenon. The perception of this phenomenon becomes even more complicated if we assume, according to Eurofound (2020), we assume that the quality of life of individuals results from the quality of life of the society. Activities in these two areas in terms of quality of life are interrelated and mutually affect each other. Villamagna and Giesecke (2014) stated that the quality of life is affected by factors associated with the implementation of material and non-material needs. Objective and subjective factors describing the quality of life are multidimensional and interpenetrate on many levels. Welsch (2011) showed that objective, macroeconomic factors which very strongly influence the quality of life of an individual are unemployment and inflation. Income, higher education and marriage were among the subjective or characterizing factors of the individual that create the highest positive correlation with life satisfaction. However, the most important factor affecting life satisfaction was unemployment.

Brown *et al.* (2018) indicated five domains of human well-being: income and household expenditure, housing and material assets, food security and nutrition, health, cultural and subjective well-being, other. Three areas here are related to the quality of life perceived through the prism of using organic products.

As broad as the concept of life satisfaction and subjective well-being is it embrace ever new factors. Butler and Oluoch-Kosura (2006) pointed out that the individual's perception of well-being is related to a specific moment in life and therefore a temporary context, expectations, relationships, social position, and a sense of participation and inclusion play an important role here.

Villamagna and Giesecke (2014) determined the indicator of changes in human well-being so as to take into account biophysical and socio-economic changes affecting the provision of ecosystem services. They assumed that this indicator must be flexible (use in different environmental and socioeconomic conditions) and coherent to allow comparisons.

1.3. Organic Well-Being

As some references to the place of the ecosystem in the well-being definitions have been mentioned in the paper one should think about what ecosystem services are. Kremen and Miles (2012) present several elements to be considered. The most related to individual's well-being are nutrient management, water-holding capacity, energy efficiency and reduction of warming potential, resistance and resilience to climate change. Other elements of ecosystem services affect human well-being indirectly. They are: biodiversity, soil quality, control of weeds, diseases, and pests, pollination services, carbon sequestration and crop productivity.

Individual the quality of life depends indisputably on income. Higher quality of life affects the ability to make decisions not only to satisfy basic needs but also to open up opportunities to realize the need for ecology, environmental protection and changing nutrition systems. It thus changes consumption patterns and behaviors. The most obvious consequence is turning towards pro-ecological behaviors. People at risk of poverty choose the cheapest products (which are often associated with poor quality) and sometimes it is difficult to find any sense in their existence. In order to further describe the relationship between well-being, subjective life satisfaction and organic food, farming, products or production, the term organic agriculture was adopted for all activities related to the production of organic goods. Of course, the positive relationship between income and awareness of individual pro-ecological and organic agriculture oriented activities is a generalization which allows for some possible cases of negative relations.

Organic is one of the functions of the ecosystem. As a close relationship between well-being, organic agriculture and ecosystem services, it should be pointed out that the factors necessary for subjective well-being are material and non-material factors. Therefore, material factors such as shelter, clothing and food, as determinants of well-being are related to organic production. But looking more broadly at the policy of sustainable development, organic idea impacts the increases of the ecosystems' functions, which gives the opportunity to achieve non-material goals of well-being even related to leisure, health, safety, frame of mind and the ability to make your own choices.

Since organic food is of better quality, it is a key statement that the consumption of good quality organic products not only improves health and physical condition, but combined with the awareness of the socio-economic-ecological relationships of market factors, can improve the well-being also in its psychological aspects. Reganold and Wachter (2016) presents similar justifications. These authors also point out that organic agriculture underuse abilities as main factors in global food and ecosystem security.

The advantage of organic agriculture over conventional remains unchallenged. It is important, however, to draw the attention of more consumers to this agricultural production system and to indicate its positive effects for a single person (mainly health aspects) and for global well-being, which also translates into benefits for individual well-being (protecting the natural environment, limiting global warming, reduced food waste, increased employment). Factors responsible for sustainability in agriculture are not mutually exclusive and information promoting their co-existence should be widespread.

Organic agriculture must develop constantly and be supported by legal solutions and co-financed by governments or, as in case of European farms, additionally by the EU (Picket 2013). However, the question arises whether Europeans citizens understand this, or believe that there are other more pressing needs. For this reason, education and public engagement is necessary (Picket 2013). The exact impact on human well-being ecosystem and agricultural productivity was presented by Brown *et al.* (2018), who cited agroforestry intervention as an example. At the core of the actions to improve the three areas were farmers' conviction and involvement as well as education in the research area.

Well-being is one of the Principles of Organic Agriculture developed by the International Federation of Organic Agriculture Movements (IFOAM 2009). These rules apply respectively to Health, Ecology, Fairness and Care. And it is the latter that advise management and production rules for organic agriculture to be conducted in such a way as to guarantee well-being of current and future generations and the environment.

The positive link between well-being and organic agriculture can also be found in the European Commission's guidelines. In 2016, the Commission took steps to implement the sustainable development program within the European Union (European Commission 2019). These decisions were a response to the 2030 Agenda taken in 2015 by the United Nations General Assembly. The 17 sustainable development goals have been set to

fight poverty, protect our planet and ensure the well-being of all people. From the point of view of the presented research objective, the most important are the combined activities in the areas of: zero hunger; good health and well-being, responsible consumption and production, life on land. Together, they allow us to define the main determinant of sustainable organic agriculture in improving social well-being. Based on these goals, we determined that organic agriculture should be developed to ensure care for the ecosystem and biodiversity. This in turn will affect sustainable consumption and develop healthy eating patterns, increase quality and guarantee care for the safety of organic products, thereby improving both the quality of life and assessment of well-being of individuals.

Summarizing the considerations on the relations between well-being and organic agriculture, it can be pointed out that there are substantive premise to indicate these relations. Although we have highlighted some ways of indicating human impact on the ecosystem as well as the impact of organic agriculture on well-being. Literature suggests that it is a very difficult task. For example, according to Villamagna and Giesecke (2014) it is difficult to pinpoint a direct link between well-being and the ecosystem, and thus relate those two to organic agriculture and production.

In such situations, it is worth using Brueckner-Irwin, Armitage and Courtenay (2019). They defined four dimensions of social-ecological well-being and sample attributes: material (income, assets, shelter, food, access to resources), relational (relationships of affection, relations with the state, social institutions, rules and norms that dictate access to resources), subjective (values, beliefs, satisfaction, self-identity, spirituality). The last dimension is ecological. The authors give here attributes such as biological diversity, modularity, openness, reserves and capital. One should also agree with the need to thoroughly identify purchasing behaviors of organic goods consumers, indicated by Freyer, Bingen and Paxton (2014). International Federation of Organic Agriculture Movements (2009) indicates that the possibility of organic farming functioning requires major changes in society.

2. Data Used in the Analysis

In order to search for the relationship between QoL, economic situation and attitude towards organic agriculture and modern agriculture, we used data from the EUROSTAT, the Euro-barometer survey (European Commission 2013; European Commission 2018) and the IFOA data collected by FIBL (2020). During the description of the results, we provided the data sources in detail. EUROSTAT and IFOA provide aggregated data for countries or regions. Whereas, Euro-barometer data relate to the individuals' subjective assessments of all Europeans participating in this panel study.

During the analysis, we used, in addition to descriptive statistics, frequencies, linear ordering method and correspondence analysis.

Frequency calculation is most often used in analyzing conjunctive questions. These types of questions are included in the Euro-barometer's questionnaires. We calculated the frequencies by referring to the number of options selected by all respondents. Łobocki (1975) indicates that calculating the frequencies of answers for this type of question allows to indicate the hierarchy of these answers.

Linear ordering method allowed us to make a ranking of objects due to the set of characteristics of the research problem. Balicki (2013) points out that in linear ordering, the measurement of diversity should characterize how much, on average, one object is better (or worse) than another due to variable values. We used the Hellwig's method in the study, not the widely used TOPSIS method. In Hellwig's method (Hellwig 1968), the ordering synthetic measure results from the relation between the distance of object to ideal solution and the interval of variability of all the distances between objects and the ideal solution. Based on the differences in the level of the Hellwig's ordering synthetic variables, we determined four classes of objects, based on the mean and standard deviation. This classification guarantees the greatest possible diversity of objects values from different classes and the smallest possible diversity of objects in the same classes (Nowak 1990).

We used correspondence analysis to achieve the goal of the study, which was to check the relationship between the subjective assessments of quality of life, financial situation, and attitude to sustainable agricultural production. This method has been widely described in the literature: in many publications by Greenacre (e.g. 1984, 2010), as well as those by Backhaus *et al.* (2003), Blasius (2001), Heijden (1987). Using correspondence analysis, it is possible to examine the relations between the categories of non-metric variables. The result of this method is an indication of the groups of coexistent categories and their graphic presentation. In our study, we used the correspondence analysis for a concatenated and multiway contingency table.

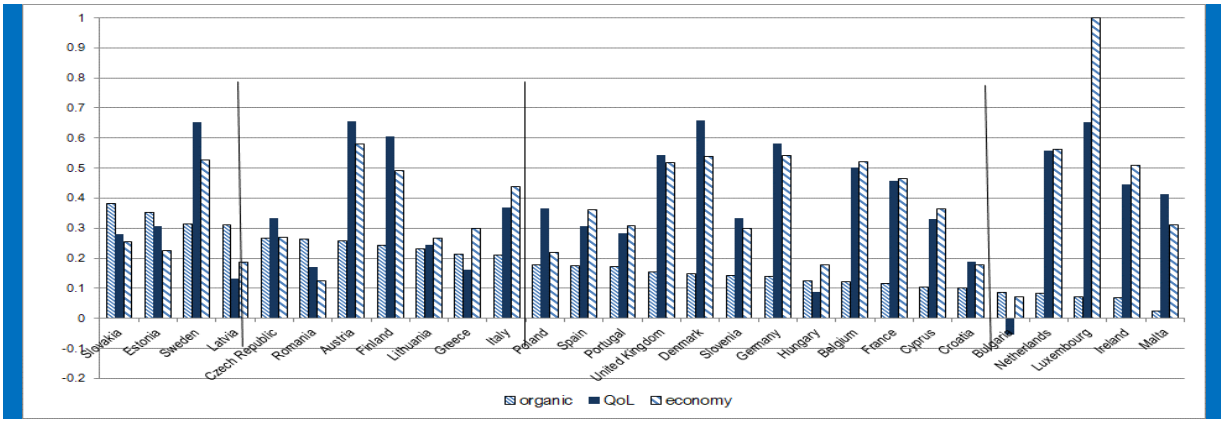
This article does not present algorithms of conducting analysis using the selected methods, as they are discussed in detail in the cited literature (we gladly provide information on the algorithms of these methods).

3. The relationship between economic conditions, quality of life and organic agriculture

We used data from years 2013 and 2018 to check how the relationships between economic conditions, quality of life and organic agriculture change over time. In those years only the indicator of subjective assessment of the quality of life was published by EUROSTAT. The economic situation of countries was assessed on the basis of: GDP per capita, the final consumption expenditure and the final consumption expenditure of households. We assessed the socio-economic situation from the point of view of citizens, which is why we chose the variables related to the individuals: the annual net earnings, the median equalized net income, the income quintile share ratio S80/S20 for disposable income, the inability to afford a meal with meat, chicken, fish (or vegetarian equivalent) every second day, the inability to face unexpected financial expenses, the rate of people at risk of poverty or social exclusion, the satisfaction with financial situation, the overall life satisfaction, the unemployment. Whereas the variables describing the status of organic agriculture came from EUROSTAT and IFOA: the organic area as a share of total farmland, the rate of organic retail sales per capita, the rate of organic producers in organic importers, the size of organic area per organic processors and the size of organic area per organic producers.

After the normalization of variables and the application of the Hellwig's method, we obtained the order of countries in three areas (organic, QoL, economy). The results are presented in Figures 1 and Figure 2. The highest values present the best levels of the analyzed phenomenon. On both figures, a vertical line indicates the division of countries into four classes due to the obtained assessment of the level of organic agriculture.

Figure 1. Results of Hellwig's ordering in three areas in 2013

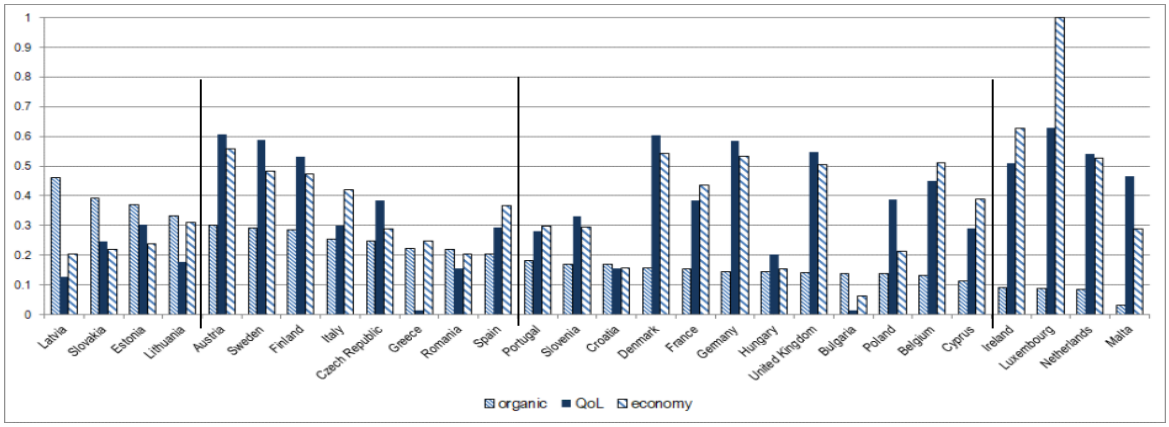


Source: Own calculations using data of EUROSTAT and FIBL (2020).

In 2013, the highest level of organic agriculture was observed in Slovakia (Figure 1). The lowest in Malta. It should be noted, however, that countries with a lower area of the country are less likely to provide domestic organic production compared to countries with the largest area, *i.e.* Poland, France or Germany (and such assumptions were made during variables selection, *i.e*. we chose variables that mainly determine the involvement of domestic producers in individual countries in organic agriculture). In countries where QoL was rated the highest, there are countries in which organic agriculture was qualified to the second group (Austria, Sweden, Finland), as well as third (Denmark, Germany, UK) and the worst (Ireland, Netherlands). Attention should also be paid to Bulgaria's assessment of QoL. The synthetic measure in the Hellwig's method, can take a negative value for an object for which the values of variables significantly more differ from the ideal solution than other objects, and when the number of objects is large.

In 2018, Austria, Sweden and Finland where QoL and economic situation were rated better than in Latvia, Slovakia, Estonia, Lithuania, the level of organic agriculture was rated low (Figure 2). So, in first group of the highest organic agriculture level are countries with low level of QoL and Economic situation. In countries included in the last group in terms of organic agriculture, a very high level of QoL and economic situation can be observed in turn. As in 2013, the second group in terms of the assessment level of organic agriculture were included countries with one of the highest QoL levels, namely Austria, Sweden, Finland. The third group with very low organic agriculture ratings also includes countries with a high QoL index and high assessment of the economic situation (Denmark, Germany, UK).

Figure 2. Results of Hellwig's ordering in three areas in 2018



Source: Own calculations using data of EUROSTAT and FIBL (2020).

On the basis of the Hellwig's method, we also assessed what changes occurred in the hierarchy of ratings achieved by individual countries.

The position of Poland in terms of organic agriculture in 2018 was 10 positions worse than in 2013 (positions 22 and 12 respectively). In contrast, the largest increase in the organic agriculture rating was recorded for Croatia: 23rd place in 2013 and 15th place in 2018. Despite these changes in the ranking, both countries were included in the third groups (in 2013 and 2018).

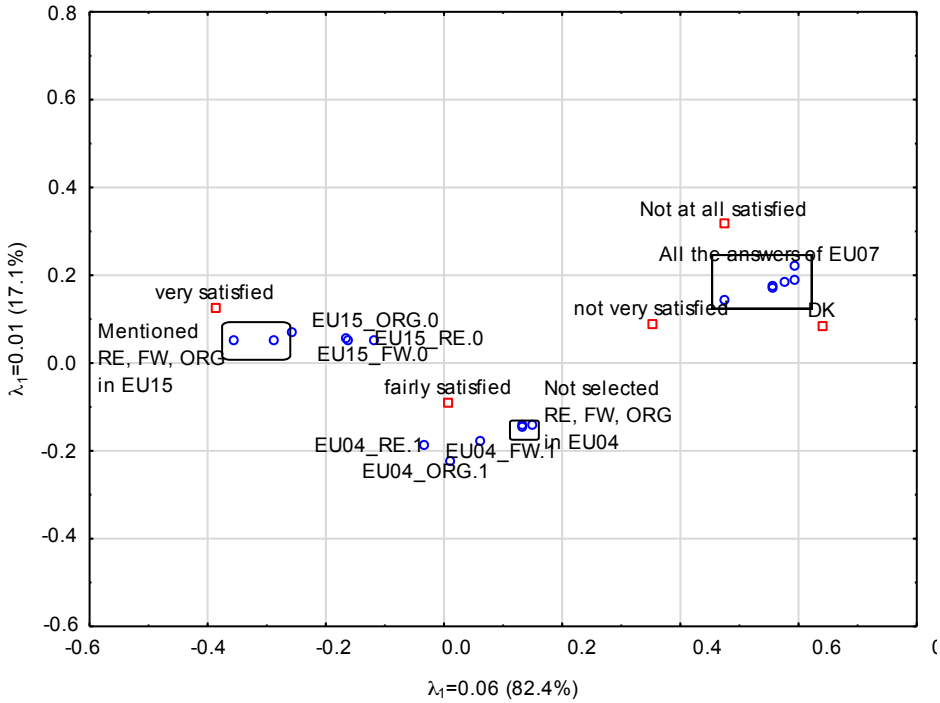
4. Subjective Assessment of Europeans towards Organic Agriculture and Modern Agriculture

To realize the goal of the study, which was to check whether Europeans understand the importance of sustainable agriculture development and the benefits of organic agriculture, we used data from the Euro-barometer. From the Euro-barometer survey, we selected some respondents' assessments regarding the analyzed problem and we presented them divided into three groups of EU15 countries – countries that formed the European Union before 2004, EU04 are the countries that joined in 2004 and EU07 countries that joined the EU in 2007 and later. These groups of countries differed in awareness of individuals regarding organic food and threats arising from agricultural production. Countries that joined the EU since 2004, and in the 1990s underwent economic transformation, faced equalization of opportunities in many areas of life and functioning of the state compared to countries of the key 15. Addressing the increase in ecological awareness of the inhabitants and focusing on the development of organic agriculture, were problems postponed for the future. Consumer behavior in these countries and growing international competitiveness have changed attitudes. For example, in Poland, the development of organic farming did not take place until 1999 when organic farmers received state subsidies and applicable legal regulations.

In Euro-barometer 90.2, autumn wave 2018, Europeans' opinions on many aspects of the functioning and future of the European Union were examined. The survey also asked respondents about issues related to environmental protection and agriculture. Question QA1 (we left the original numbering of the questions) contained in Euro-barometer 90.2 concerned issues described the ideal future for the European Union. By calculating the frequency of responses, taking into account the possibility of indicating two aspects, we have identified the most and the least important factors for the Union in the future. For Europeans from the three groups of countries, issues related to organic agriculture were not mentioned as the most important. Reduction in food waste (FW) within the European Union was indicated by 6.7% of EU15 residents, 6.3% from EU04 and 5.3% of citizens of the shortest time belonging to the EU. The problem of increasing of organic agriculture (ORG) within the European Union as important for the Union in the future indicated 4.6% of the EU15 members, 4.3% of inhabitants of the countries joined to the Union in 2004 and 5% of EU07 citizens. Increased use of renewable energies (RE) within the European Union is also important for the development of sustainable agriculture. This problem, as important for the future of the Union, was more often mentioned by the inhabitants of the EU-15 than EU04 and EU07, respectively 9%, 5.6% and 5%. Europeans have unanimously identified as the most important issue in the EU in the future Equal wages for the same job across the European Union.

Then we checked how these three factors (FW, ORG, RE), which should to characterize the EU in the future, are related to the assessment of respondents' satisfaction with life. For this purpose, we used correspondence analysis. The results are presented in Figure 3.

Figure 3. Relationship between reduction in food waste (FW), increasing of organic agriculture (ORG), increasing of renewable energies (RE) and satisfaction with life



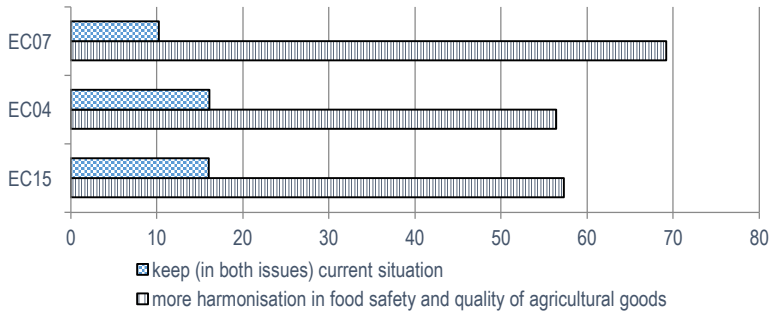
Source: Own calculations using data of European Commission (2018).

Figure 3 shows that the citizens of EU15 countries most often indicated the need for reduction in food waste, caring for increase of renewable energies sources and of organic agriculture. At the same time, they indicate that they are very satisfied with life. The opposite is true in the group of countries that joined to the EU in 2007. Inhabitants of the countries joined to the EU in 2004, who also indicated the need to pay attention to the three analyzed problems (RE, FW, ORG) in the future in the EU, are fairly satisfied with life.

For the proper development of organic agriculture in the EU, it is important whether Europeans want to harmonize the conditions affecting the food safety and quality of agricultural goods. Inhabitants of three groups of countries clearly indicate that the EU should introduce harmonization between European Union countries to improve the food safety and quality of agricultural goods (see Figure 4).

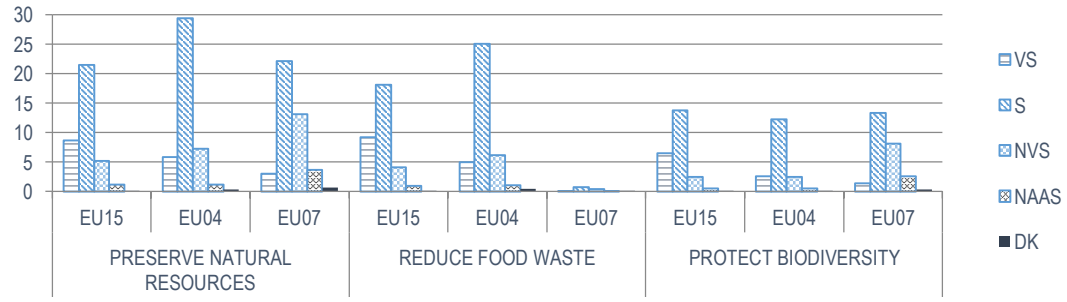
The Euro-barometer 90.2 survey also made it possible to identify what Europeans consider the most important for environmental protection. We compared these results with life satisfaction (VS – very satisfied, S – fairly satisfied, NVS – not very satisfied, NAAS – not at all satisfied, DK – don't know) – Figure 5. We chose three elements most related to sustainable development of organic agriculture. In all countries, preserve natural resources was indicated as an environmental protection activity by people satisfied with life from all countries. Similarly, for the action of protect biodiversity. In the case of reduction of food waste should be noted a much lower share of the indications of this action to protect the environment in the countries which are the most recently joined the EU compared to the other 25 EU countries.

Figure 4. Assessment of harmonization to improve the food safety and quality of agricultural goods



Source: Own calculations using data of European Commission (2018).

Figure 5. Actions to environmental protection vs. life satisfaction



Source: Own calculations using data of European Commission (2018).

Based on the results obtained from Eurobarometer 80.2 from 2013, it is possible to determine how the inhabitants of the European Union assess co-financing and support in developing modern agriculture while maintaining the principles of sustainable development.

Based on the QB1 question, information about how important are agriculture and rural areas for future of the Europeans was obtained. In all three groups of countries, Europeans have indicated (in almost 100%) that this is a very important subject for their future. Because we indicated the financial situation of individuals as an important reason for choosing organic goods by consumers, we checked whether it affected the assessment of significance of agriculture and rural areas for the future of Europe. Regardless of whether the respondents have financial problems or not, they indicated that this will be a very important (over 50%) element of EU policy in the future. The situation is similar when the opinion on the factors related to organic agriculture and environmental protection will be assessed through the prism of life satisfaction. In all EU countries, regardless of whether the residents are happy or dissatisfied with life, they indicate that agriculture and rural areas are very or fairly important for future of the Europeans.

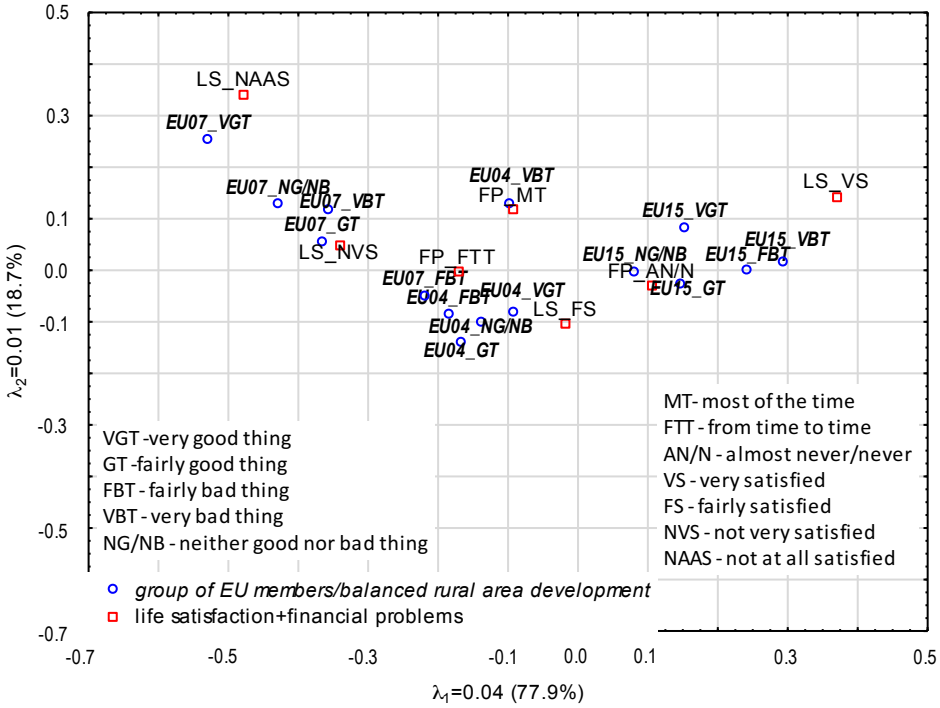
We then asked the question, if Europeans consider agriculture and rural areas to be important, how do they assess the common agricultural policy and EU subsidies for agriculture? We linked their assessments with the assessment of life satisfaction and financial situation.

In all EU countries (based on question QB3), respondents have heard about the support policy of the EU for farmers through its Common Agricultural Policy (CAP) but they didn't know the details of this policy. In the EU-15, 60% of the inhabitants know that the EU operates a CAP, 67% declare knowledge of CAP in the countries that joined the EU in 2004, and 59% in the three other countries. Common Agriculture Policy (based on QB4 question) is oriented in such a way as to guarantee the food supply for Europeans, to develop rural areas in the EU in a balanced way, to give support to farmers in a fairer and more targeted way, to support young farmers, among others, to link financial aid to farmers whose follow practices that benefit the environment. From the point of view of achieving the research objective, it is important to check whether there is a relationship between assessments of developing rural areas in the EU in a balanced way, of financial aid to farmers whose follow practices that benefit the environment and with life satisfaction or financial condition of the households. The results are presented in the Figures 6 and 7 (correspondence analysis was used).

Based on the associations presented in Figure 6, we found that EU07 residents who believe that developing rural areas in EU in balanced way is very good think, are not at all satisfied with life. People from this group of countries who believe that this EU policy is fairly good thing, very bad thing or neither god nor bad are not very satisfied with life. Citizens of countries that joined the EU in 2004 and are most of the time in financial trouble believe that EU policy on balanced rural area development is a very bad thing. The location of points presenting all opinions (positive and negative) in EU15, between points illustrating very high life satisfaction and almost never financial problems, indicates that, compared to other countries, life satisfaction and lack of financial problems is for the residents of EU15 related to all opinions on topic balanced rural area development.

When analyzing the location of points in Figure 7, similar conclusions can be drawn as in Figure 6. However, some clearly defined associations should be indicated. EU15 citizens who believe that financial aid to farmers whose follow practices that benefit the environment is a very bad thing are very satisfied with life. Fairly satisfied with life are citizens of the countries joined to the Union in 2004, who believe that financial support for farmers is a very good thing. Not at all satisfied with life are members of EU07, who declare that financial aid to farmers is very good thing ore neither god nor bad.

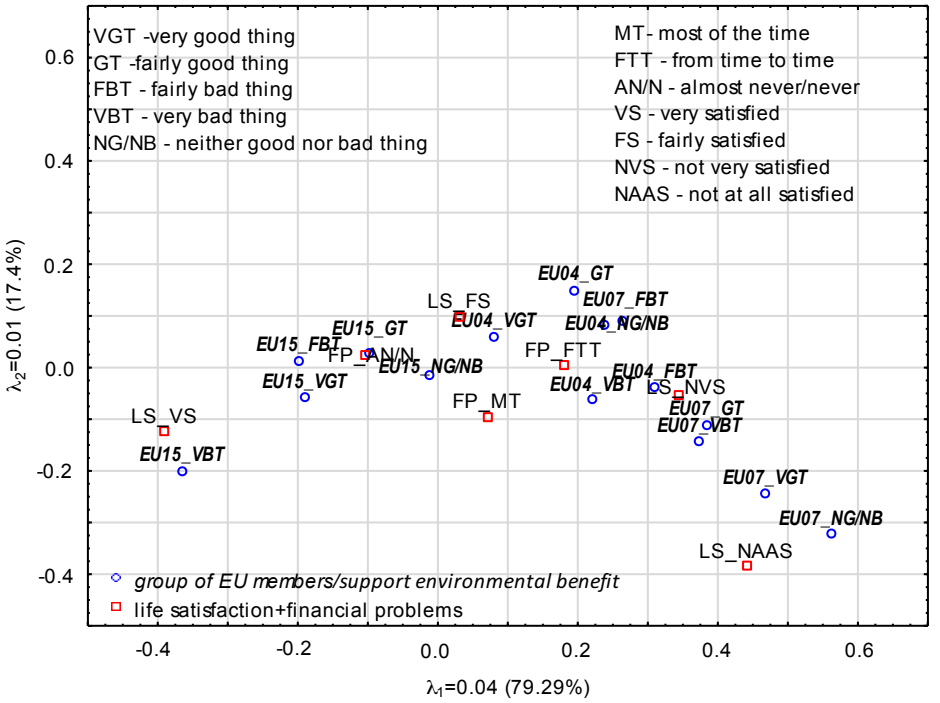
Figure 6. Relationships between balanced rural area development and life satisfaction (LS) or financial problems of households (FP)



Source: Own calculations using data of European Commission (2013).

Regardless of the country's accession to the EU, respondents indicated that the most important reasons for maintaining agriculture in all parts of the EU (based on question QB6) are in the order benefits for society, through the production of safe food and standards ensuring respect for the environment and animal welfare, contribution to the economy in rural areas, protection and enhances the environment. All these factors determine the production of high-quality organic food and goods.

Figure 7. Relationships between financial aid to farmers and life satisfaction (LS) or financial problems of households (FP)



Source: Own calculations using data of European Commission (2013).

Conclusion

In the study, we confirmed the conclusions made by Butler and Oluoch-Kosura (2006), that the level of well-being and economic services varies widely across countries. Policies, legislation and support for environmental activities are also very diverse. Awareness, knowledge and joint actions are necessary to increase the importance of organic agriculture, and as a result to protect the environment and ultimately increase well-being in both human and individual subjective terms. Our study shows that, taking into account aggregated indicators for organic agriculture, these indicators are not positively correlated with aggregated factors describing QoL and the economic situation of EU countries. According to our survey, this tendency persisted in the analysed periods. This is particularly visible in 2018, where the best class in terms of organic agriculture was created by four countries with a low QoL index. The relevance of using the Hellwig's method in this fragment of the study should also be indicated. Summing up this part of the study, one should agree with Villamagna, and Giesecke (2014), who say that lowering the level of well-being may result in a departure from the protection of natural capital in favor of financial benefits.

An analysis of the subjective assessments of Europeans did not show very large differences in the assessment of organic farming, environmental protection and CAP. Taking into account life satisfaction or financial problems of residents of three groups of EU countries, we have indicated that they assess in similar way the problems related to the growing importance of renewable energy and organic agriculture as well as the reduction of food waste. They consider that these are not the most important areas of EU policy. However, limiting the analysis to these factors only, we pointed out that EU15 residents are more interested in how to solve these problems in the future. By assessing developing rural areas in a balanced way and financial support to farmers, we obtained confirmation of the indicated situation. Residents of EU07 indicated that they are dissatisfied with life regardless of whether they assessed both, the EU policy on the developing rural areas in a balanced way and financial support to farmers as important or unnecessary. Summarizing the analysis of subjective assessments of Europeans regarding organic agriculture, we would like to point out that the methods used enabled a detailed analysis of the problem.

In the study (using both aggregated and individual data), we obtained confirmation of the thesis that a better financial situation and a higher quality of life imply a positive attitude to activities related to the idea of organic. Thus, according to Butler and Oluoch-Kosura (2006) we want to indicate that the activities of individuals performed only in their close environment have an impact on the ecosystem services. However, it is smaller compared to the one resulting from operating on a local, regional and global scale. These authors also indicate the impact of impoverishment of ecosystem services on human well-being. In addition, people operating on a local, regional and increasingly global scale have a significant impact on the availability and quality of ecosystem services. Increasingly, human activities have long-range effects on other people, their culture, behavior and socio-economic situation.

Although there are many publications on organic agriculture, only some of them contain references to social well-being, quality of life or poverty. Promoting the idea of organic lifestyle and organic agriculture along with the dissemination of relevant information, will increase public awareness of the dangers caused by unrestrained growth in the use of artificial chemicals and the unlimited growth of conventional production.

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Socioeconomic Constraints to Tea Productivity: A Case of Small-Scale Tea Farmers in Burundi

Pierre Claver BITAMA
Economics and Rural Development Unit
University of Liege-Gembloux Agro-Bio Tech[1], Belgium
pierreclaverbitama@yahoo.fr

Philippe LEBAILLY
Economics and Rural Development Unit
University of Liege-Gembloux Agro-Bio Tech, Belgium
philippe.lebailly@uliege.ac.be

Patrice NDIMANYA
Rural Economics Unit, University of Burundi[2], Burundi
ndimanyap@yahoo.fr

Philippe BURNY
Economics and Rural Development Unit
University of Liege-Gembloux Agro-Bio Tech, Belgium
philippe.burny@uliege.be

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Abstract:

The article identifies and discusses the socio-economic factors that constrain the productivity of the tea bush of the small-scale tea farmers who supply most of the green leaves to the state-owned factories in Burundi. Despite technical support and fertilizer subsidies from Burundi Tea Board (OTB), the productivity of small-scale tea farmers is still lower than the productivity of state-owned plantations. To investigate the cause of this low productivity, a survey was carried out on a sample of 120 small-scale tea farmers in two communes (Mugongomanga and Bukeye) located in two tea-producing areas (Ijenda and Teza) in Burundi.

The results show that the low level of education has a considerable negative impact on the maintenance of plantations in good condition. In addition, the problems of availability of family labour and the high cost of hired labour, the variety and age of the tea bushes and the customs of the country are hindrances to the productivity of smallholder tea growers. In order to maintain the tea as a strategic sector for the country, there should be close and sustained supervision of smallholders and investment in research and development.

Keywords: Burundi; productivity; tea plant.

JEL Classification: O1; Q1.

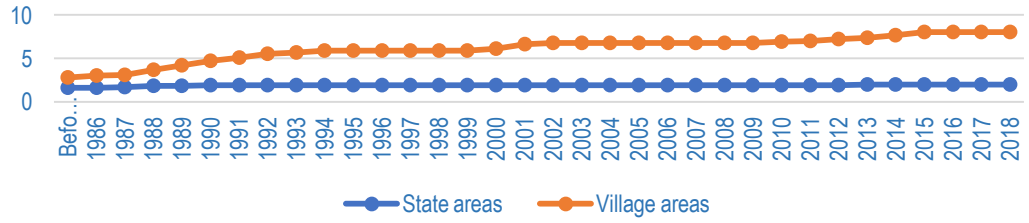
Introduction

The tea plant was introduced in Burundi in the 1930s and was cultivated in five zones (Tora, Ijenda, Teza, Rwegura and Buhoro) of the Mugamba natural region thanks to studies carried out at the agricultural research centre (ISABU) in Gisozi (Flémal 1986). The tea plant is a crop of great importance for the country. It is the third most important sector (after coffee and gold) for the country in terms of export earnings and represents on average 11.8% of the value of exports for the year 2017 (OBR 2018). The tea bush sector is very labour-intensive. The tea bush provides regular income for tea farmers and employment opportunities: 60,000 rural farmers have tea plantations, nearly 4,000 laborers pluck tea from state-owned plantations and worked in factories, and more than 1,000 employees are permanently employed in the OTB.

[1] Passage des Déportés 2, 5030 Gembloux
[2] Boulevard Mwezi Gisabo, Bujumbura, Burundi

Mostly cultivated (more than 80%) in village areas, the tea plant has experienced little expansion over time (Figure 1). Until 2018, the area under small tea farmers covered a total of 8,005 ha. State owned plantations are very small and have not expanded over a period of several years. In 2018, they represented an area of 2,000 ha. The small extensions carried out in village areas from 2010 to 2015 are of the order of 1% to 3% per year. Until 2018, the tea plant covered a total area of 10,005 ha. Land availability and financing problems are the main factors in the lack of extension.

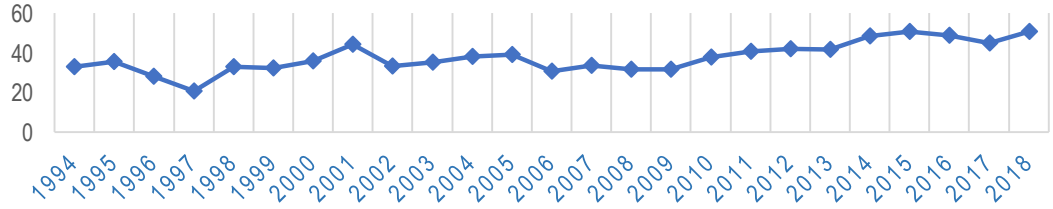
Figure 1. Area extension (in thousand ha) of tea plant in Burundi



Source: OTB, 2019

In order to maintain the strategic sector for the country, the entire sector is under the control of a single state structure - the OTB. The OTB buys the green leaves (GL) from the tea growers, and processes them to obtain black tea (BT) in association with the leaves from the state plantations. The BT is sold to the auction markets in Mombassa (80%), to direct and foreign markets (15%) and to local markets (5%). BT from Burundi is of the best quality in Africa. After beating the record in 2015, it ranked third in 2016. To encourage tea farmers to grow tea, some services are offered free of charge, including young tea plants, technical support and fertilizers are granted at a rate of more than 70% of the total market value. Thanks to small extensions of the plantations, the production of GL has continuously increased from 18,728 tons in 1990 to 50,820 tons in 2018 (Figure 2).

Figure 2. Green leaf production (in thousand tons) in Burundi

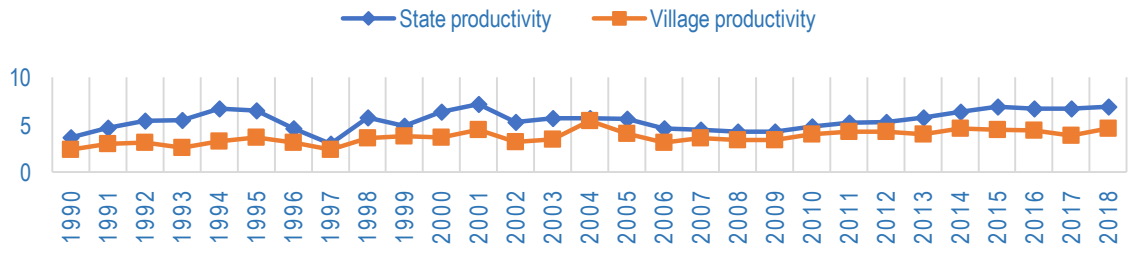


Source: OTB, 2019

More than 80% of the production are from village areas. Overall productivity per hectare has increased from 3.7 tons/ha in 1990 to 6.9 tons/ha in 2018. Productivity in village areas is lower than in state areas (Figure 3).

The tea plant exploitation is very resource-intensive. From the nurseries to the production of BT, the ground is prepared, the tea plant is cultivated, pruned and cared of (weeding, fertilization, etc.), GL are harvested and transported to the collection hangars. At the collection hangars, the GL are sorted, weighed, packed in special bags, loaded into trucks and transported to the factories. At the factory, the GL are weighed and controlled again. The processing starts with the withering of the leaves and then moves on to the cut tear curl stage. This is followed by fermentation, drying, grading, weighing, tasting, packaging and storage before being sold abroad.

Figure 3. Productivity evolution (in tons per ha) in Burundi



Source: OTB, 2019

Productivity in the tea bush industry depends on several factors. Climate change (drought, hail) affects the tea sector the most with a direct impact of reducing revenues to upstream and downstream actors in the chain (FAO 2016). In Burundi, climate change is not a major threat to tea productivity. However, some factors are hidden sides to low productivity of the tea plant. This paper aims to analyze some of these factors and discuss ways and means to mitigate their negative impact on the tea productivity of smallholder tea farmers in Burundi.

1. Literature Review

Productivity is a broad, multi-faceted term. Therefore, it is difficult to conceptualize productivity, even though it represents one of the most important basic measures of economic activity (Tangen 2002, Kodithuwakku and Priyanath 2007). The concept of productivity has evolved over the years to represent more than just efficiency ratios. From cost and quality issues, its scope has expanded to embrace social concerns - such as job creation, job security, poverty alleviation, resource conservation, social responsibility - to business excellence, governance, and environmental protection. Nowadays, the term evolves towards other concepts of productivity such as social productivity and knowledge productivity (Kalaw 2015).

In general, productivity is often defined in relationship between the output and the input of a production system. The output can be a product or a service, while the inputs are resources (human, physical, financial) used in the production process. Physical resources include land, infrastructure, machinery and equipment, raw materials or other current assets and financial capital can be own capital or borrowed capital. For human capital, particular emphasis is focused on human health, especially in developing countries where manual labour is crucial for productivity and capital accumulation (Nuttee, Thamma-Apiroam and Santipolvut 2019, Tran, Alauddin and Do 2019). Producing more or high-quality goods/services from the same resources increases productivity. Similarly, producing the same quantity of goods/services with fewer resources increases productivity (Pekuri, Haapasalo and Herrala 2011, Bernolak 1997, Salehi, Shirouyehzad and Dabestani 2013). Productivity means a real increase in the output/input ratio and differs from a nominal or monetary increase. The increase in turnover due to an increase in the unit price (in the case of inflation) is not synonymous with productivity. The same applies if the sales volume increases proportionally with the resources used. The improvement in productivity is measured only by the increase in the production of goods/services in relation to the resources used (Bernolak 1997). Authors as Misterek, Dooley and Anderson (1992) distinguish five cases of productivity improvement:

- the increase in output and input, but the increase in input is less proportional than the increase in output;
- the output increases while the input remains the same;
- the increase in output while the inputs are reduced (greater efficiency);
- the output remains the same while the input decreases;
- the output decreases less proportionally than the input.

These five cases can be explained by the managerial and technical dimension that underpins the production activities in a referential of efficiency and effectiveness. Productivity is therefore closely linked to the availability and above all to the use of resources (Tangen 2005). Dey and Gupta (2010) postulate that productivity is a key to a company's success insofar as a company's performance is driven by certain criteria including efficiency, effectiveness, product quality, productivity, workforce quality, innovation, etc.

In the agricultural sector, productivity is measured by the output obtained for a given amount of input or set of inputs. By convention, productivity is measured by the ratio of the quantity produced per unit of input - *e.g.* tones of potatoes per hectare of arable land (Mozumdar 2012). This measure is very simplified since the factors influencing productivity are multiple: physical capital (soil structure, water, fertilizers, etc.), human capital, technology transfer, research and development, etc. Neglecting to take these different factors into account when assessing productivity makes it less robust. Ideally, the measurement of aggregate productivity would capture the impact of each input in production, but measuring it is not easy in practice. The major problem is that the impact of some factors in production is difficult to quantify or to sum up. Besides, productivity measures are difficult to interpret when the quality of output or input changes (Misterek *et al.* 1992). Measuring productivity in the agricultural sector is made more complex by natural and social phenomena. Pinnawala and Herath (2014) postulate that efficiency in the process of converting inputs into outputs is influenced by external natural phenomena (rain, temperature, wind, etc.) and social phenomena such as attitudes, beliefs, behavior, friendship, *etc*. The authors argue that the use of sorted seeds, pesticides and fertilizers can only improve productivity to the extent that farmers decide to use them. For him, inputs are necessary but not a sufficient condition for productivity.

2. Materials and Methods

The analysis was carried out as part of a study of the tea sector on various aspects, particularly its importance in the livelihoods of tea farmers in Burundi. Thus, interviews from several aspects were carried out with the different directors of different departments of the OTB as well as with the different managers of the factories processing GL into BT. In addition to these interviews with these authorities, we were provided with essential data in our research. Before taking a position on a choice of sample, we visited in 2017 the rural areas of Ijenda and Teza by simple scientific curiosity to familiarize ourselves with the field and to be aware of the different daily activities of tea farmers, especially those related to the tea plant. During these visits, conversations allowed us to familiarize ourselves with the community, and the farmers were very happy to share with us their know-how in the agricultural field, which they considered unusual in our eyes. The choice of these two areas was motivated by their proximity to the country's capital. The commune Mugongomanga is located 42.8 km away from the capital by taking the RN7 and the commune Bukeye is located 54.9 km away from Bujumbura by taking the RN1. Both sites are located on the hillsides of the Congo-Nile Rift massif with abundant rainfall (average 1400-1500 mm) and temperature is between 15°-21°C (Flémal 1986). The rural farmers of these two sites live mainly on subsistence agriculture. Food crops in these areas are rainfed and marshland cultivation. In Mugongomanga commune, crops are less diversified than in Bukeye commune because of the absence of marshlands. Thus, the food crops are: potato, maize, beans, sweet potato, cassava, wheat, peas, vegetables (cabbage, carrot, leek, onions, squash, etc.). Livestock consists of large livestock (cattle) and small livestock (goats, sheep, pigs and chickens and rabbits).

In 2018 and 2019, surveys were conducted among a random sample of 60 tea farmers in each of the communes of Mugongomanga and Bukeye located in the Ijenda and Teza tea complexes respectively. The socio-demographic data of the sample showed that the tea growers farmed small areas (more than 80% farmed less than 10 ares). Our sample is made up of tea farmers with a very low level of education (more than 95% have basic training) and most of them can neither read nor write the local language. For the present analysis, we have constructed a semi-structured questionnaire based on the socio-economic aspects deemed constraining to the productivity of the tea plant. Interviews and focus groups were organized with the sample. Given the objective of the article, the bibliographical review focused on the key word - productivity. We used qualitative methods for the analysis of the collected data (Hsieh 2006, Gheyle and Jacobs 2017).

3. Results

3.1. Technical Support

The technical supervision of tea farmers is provided by the plantation department, mainly through extension workers. These are the agents who regularly visit the plantations of the small tea growers in order to find out whether or not the plantations are well maintained. Data show that the ratio of extension staff to the area under tea cultivation is low - one extension worker for every 300 tea farmers, or one extension worker for roughly 35 ha, which implies a partial visit to the plantations. Some activities are therefore the total responsibility of the tea growers. Weeding, fertilizer application and plucking are some of the compulsory activities for the tea growers. A tea field requires two weedings per year otherwise the tea plant gives a lower production in quality and quantity. Mulching the tea plant is not a compulsory activity. It is not practiced in the commune of Mugongomanga. In Bukeye commune, only 78% of the tea farmers bring mulch to the tea plant. Mulching is integral. The training on pruning and plucking techniques is done on the spot by the workers' instructors and the authorities in charge of the plantation service in the factories. Remarks for a non-fine plucking are constantly given at the collection shed so as not to be refused the totality of the GL sold. 87% and 90% of tea growers in Mugongomanga and Bukeye respectively are satisfied with the supervision.

3.2. Efficiency and Effectiveness in Fertilizer Application

In village areas, surveys revealed that some tea farmers do not apply fertilizer or apply little fertilizer on their plantations for several reasons. Due to their low level of education, some tea farmers do not give particular importance to the recommended dosages for tea cultivation. Young plants are very intensively cared of. A young tea plant is only productive after a period of at least 3 years. This period for young plants is theoretical. It can be longer than expected if they are not well maintained - mainly by applying NPK mineral fertilizer and mulch in sufficient quantities. A new tea plant is very costly. It has significant opportunity costs for the land that could be exploited for a relatively short period (a few months) in a context of land scarcity. This may make it difficult for tea farmers to buy mineral fertilizer and to devote time to the maintenance of a plantation that will be productive for more than three years. Their level of education and their financial situation in the households means that they do

not buy fertilizer for new plants that are not yet productive. For tea farmers who are expanding their tea cultivation, the application of fertilizer does not meet the standards of 2.5kg/are or 2.5 kg per 120 tea plants. Failure to meet these standards affects productivity in terms of quality and quantity. Another difficulty in the complete application of mineral fertilizers is their reallocation to food crops. During our surveys, one of the tea farmers told us that he splits the fertilizer he receives in two parts, one part for the tea plant and another part for food crops, despite the OTB's recommendations for strict application. Probably this practice exists among some tea growers although they did not want to admit it. As mineral fertilizers are granted on credit, some tea farmers may sell them to traders to meet urgent needs. In addition, due to lack of firewood, branches and leaves that may constitute organic manure after pruning the tea plant are directly used in households for cooking.

It is difficult for tea growers to care for the tea plant in real time. The weeding period of the tea plant corresponds to the busy schedule of tea farmers who are concerned about not being late with the agricultural calendar of food crops. Thus, the weeding of the tea plant is delayed and the effort is mainly focused on food crop activities. During our field surveys in October 2019, field observation revealed a significant number of plantations that were not weeded to such an extent that they could be considered abandoned. Reasons given for not weeding were multiple: illness in the households, lack of time, lack of labor, etc.

3.3. Variety of the Tea Plant

Tea plantations in Burundi are made of *Camellia sinensis* variety *Assamica*. Field observation shows that some plantations are of a different variety and are less productive. The tea growers revealed to us that some plantations come from stumps that have been planted. Moreover, some plantations are getting older and older. These are tea plants that are more than 50 years old. They are becoming less and less productive. Some growers cannot realize that their plantations are getting older and older to be replaced by young plants or do not want to lose their regular income.

3.4. Inheritance

In Burundi, the heritage is patrilineal in rural areas. Upon the death of a family's parents, sons (if they do exist) inherit and share equitably the property left by their parents. This is usually livestock, land, sheet metal or tiles of the house, etc. If these parents were tea farmers, the plantation is not immediately shared between the heir sons or the assignees in the absence of the heir sons. In this case, the holding is common and the income is shared equitably. The result is poor exploitation of the plantation due to a lack of responsibility on the part of one or the other, especially for the pruning and mulching of the plantation. Surely, the heir sons would like the sharing to be immediate so that the question of responsibility is not raised. The custom in Burundi is opposed to this immediate sharing and two ceremonies of partial and final mourning must take place. The second ceremony may take place after more than a year. As soon as the plantation is shared, some sons may receive portions of land with better yields than others. Heirs or assignees who will receive less productive shares of the tea plant will put in less effort or may not maintain their respective shares. They may consider the allocation of labor to them as a loss and the productivity of the whole plantation is undermined.

3.5. Labor

3.5.1. Plucking Cycle

Plucking is a delicate and problematic task in the tea sector. Tea growers must strictly adhere to the GL plucking cycle. Failure to respect this cycle has a negative impact on the quantity of GL to be plucked for the next period. In Burundi, the rotational plucking cycle is the same throughout the country. It is one day out of 11 days in case of low production. In case of abundant production, it is one day out of 8 days. Generally, the harvest that is made and accepted is the pekoe+2 leaves. Plucking takes place throughout the year, but if all the ready shoots (leaves) are not plucked or if tea growers do not pluck due to lack of labor, disorderly overgrowth occurs. Under certain circumstances, pruning of the entire plantation must be done. This results in a loss of productivity. If pruning is carried out, plucking is resumed after six months, resulting in a loss of production over the six months.

3.5.2. Sharecropping System

In the area studied, tea leaves are essentially plucked by family labor, which is considered free of charge even though it has an opportunity cost. When family labor is scarce, small tea farmers use a system of sharecropping to keep the tea bush in productive condition. The sharecropper takes care of all the tasks related to the tea bush under conditions agreed with the tea farmer and shares the income with the owner of the tea bush. Generally, the sharecropper shares the income equitably with the owner. The practice of sharecropping has pros and cons. On

the one hand, the owner receives income without making any effort, even though his income decreases. On the other hand, the owners complain of a lack of responsibility for the maintenance of the plantation. In Mugongomanga and Bukeye, the tea growers strongly criticized the sharecropping system which ends up destroying the tea plantation and thus reducing the quantity to be plucked in the medium and long term.

3.5.3. Hired Labor

In Burundi, tea growers occasionally employ hired laborers in various activities related to the exploitation of the tea bush, particularly during the plucking process. Their remuneration is 2,500 BIF in Mugongomanga and 2,000BIF in Bukeye per working day. The plucking day starts at 6 or 7 *a.m*. and ends around noon. Thus, in order for a tea grower to make a profit, the hired worker must pluck more than 10 kg of GL in Mugongomanga and 8 kg of GL in Bukeye (the selling price of the GL is 250 BIF/kg). This quantity is difficult to pluck during the period of low production. So, workers must be hired according to their performance. An efficient day laborer plucks a quantity ranged between 20 and 25 kg of GL during periods of abundant production. During the dry season (July and August), the quantity harvested is between 10 and 15 kg because the GL have no moisture content. With such plucking capabilities, tea growers realize lower margins.

The problem of the labor payable per working day is mitigated by a labor payable by the quantity harvested at a rate of 100 BIF/kg. The workers resist being paid per quantity plucked. They notice a loss of earnings especially during the period of lower production or if they have a lower performance. The commitment of paid labor per quantity harvested has disadvantages in terms of productivity in the absence of an owner to control the workers. Generally, these workers must perform additional activities (removing banjhi) to facilitate the formation of new leaves in addition to strict adherence to harvesting standards. In the absence of the owner, these additional activities may not be carried out either because of lack of responsibility or ignorance or because workers are interested in plucking large quantities, as this additional activity slows down the plucking process. The removal of banjis during plucking is an activity of significant importance. If such a task is not carried out, the productivity of the tea plant will decrease in the short and medium term.

4. Discussion

The results show that productivity in thei culture is influenced by a range of socio-economic factors. Technical support is less effective due to the low level of education of tea farmers. This level of education results in little or no use of fertilizers by diverting them to food crops, a hindrance to tea plant productivity. The high level of education enables farmers to use existing resources effectively and efficiently and to imitate new innovative methods and technologies. It also helps to break down resistance to change (Hua 2005, Minani 2014). The tea growers have an embryonic level of organization to be able to integrate good practices in research and technology (Schuster and Ndimubandi 2018). Smallholders are not able to internalize and apply good practices that can boost productivity without access to services provided by downstream value chain actors. Better services would be essential for them to increase production. Thus, downstream actors need to regularly analyze the soil structure through research and development and adapt the NPK 20:10:10 mineral fertilizers used since the introduction of the tea plant in Burundi up to now. The state authorities could also subsidize the entire cost of fertilizer for young plants.

The natural region of Mugamba is the only region with natural conditions favorable to the cultivation of tea. In order to increase the productivity of the tea plant in this region, it is essential to regularly replace the plantations in village and state areas by more productive varieties (hybrids) with appropriate mineral fertilizers. Studies on varieties and their mineral fertilizer requirements should be undertaken at ISABU. To increase productivity, Vietnam replaced 49% of the plantation area with hybrid tea plants in 2009. While the PH1, TRI 777 and Shan varieties produce 10 tons/ha, 8 tons/ha and 6 to 7 tons/ha respectively, the LDP1 and LDP2 hybrid have a productivity of 15 tons/ha. The Vietnamese government wants to reach 90% of hybrid tea plants by 2030 to optimize productivity in terms of tea quantity and quality (Le 2018). In Kenya, the Tea Research Foundation has significantly contributed to increased productivity through selection of high yielding tea varieties and improving methods of cultivation (Mwangi 2014). Convincing small, low-income tea farmers to replace less productive tea plants - old or of poor quality - with more productive plants for a period of at least 3 years is not an easy task. The government must take the issue in hand to maintain the country's strategic sector and contribute to the well-being of its population. In 2016, Sri Lanka improved productivity amongst the smallholders who supplied the bulk of the country’s green tea leaf. It approved a fertilizer subsidy for tea farmers with cultivated land of less than two hectares, and it offered a modest subsidy for replacing old tea bushes with new ones. As a result of these policies, Sri Lanka firms have built their competitiveness on value-added and high-quality tea exports (Mohan 2018). Since they could not pull up the tea plant to grow other crops, tea farmers had to make the tea plant's productivity optimal on the land being farmed

so as not to incur opportunity costs. Indeed, with population pressure making arable land scarce, any portion of land had to be optimally exploited regardless of the type of crop grown. Even if the land was vast, efficiency in the use of resources would limit arbitrary exploitation. In addition, mulching and weeding of the tea plant should be a rule in all areas of tea cultivation and in case of lack of mulch, organic manure (from compost and/or livestock) would supplement mineral fertilizers which must be strictly applied in their entirety. This will be made possible by periodic meetings of extension workers in collaboration with the grassroots authorities, the organization of training seminars and, where appropriate, the granting of incentives to tea growers on plantations that are better maintained than others.

Thei culture is the most labor-intensive, especially during the plucking of GL from the tea bush. The use of family labor on the tea growers' plantations is not sufficient on its own during the period of high production, despite the small size of the areas under cultivation. The use of hired labor, which is becoming increasingly expensive, is necessary in all tea-producing countries, although it is less profitable in terms of output/input ratio. In Kenya, for example, the payment for pluckers' labor per kg has successively increased on average to 5.50 Kenyan shilling ($0.06) in 2009, KSh7 ($0.08) in 2010 and KSh8 ($0.09) in 2012. On the other hand, one kg sold of GL is paid at 12 KSh ($0.15), a labor remuneration at more than half the price/kg of GL sold. Workers consider the remuneration less attractive and solicit a continuous increase or leave the sector (Kagira, Kimani and Gthii 2012).

Plucking machines affect productivity in terms of quantity and quality. It leads to injuries on stems that prevent bud development. Moreover, the use of plucking machine results in coarse rather than fine and selective plucking - Pekoe+1 leave or Pekoe+2 leaves (Burgess and Carr 2018, Obanda and Owuor 1995). In order to cope with the constraints of paid labor, tea farmers had to group together in producer associations/cooperatives in small groups of 5 to10 tea farmers for example. This would be a formalization of the mutual assistance that characterizes the African people. Some ancestral practices that are not favorable to productivity should be abolished. Andria *et al.* (2019) criticize the weakness of macroeconomic analysis which overestimates economic factor, the role of capital in development and neglects the role of non-economic factors. There is no analysis of influence of social conditions, social structures and the style of society's culture. Their analysis of factors affecting local own-source revenue (PAD) in 30 Indonesian Provinces (2010-2017) showed that non-economic (democracy, politics, corruption and governance) factors had a significant effect and explained PAD by 79.19% in comparison with economic (investment and development inequality) factors. The country's economy must also be analyzed in regard to social phenomena and State authorities would play a key role in changing people's mentalities by highlighting the issues of food insecurity and hunger among people in developing countries.

Conclusion

This paper identifies and discusses the factors that undermine the productivity of the tea plant of tea farmers compared to the productivity of state plantations. As the concept of productivity is very complex, we considered productivity as production (in tons) per unit of arable land (ha) for simplicity. Nevertheless, this paper shows that some socio-economic factors that influence productivity are just beyond quantification. The technical supervision is not effective in the village area and tea growers do not apply mineral fertilizers in their entirety (the recommended doses) due to their low level of education and/or their state of poverty. Moreover, small tea farmers give priority to food crops rather than to the maintenance of the crop (mainly weeding) due to the lack of sufficient labor. In the state-owned plantations there are sufficient and better-controlled hired workers. Sharecropping and inheritance, which alter production in the medium and long term, exist only in village area plantations. It would be reasonable to compare productivity either across sectors or across nations using the same indicators. This comparison would be simple by answering the question: Which input for which output? Our analysis shows that some practices, customs, etc. are of a different consideration in terms of input/output and therefore in terms of productivity. The inputs determining production remain strongly influenced by human beings in their individual and/or collective actions. This study is only an attempt to explore a few socio-economic factors. An in-depth investigation could enrich the subject.

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Investment Protection and Sovereignty: The Clash of Theories in the Practice of Investment Arbitration

Martin KARAS
Faculty of International Relations[1]
University of Economics in Bratislava, Slovakia
martin.karas@euba.sk; martinkarasjj@gmail.com

Katarína BROCKOVÁ
Faculty of International Relations
University of Economics in Bratislava, Slovakia
katarina.brockova@euba.sk

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Abstract:

This article focuses on investment arbitration as a political space where the concepts of national sovereignty and investment protection come into conflict. The goal of this article is twofold. *First*, it aims to situate this conflict within the wider theoretical debate on the role of the nation state in the globalized world. *Second*, it attempts to show in detail how this theoretical conflict is being resolved in practice on the level of investment arbitration. This is achieved by identifying the main legal issues related to the theoretical concepts set up at the beginning, and by analyzing a sample of investor-state dispute settlement cases to illustrate the conflict and show how the arbitration tribunals address these issues in practice.

Keywords: investment; arbitration; sovereignty; investor-state dispute settlement; neoliberalism; neorealism.

JEL Classification: F55; K33.

Introduction

The modern theory of international economic relations can be viewed through the lens of the debate between neoliberal conception based on economic interdependency and transnational globalization on one hand, and the neorealist conception based on political competition between sovereign nation states in an essentially anarchic environment. While the two theoretical frameworks have found a lot common ground in the last three decades, major differences remain, not least in terms of the question to what degree do the new forms of integration and the rise of the transnational corporations limit the sovereign powers of the state as the main actor of international politics (Krasner 1983, Strange 1996). This question resonates in every field of international relations. This article focuses on one particular aspect of this debate; the conflict between investment protection and national sovereignty on the level of investment arbitration.

The theoretical framework of this article is represented by the competing concepts of investment protection and national sovereignty. The aim of the article is twofold: to demonstrate that investment arbitration can also be viewed as an arena where the struggle between the national states and transnational institutions takes place, and to analyze the practice of investment arbitration through the lens of the theoretical conflict between investment protection and national sovereignty, in order to describe the implications of the practice of investment arbitration for the political space that nation states enjoy in the current global investment regime.

1. Current State of Scholarship on Investment Regimes and National Sovereignty

International investment law has been the subject of interdisciplinary research at least since the modern discipline of International Relations has been created. The early IR scholars have all been interested in the way that international law affects the behavior of states, but most of them came to a conclusion that international law is secondary to relations of power (Carr 1939, Morgenthau 1942). A more serious research into the relationship between legal regimes and sovereignty of states begins with the emergence of theoretical frameworks critical to

[1] Dolnozemská 1, 852 35, Slovakia

the dominant realist paradigm in the 1970s. Among these approaches, the most relevant for the purposes of this paper are the new neoliberal and constructivist theories focused on interdependence, international regimes, transnational relations and the role of norms in the international arena. These approaches attempt to describe how international norms and international regimes constrain the behavior of states. Examples on the part of the IR scholars include the main texts of neoliberal theory of international relations (Krasner 1983), and on the part of legal scholars' analytical texts, such as the 1993 paper by Schreuer on the "waning of the sovereign state" (Schreuer 1993). It is within this framework, where the conflict between international economic and legal regimes and national sovereignty first comes into focus. More recently, the issue has been analyzed on the level of theory by Mitchell (2017).

Scholarship on regimes of investment law has become widespread in the 1990s and early 2000s with the unprecedented proliferation of investment treaties. The original research was mostly focused on the relationship between legal regimes of investment protection and economic growth (Neumayer ans Spess 2005, Hallward and Driemeier 2003, Salacuse and Sullivan 2008). Emergence of the interest in the conflict between investment protection and national sovereignty can be traced to several controversial and publicized investment arbitration awards, which showed in practice how important legal regimes of investment protection really are for the national sovereignty of nation states. The most recent scholarship in this field is focused on two levels of analysis. The level of investment treaties and the level of investment arbitration.

On the level of investment treaties, the scholarship is focused mainly on analysis of the provisions of investment treaties and the way that these provisions either protect foreign investors, or the sovereignty of the state. A good example of this type of research is represented by the UNCTAD publications, which use content analysis to track the evolution of investment treaties in time (UNCTAD 2018), although many scholars engage in this type of analysis (Dolzer 2005, Bird-Pollan 2018, Thaliath 2018). The second level on which the research into the conflict between investment protection and national sovereignty proceeds is the level of investment arbitration and it is this level that this article is focused on. The recent research into the conflict between investment protection and national sovereignty on the level of investment arbitration has been focused mainly on the concept of the "right to regulate", which several authors feel is being threatened by the ability of investors to sue the countries in front of international tribunals. This is often related to the "regulatory chill" hypothesis, which describes a phenomenon where a state fails to enact a regulation in public interest out of fear of being sued by the foreign investor in an investment court (Baetens and Tietjem 2014, Brown 2013). Work has also been done recently on the tracking of changes on the level investment arbitration connected to the changing landscape of investment treaties (UNCTAD 2018).

The contribution of our paper to this discussion is mainly on the level of investment arbitration, where we identify and analyze the main concepts, which come into play in tribunal proceedings in relation to the conflict between investment protection and national sovereignty.

2. Theories of Investment Protection and National Sovereignty

In this part of the paper we will first set up the theoretical conflict by defining and describing the concepts of investment protection and national sovereignty in the context of the discussion between neoliberalism and neorealism. Then, we will proceed to analyze a sample of investor-state dispute settlement (ISDS) cases in order to show how the conflict plays itself out in practice and what are the implications for the space that the nation states enjoy to exercise their sovereign powers. While the existing literature on investment regimes does include various analysis of the relationship between investment protection, investment arbitration and national sovereignty (Henckels 2015), we can observe a distinct lack of interest of these authors to situate the discussion within the larger framework of international relations theory. This is mainly due to the fact, that issues of investment law are mainly, although not exclusively, dealt with by legal experts. This article attempts to rectify this oversight and places investment regimes firmly within the theoretical debate between neoliberalism and neorealism in IR.

Foreign investment protection is one of the key concepts of neoliberal thought. It consists of all measures existing to protect foreign investment from negative impacts of arbitrary or discriminatory government action or other influences. The goal of investment protection is to ensure stable investment environment and consequently stimulate foreign investment, which is seen as a major driver of economic growth and development (Vogiatzoglou 2018). The theory of investment protection is effectively inscribed into the network of international investment treaties and treaties with investment provisions. The origins of this network can be found in USA Treaties on Friendship, Commerce and Navigation, which stipulate the legal principle of protecting the „property of strangers" by „all efforts in his (the sovereign) power" (Dolzer and Schreuer 2012). Since then, a dense network of bilateral and multilateral investment treaties and treaties with investment provisions has been developed. These treaties

contain provisions guaranteeing the rights of foreign investors. Until recently, these investment protection provisions were a matter of wide-ranging consensus, and generally include provisions such as: fair and equitable treatment (FET), most favored nation treatment (MFN), national treatment (NT) and full protection and security.

Within the context of global investment regimes, investment protection comes into direct conflict with the theory of state sovereignty. Theory of sovereignty has a long tradition going back to the Peace of Westphalia, when the concept was first codified on the international level. For the purposes of this paper, we will be using the most parsimonious formulation of the so-called Westphalian sovereignty, which Krasner defines as „lack of other authority over state other than the domestic authority" (Krasner 2001, 11-12). It is obvious how this concept of sovereignty clashes with the conception of investment protection, since investment protection provisions codify specifically those situations, where limits are put on the government activity. The conflict set up in this way occurs on the level of theory.

This article is however more interested in how this conflict gets resolved in practice. That is to say, which concept prevails under which circumstances. This is the domain of investment arbitration, which is the mechanism set up to arbitrate this conflict between two established principles of international law through investor-state dispute settlement. Investment arbitration enables foreign investors to litigate against nation states in case of a perceived breach of an investment treaty. The rationale for the regime of investment arbitration is based on the assumption that the foreign investment stimulates development and growth and in order to stimulate foreign investment, the dispute settlement mechanisms need to be transnational in nature to avoid the „home bias" of domestic courts, therefore ensuring stable investment environment. In the context of this article, investment arbitration represents the practice of the conflict between investment protection and national sovereignty. The interpretation of where does the sovereignty of a state end, and the protection of foreign investment begin has developed over the years of ISDS cases and can be found within the case law of investment arbitration.

This article aims to contribute to the growing literature on this topic by identifying three main concepts that can be used to frame this discussion on the level of investment arbitration:

- indirect expropriation,
- legitimate expectations,
- domestic legal sovereignty.

In relation to each of these concepts, I will be analyzing two things:

- the limits that are put on the state sovereignty by the practice of investment arbitration through interpretation of investment protection provisions of investment treaties by the investment tribunals;
- the protections that are afforded to national sovereignty by the investment tribunals.

3. Investment Arbitration Tribunals and Their Interpretation of the Conflict Between Sovereignty and Investment Protection

Investment arbitration tribunals represent institutional spaces, where the theoretical conflict presented in the previous chapter is resolved. This happens mainly through interpretation of investment treaty provisions within the context of a specific ISDS case. Case law therefore represents a major source for investment arbitration. In this chapter, we will take a closer look at selected ISDS cases, which will help determine where the limits for government action within the context of investment protection are. These limits are set through several key concepts that will be analyzed here. The concepts are: indirect expropriation, legitimate expectations, sub ordinance of domestic law.

3.1. Indirect Expropriation

Indirect expropriation is a concept used to describe a measure of a state which substantially deprives investor of the value of his investment, without seizing the property outright (direct expropriation). The most typical cases of indirect expropriation relate to a revocation or a non-renewal of a license, a permit, or a contract, but can also include erosion of investor´s ability to make profit on an investment over time through a series of measures (creeping expropriation). Within the theoretical context presented previously, the conflict is related to determination of where the line is between a sovereign regulatory measure for legitimate public purpose and a regulatory measure that amounts to indirect expropriation and requires compensation to the investor affected by it. In other words, the question is how, and to what degree does the doctrine of indirect expropriation limit the sovereign space of the states to enact regulation. It is worth reiterating that we are not interested in what the investment treaties tell us about indirect expropriation, but what has been established in the case law of investment arbitration.

The issue is recognized at the scholarly level, at the level of international organizations and also at the level of the investment tribunals themselves. Dolzer and Stephens (1995) point out that: "For the host State, the definition (of the line of demarcation between measures for which no compensation is due and actions qualifying as indirect

expropriations) determines the scope of the State's power to enact legislation that regulates the rights and obligations of owners in instances where compensation may fall due. It may be argued that the State is prevented from taking any such measures where these cannot be covered by public financial resources" (98). More recently, the issue has been analyzed in relation to environmental regulation by Zhu (2019). OECD paper claims that "the question that arises is to what extent a government may affect the value of property by regulation, either general in nature or by specific actions in the context of general regulations, for a legitimate public purpose without effecting a "taking" and having to compensate for this act" (OECD 2004, 2). Even investment tribunals have previously recognized the difficulty of ruling on the matter of indirect expropriation v. legitimate regulation, such as in Feldman v. Mexico (1999), where the tribunal stated that "It is much less clear (than defining direct expropriation) when governmental action that interferes with broadly-defined property rights – an "investment" under NAFTA, Article 1139 – crosses the line from valid regulation to a compensable taking, and it is fair to say that no one has come up with a fully satisfactory means of drawing this line" (98).

In the same case, the tribunal also stated that "Reasonable governmental regulation of this type (in public interest) cannot be achieved if any business that is adversely affected may seek compensation" (103). The issue therefore rests on determination whether indirect expropriation occurs every time a government interferes substantially with the value of a foreign investment ("sole effect" doctrine) or the motivation and the aims of the particular government measure are taken into account in determination of whether indirect expropriation occurs. The key concepts for this issue are "sole effect doctrine", "police powers doctrine", and "proportionality".

Illustrative case of the effects that indirect expropriation doctrine can have on sovereignty of the states include Tippets, Metalclad v. Mexico and Biwater v. Tanzania, as cases demonstrating the limits that the practice of investment arbitration puts on sovereignty, and Methanex v. USA as a case which demonstrates the trend to protect the sovereignty of the state by arbitration tribunals.

Metalclad was an American company that obtained a permit to operate a landfill in Mexico in the 1990s. The local municipality denied a construction permit to the corporation, which the tribunal deemed to be in violation of both the fair and equitable treatment and expropriation provisions of the NAFTA. Of interest for this paper, however, is the decision of the tribunal on the Ecological Degree issued by the governor of the municipality, which prohibited construction in the relevant areas. The Metalclad tribunal decided that this measure also amounted to indirect expropriation, since it substantially deprived the investor of the value of its investment. The award stated that the "Tribunal need not decide or consider the motivation or intent of the adoption of the Ecological Decree..." (Metalclad v. Mexico 2000, 85) It added that indirect expropriation could occur "even if not necessarily to the obvious benefit of the host State" (86). This formulation of the tribunal implies that any measure that the government of Mexico might take, even one demonstrably related to public interest is unlawful under the international law, unless compensated for.

Biwater v Tanzania is a case where the investor claimed expropriation on the basis of termination of contract and seizure of property in the domain of water and sewage infrastructure and services. Although the tribunal did not award any damages to the investor, it decided that expropriation did occur, also effectively excluding consideration of sovereign regulatory powers of the state by recognizing "that many tribunals in other cases have tested governmental conduct in the context of indirect expropriation claims by reference to the effect of relevant acts, rather than the intention behind them" (Biwater v. Tanzania 2008, 463). Similar reasoning can also be found in the Tippets case from the Iran-US Claims Tribunal, with the tribunal stating that expropriation occurs "whenever events demonstrate that the owner was deprived of fundamental rights of ownership and it appears that this deprivation is not merely ephemeral" (Iran-US Claims Tribunal 1984, 12).

These cases represent one of the spectrum of approaches of tribunals to indirect expropriation, one that puts clear limits of sovereign regulatory powers of the state. This is done by not taking into consideration the motivation of the government measure in question, therefore requiring compensation even for legitimate public interest measures in case these measures affect the value of foreign investment. This is sometimes called the "sole effect" doctrine.

On the other side of the spectrum of investment arbitration practice, we can find the doctrine of "police powers" of the state, which excludes the liability of the state for measures tantamount to expropriation in cases where the measures are a part of the exercise of the state´s police powers. While we can found a large amount of cases, where the police powers doctrine is invoked in defense of the states, the tribunals are generally not keen in taking the police powers into their consideration, mainly due to the fact, that the concept is not well established and defined in the practice of investment arbitration. In theory, the measures that fall under the police powers of the state are bona fide, non-discriminatory measures that are taken for a legitimate public interest purpose, mainly to protect health, safety or welfare of citizens. One often cited example of a tribunal seemingly adopting the broad

definition of "police powers" is the Methanex case. Methanex is a Canadian producer of methanol. After the state of California banned the use of MTBE as a gasoline additive due to environmental concerns, Methanex filed a case against the US alleging a breach of NAFTA provision on expropriation among other things.

In direct opposition to the Metalclad tribunal´s assessment, tribunal in Methanex v. USA rejected implicitly the "sole effects" doctrine and put forward the doctrine of "police powers" as the most important concept when deciding whether expropriation occurred or not. The tribunal stated that "a non-discriminatory regulation for a public purpose, which is enacted in accordance with due process and, which affects, inter alia, a foreign investor or investment is not deemed expropriatory and compensable…" (Methanex v. USA 1999: Part IV - Chapter D, 4).

Finally, the concept of "proportionality" provides a certain middle ground in the practice of investment arbitration between the sole effect doctrine and the police powers doctrine. It consists of adding a proportionality criterion into consideration of whether expropriation occurred or not. For a measure of a state to be considered lawful under the most common investment treaties, it needs to be (among other things) proportional to the legitimate public interest purpose that the government is pursuing by adopting this measure. To see this concept applied in practice, see for example Occidental v. Ecuador or Feldman v. Mexico. It is also important to point out that most of the new investment treaties contain a clarification of the expropriation clause, which specifies that legitimate public interest measures do not constitute indirect expropriation, although the manner in which this clarification will be interpreted by investment tribunals is not yet clear.

This analyses clearly demonstrates the existence of a conflict between investment protection and national sovereignty on the level of investment arbitration in relation to the concept of indirect expropriation. The key concept of investment protection here is the "sole effects" doctrine, while the sovereignty is protected by the doctrine of "police powers", with the practice of investment arbitration showing that tribunals usually try to balance these polar opposites, sometimes through applying the proportionality criterion.

3.2. Legitimate Expectations

Within the current interpretation of the FET standard of investment protection, the states are required to conform their policies to the legitimate expectations of the investor. The goal is to provide the investors with a stable investment environment where they are able to calculate their profits, which encourages investment in general. The controversy of this concept rests on the interpretation of which expectations can be seen as legitimate, and which are not. Within the theoretical framework of this article, the conflict rests on the interpretation of where the line is between a sovereign change in policy of a state (for example after elections), and a breach of investor´s legitimate expectations about the investment environment and their ability to make profit (Vicuna 2003, Zeil 2011).

Legitimate expectations were first introduced in investment arbitration practice in 2003 by the tribunal in Tecmed v. Mexico, which based the concept on good faith practices. It has since become an integral part of the FET standard. As a matter of fact, it is now rare to see a claim of FET breach without claiming a breach of legitimate expectations. The basic definition comes from Tecmed, where the tribunal stated that in view of the good faith principle, the relevant treaty "requires the Contracting Parties to provide to international investments treatment that does not affect the basic expectations that were taken into account by the foreign investor to make the investment" (Tecmed v. Mexico 2003, 61). In terms of the theoretical framework of this article, legitimate expectations fall firmly under the concept of investment protection. The issue is therefore under which circumstances do investment tribunals rule that the legitimate expectations of the investor are breached. This can lead to inconsistencies, as there is no explicit rule as to what consists legitimate expectations. More recently, the tribunals have been more explicit in their determinations, often providing a more restrictive conceptualization of legitimate expectations, such as the Antaris tribunal, which stated that an investor "must establish that (a) clear and explicit (or implicit) representations were made by or attributable to the state in order to induce the investment, (b) such representations were reasonably relied upon by the Claimants, and (c) these representations were subsequently repudiated by the state" (2014, 97). However, even within this framework, inconsistencies seem to be abundant. The limits that the concept of legitimate expectations put on state sovereignty will be illustrated by Eiser and Energia Solar v. Spain., SW Solar and Wirtgen v. Czech Republic, Blusum v. Italy.

The most cited cases in the matter of legitimate expectations are the so-called "Argentinian cases", which relate to arbitrations initiated as a response to measures enacted by Argentina in the wake of their financial crisis from the turn of the century. The cases are often used as a demonstration of inconsistencies of the investment arbitration regimes when it comes to legitimate expectations. As these cases have been analyzed extensively (Lavopa 2015, Brockova 2016), I will illustrate the issue on some of the more recent cases. For reference, the most important of the "Argentinian cases" include LG&E v. Argentina, CMS v. Argentina, Total v. Argentina and other.

In one of the most recently resolved cases, Eiser and Energía Solar v. Spain (2017), the tribunal decided that the change in the government policy after the Spanish election of 2011 in the energy sector amounted to the breach of the investor´s legitimate expectations and therefore constituted the breach of FET. More specifically, the government changed the subsidy scheme for the solar energy sector in order to address the issue of government deficit and public dept. An added complication to the story is the fact that Spain in fact has international obligations to keep its deficit in line with the prescribed levels under the EU pact. This case raises the question of where the line is between a change in policy after a political change brought on by elections, which is also based on international obligations, and the legitimate expectations of the investor to have the same regulatory framework applied no matter what government is in force. The case also highlights that the problems are exacerbated in domains where the investment has a slow return rate (the investor needs a stable environment for a long time) and in combination with a Western type democracy, where the right wing and left wing government change periodically.

To make the matter even more confusing, a similar case involving tariffs for renewable energy sector occurred in Italy: Blusun v. Italy. In this case however, the tribunal decided that the legitimate expectations of the investor were not breached, since the government measure was proportionate to the public policy goal it was pursuing (Blusun v. Italy 2017). The same way, once again in the solar power business, the claim in SW Solar and Wirtgen v. Czech Republic, was dismissed on similar grounds (SW Solar and Wirtgen v. Czech Republic 2017).

The practice of investment arbitration therefore shows that legitimate expectations represent a problematic concept. The state sovereignty is protected by argumentation on the legitimacy of a change in policy as part of the political (democratic) process. The investors are protected by the doctrine of legitimate expectations, which is set up to ensure stable investment environment. The most recent developments in investment treaty-making point to a possible elimination of the legitimate expectations concept as part of the FET standard. However, as the ISDS cases are always brought under the “older” treaties, and we can therefore assume that legitimate expectations will continue to be relevant to the practice of investment arbitration for the foreseeable future.

3.3. Domestic Law on the Level of International Investment Arbitration

Within the theoretical framework of this article, the issue of domestic law in investment arbitration refers to the conflict between sovereign judicial powers of a state within its own territory and the ability of investors to challenge the decisions of a domestic court through investment arbitration. The issue usually arises when the investor first seeks to challenge a regulatory measure on the level of domestic courts. In cases where the investor loses in the domestic courts, he can challenge the measure on the level of an investment arbitration tribunal, which is than required to decide whether it will take into question the decision of the domestic court and order compensation despite its verdict. Alternatively, the investor might directly seek remedy at the level of an investment tribunal, which might then be required to interpret domestic legal framework without the necessary expertise.

The issue generally comes down to whether the tribunal applies the so-called Azinian principle. As cited the most recently in Fouad v. Jordan (2017), the Azinian principle states that “a governmental authority surely cannot be faulted for acting in a manner validated by its courts unless the courts themselves are disavowed at the international level” (86). Cases invoked during Fouad v. Jordan include Mondev v. USA and Helnan v. Egypt, further refining the principle by citing: “Under NAFTA, parties have the option to seek local remedies. If they do so and lose on the merits, it is not the function of NAFTA tribunals to act as courts of appeal” (Mondev v. USA 2002, 126), and “when a tribunal is considering an issue of domestic law previously ruled upon by a domestic court, the tribunal will accept the findings of local courts as long as no deficiencies, in procedure or substance, are shown in regard to the local proceedings which are of a nature of rendering these deficiencies unacceptable from the viewpoint of international law, such as in the case of a denial of justice”(Helnan v. Egypt 2008, 106). Therefore, investment tribunals generally do not put into question the decisions of domestic courts. Despite this fact, in many pending cases, the investors are asking the investment tribunals to revisit the rulings of domestic courts, including constitutional courts. Examples include: Cosigo v. Colombia, Chevron v. Ecuador. Previously, investment tribunals did take on jurisdiction in cases where interpretation of domestic law was necessary, since there was no ruling of domestic courts on the matter, such as Metalclad v. Mexico, where the tribunal accepted the interpretation of the investor, which relied on the assertion that the domestic legal framework did not enable the municipality to revoke the permit for operation of a waste landfill (Metalclad v. Mexico 2000).

The second issue of investment arbitration related to judicial sovereignty is systemic, and refers to the fact that the arbitration takes place outside the sovereign system of domestic courts. Of course, this is part of the core rationalization for the system of international investment arbitration. It nevertheless represents a voluntary concession of sovereignty on the part of the state, justified by the expected inflow of foreign investment resulting from the increased protection against arbitrary use of legal system against the investors by the state. The current

efforts at reform of investment arbitration have also addressed this issue, by focusing on the possibility of introducing exhaustion of local remedies provisions into international investment agreements (IIAs). This would require the investors to first file their case in the domestic courts before seeking compensation on the international level. These provisions are already being used in several of the more recent IIAs, such as the Albania-Lithuania Bilateral Investment Treaty and the Romania-Sri Lanka Bilateral Investment Treaty.

Other option is to completely do away with ISDS and simply rely on domestic courts for arbitration. This requires a high level of confidence towards domestic courts, and a certain level of balance between imported and exported capital between two partners. While this seems unrealistic in many contexts, such as bilateral treaties between highly developed and developing countries, it might become reality in the "new NAFTA" between Canada and USA, pending ratification of the United States-Mexico-Canada Agreement, which completely eliminates ISDS mechanisms in the relationship between the USA and Canada.

The conflict shown in this part of the paper between the national sovereignty and investment protection rests on the application of the Azinian principle. The practice of investment arbitration shows that the tribunals usually apply this principle. It means that apart from the systemic framework, which clearly limits national sovereignty by definition, the tribunals are mostly willing to protect judicial sovereignty of domestic courts.

Conclusion

This article analyses the competing concepts of investment protection and national sovereignty on the level of investment arbitration. Firstly, we set this conflict firmly within the wider theoretical framework by situating the concept of national sovereignty within the neorealist conception of global political order with its focus on nation state as the main actor, and placing the concept of investment protection within the neoliberal conception of a globalized economic order with foreign investment as the major driver of economic growth.

The article then analyses the practice of investment arbitration to come to relevant conclusion regarding the aforementioned conflict. Through this analysis, I came to 3 conclusions:

- there is a definite conflict between investment protection and national sovereignty on the level of investment arbitration, which enables us to situate investment law within the theoretical framework of international relations;
- the conflict rests mostly on the way that the tribunal approaches three key concepts: indirect expropriation, legitimate expectations and domestic judicial sovereignty;
- With the exception of the domestic judicial sovereignty, the conflict has not been resolved consistently by the investment tribunal.

These conclusions set up new research opportunities and questions, such as: How does the way that investment tribunals resolve the conflict change in time? Are the tribunals tending toward national sovereignty or investment protection over time? Do the new investment treaties resolve the conflict set up in this paper? Answering these questions would contribute significantly to the general theory of international relations.

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Determinants of Human Capital Inequality in Developing Countries: Generalized Method of Moments (GMM)

Suraya MAHMOOD
Faculty of Business and Management
Universiti Sultan Zainal Abidin,Terengganu, Malaysia
surayamahmood@unisza.edu.my

Ahmed HUSSEIN
Faculty of Business and Management
Universiti Sultan Zainal Abidin,Terengganu, Malaysia
ahmed.mba@geomatika.edu.my

Bashar ALKHAWALDEH
Faculty of Business and Management
Universiti Sultan Zainal Abidin,Terengganu, Malaysia
Basharyounes@yahoo.com

Suraya ISMAIL
Faculty of Business and Management
Universiti Sultan Zainal Abidin,Terengganu, Malaysia
surayaismail@unisza.edu.my

Hammed Oluwaseyi MUSIBAU
Tamanian School of Business and Economics
University of Tasmania, Australia
hammed.musibai@utas.edu.au

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Abstract:

This paper examinesthe determinants of human capital inequality in developing Countries using the Gini coefficient as a proxy to human capital inequality. This paper uses a few variables such as average years of education, public expenditure on education, life expectancy, fertility rate and emigration rate by difference skill using dynamic panel data two-Step System Generalized Method of Moment (GMM) for 57 developing countries over the period of 1965-2017. The empirical results show that the past of human capital inequality, average years of education have a significanteffect on human capital inequality in the entire world and developing at 1% and 5% level. However, the public expenditure on education, total emigration rate, emigration by medium skill only significant in the world. For emigration rate by high skill only significant in developing countries. For life expectancy, only developing countries have a significant effect on human capital inequality at a 10% level. Other variable such as life expectancy is insignificanton human capital inequality at any level in the world and developing countries.

Keywords: human capital inequality; generalized method of moments.

JEL Classification: E24; J24.

Introduction

The persistent and increasing income inequalities in most of the countries of the world since 1980's until now have been giving a negative effect on the economy. Theoretically, the relationship between human capital inequality and income inequality are positively correlated (Benabou 1994, Chakraborty and Das 2005, Erosa, Koreshkova and Restuccia 2010, Solt 2009). In examining the ability of human capital inequality to explain the differences of income inequality across countries will naturally raise questions on the determinants of human capital inequality. Equalizing human capital through education is widely recognized as the main way for social advancement and better life chances. In a perspective of equality of opportunity, human capital should be equally distributed in the population. Thus, the reduction in human capital is important to achieve equality of distribution in human capital and indirectly

reduce income inequality. This is also parallel with the Millennium Development Goal (MDG) to reduce human capital inequality on a global scale and provide a benchmark for educational standards (MDG 2009). Besides, most developing countries try to achieve equality in human capital in the 21th century. But, in the literature, a large body of empirical research points to the persistence of inequality in human capital across countries (Breen and Jonsson 2005, Gerhards and Hans 2013, Musibau, Yusuf and Gold 2019).

There are many determinants lead to inequality in human capital as reported by the researcher in previous studies[1]. In part of determinants two-sided driving forces influencing human capital inequality. One side is describing the household behavior (average of education and the past inequality) in education as the demand for education and another side is government provision for education and skilled migration in the labour market as a supply of education. For the demand for education, average years of education and past human capital inequality is proxy past educational inequality one of the factors influencing distribution in human capital inequality.

Most of the previous studies found a negative relationship between average years of education with its inequality and positive relationship between the past human capital inequality with its inequality.In discussing the supply side of education, nowadays increased flows of migration from developing to developed countries have attracted researchers in investigating the effect of migration on growth, development as well as inequality. Beine, Docquier and Rapoport (2008), Vidal (1998) found that migration prospects have a positive and significant impact on human capital formation especially for countries with low initial GDP per capita levels in cross-section of 57 developing countries.

However, the study of the effect of migration on inequality in terms of human capital inequality is less given attention by the researcher. Sasin and McKenzie (2007) investigated how migration affects human capital inequality. The results show that migration reduces human capital inequality. This is an important issue, as the literature on inequality has gone beyond looking at the distribution of outcomes. It is also supported by Massey *et al.* (1993), migration is the latter 'crucial determinants of outcomes' such as income, wealth and human capital. It is also important issue because inequality is an outcome of interest in its own right and the effects of migration on human capital inequality should be addressed to achieve equality in human capital as well as reduce income inequality in the future. Besides that, the effectiveness of allocation resources by government provision for public expenditure education should be also addressed in affecting human capital inequality across countries. This is one of important factors in supply side must be investigated.

This issue needs to be addressed because the equality of opportunity is a key development in achieve equality of human capital and there is also lack of studies about the effectiveness public expenditure in reducing human capital inequality in literature. From this issue, we can conclude that, can demand of education and supply of education as we discussed in this section affecting in inequality in human capital for most countries especially developing countries?

The objective of this paper is to examine the determinants of human capital inequality in developing countries such as the past of human capital inequality, average years of education, migration by skill and education, public expenditure and other significant control variables such as life expectancy and fertility rate. The importance of detecting the significant determinants of human capital inequality is to achieve equality in human capital and reduce income inequality. It is because human capital inequality has been a positive effect to income inequality. If human capital inequality can be reduced this will indirectly lead to a decrease in income inequality.

The main contribution of this paper over previous empirical literature is in several important aspects. First, this paper computed and extended data set of human capital inequality for two periods (2005-2017) using Human capital Gini for developing countries based on the latest dataset from Barro and Lee (updated in 2010). Recently, Castelló and Doménech (2002) computed the human capital Gini for theperiod 1960 to 2000, using Ludwig, Schelkle and Vogel (2012) and Barro and Lee (2013) researches.

Thus, this paper producesthe results of the study from a larger sample and longerperiods. Second, this paper employs the Generalized Method of Moments (GMM) using system GMM two-step as proposed by Arellano and Bover (1995) for broad panel data in developing countries which is different from previous studies that used OLS estimator, SUR Technique and other methods.

[1] For example of gender inequality see Stromquist (2005), Buchmann *et al* (2008) and UNESCO 2010) disability Carrier (1986), Peters (2003) social class (Erikson and Goldthorpe 1992), Jonsson *et al.* (1996), Persell (1977) and Stromquist (2004). Other studies have reported other factors which influenced human capital inequality such as the effect of political economy, natural disasters, poverty, privatization, race or ethnicity, religion, language, corruption, trade and globalization.

The rest of the paper is organized as follows. Section 2 reviews the related works of literature. Section 3 explains the empirical model, method estimation and data used in the analysis, while Section 4 reports and discusses the econometric results. The final section concludes and synthesizes the whole study.

1. A Brief Literature Review

In previous studies, many researchers have identified factors that lead to inequalities in human capital. Castelló and Doménech (2002), Gerhards and Hans (2013) and UNESCO (2010) it is state that inequality in gender as one of the main factors in contributing to human capital inequality, where gender referring to inequality between males and females in relation to educational attainment, access to higher education, and compounded with the disparities of minority ethnic status. While Carrier (Erosa *et al.* 2010, Ludwig *et al.* 2012) reported the disability has influenced human capital inequality. It can be defined as a term that encompasses physical, mental, emotional, and spiritual disadvantages. Erosa *et al.* (2010), Gerhards and Hans (2013), Ludwig *et al*. (2012) find that social class also influenced human capital inequality. In Rambla (2006) social class inequality is underpinned by several heterogeneous factors. Social inequality emerges from the unequal distribution of resources, which is biased against groups of individuals. This type of inequality is much more difficult to dislodge if the groups of individuals cannot develop their basic capabilities due to their disadvantaged position (Ludwig *et al*. 2012).

Other studies have reported that there are other factors which could influence human capital inequality such as the effect of globalization and political economy *(*Beine *et al.* 2008, Gerhards and Hans 2013) natural disasters (Cuaresma 2010, Neumayer 2011, Toya and Skidmore 2014), neoliberalism (Hill 2010, Lazzarato 2009, Shin and Park 2016), poverty (Cornia 2004, McKee and Todd 2011), privatization (Ganguli and Terrell 2006, Lesorogol 2003), race or ethnicity (Oliver and Shapiro 2013, Robinson *et al*. 2015, Smith 2000), religion (Cooray and Potrafke 2011, Krueger 2018) and language (Dustmann 1999, Kubota 2011, Parker, Rubalcava and Teruel 2005). Besides the determinants as described above, the public provision of education has been commonly perceived as egalitarian and viewed as a vehicle to achieve equity goals in the economy.

The relationship between public spending on education and inequality has been examined in several research studies, most of which have focused on primary, secondary, or all levels of educational spending, rather than spending on higher education specifically. Sylwester (2002) studied in the cross-sectional the role of public expenditure on education to inequality. He found that public education spending and income inequality are positively related. Checchi and Garcıa-Penalosa (2004) found that government expenditures on education were positively associated with income inequality in the most developed countries such as the United States. Besides examining the effect of public expenditure on education, Sasin and McKenzie (2007) examined the effect of migration on human capital inequality in rural Mexico. The results showed that migration reduced human capital inequality, especially for girls, by perversely reducing schooling at the top of the human capital distribution. The conclusion is that no single factor can ultimately explain the local, regional, or national disparities associated with the inequalities of education. Besides that, this study also includes the effect of emigration by skill (low, medium high) workers, fertility rate and life expectancy on human capital inequality. The results shown that, these effects are negatively with human capital inequality (Castelló-Climent 2010, Herzer and Vollmer 2012, Krueger 2018, Morrisson and Murtin 2013).

2. Empirical Model for Determinants of Human Capital Inequality

To analyse the determinant of human capital inequality in the developing countries, this study uses a few variables such as average years of education, previous of human capital inequality, emigration rate by skill, public expenditure on education and included life expectancy and fertility rate as control variables. The data set will use unbalanced panel data which is dynamic panel data System GMM set of 57 developing countries from 1965 to 2017. The empirical model can be specified as follows:

$$\ln HCgini_{j,t} = \beta_{0j} + \beta_1 nHCgini_{j,t-1} + \beta_2 \ln Pub_{j,t} + \beta_3 \ln Ayrs_{j,t} + \beta_4 \ln Expect_{j,t} + \beta_5 \ln Fert_{j,t} + \beta_6 \ln To_{t}\_emig_{j,t} + \beta_7 \ln Low\_emig_{j,t,} + \beta_8 \ln Medium\_emig_{j,t} + \beta_9 \ln High\_emig_{j,t} + \beta_{10} Dummy_{j,t} + \varepsilon_{j,t} \quad (1)$$

where: HCgini is human capital inequality using gini coefficient (human capital Gini), Ayrs is average years of education for the population of 25 age and over, pub is public expenditure on education, Expect is life expectancy, Fert is fertility rate, Tot_emig is referred to total of emigration rate, Low_emig is emigration rate by low skill, Medium_emigration rate by medium skill and high_emig is emigration rate by high skill. Lastly ε is Error term and *j, i* represents index countries and periods.

2.1. Methods of Estimation

To estimate the model specification for determinants of human capital inequality in 57 developing countries with T=12, this paper uses dynamic panel data procedure Generalized Method of Moments (GMM). The reason of using GMM is to allow the identification of country-specific effects, controlthe unobserved effects by first-different data, and control the potential endogeneity of all the explanatory variablesand controls for a simultaneity bias caused by the possibility that some of the explanatory variables may be endogenous. Arellano and Bond (1991) proposed transforming Equation (1) into first differences to eliminate country-specific effects as follows:

$$\begin{aligned} LnHCgini_{j,t} - LnHCgini_{j,t-1} = {} & \beta_1(\ln HCgini_{j,t-1} - lnHCgini_{j,t-2}) + \beta_2(lnpub_{j,t} - lnpub_{j,t-1}) + \beta_3(\ln AYS_{j,t} - \ln AYS_{j,t-1}) \\ & +\beta_4(lnExpect_{j,t} - lnExpect_{j,t-1}) + \beta_5(lnfert_{j,t} - lnFert_{j,t-1})\ \beta_6(lnTot\_emig_{j,t} - lntot\_emig_{j,t-1}) + \\ & \beta_7(lnlow\_emig_{j,t,} - lnlow\_emig_{j,t-1}) + \beta_8(lnmedium\_emig_{j,t} - lnmedium\_emig_{j,t-1}) + \\ & \beta_9(lnhigh\_emig_{j,t,} - lnhigh\_emig\ _{j,t-1})\ (\varepsilon_{j,t} + \varepsilon_{j,t-1}) \end{aligned} \quad (2)$$

To address the possible simultaneity bias of explanatory variables and the correlation between ($\ln HCgini_{j,t-1} - lnHCgini_{j,t-2}$) and ($\varepsilon_{j,t} + \varepsilon_{j,t-1}$); Arellano and Bond (1991) proposed the lagged levels of the regressors are used as instruments. Itis valid under the assumptions such as the error term is not serially correlated, and the lag of the explanatory variables are weakly exogenous. This step is known as difference GMM estimation and the moment conditions can be listed as follow:

$$E[lnHCgini_{j,t-s}\ (\varepsilon_{j,t} + \varepsilon_{j,t-1}\ )] = 0 \text{ for } s \geq 2;\ t = 3;\ldots;\ T \quad (3)$$

$$E[lnpub_{j,t-s}\ (\varepsilon_{j,t} + \varepsilon_{j,t-1}\ ) = 0 \text{ for } s \geq 2;\ t = 3;\ldots;\ T \quad (4)$$

$$E[lnAyrs_{j,t-s}\ (\varepsilon_{j,t} + \varepsilon_{j,t-1})] = 0 \text{ for } s \geq 2;\ t = 3;\ldots;\ T \quad (5)$$

$$E[lnExpect_{j,t-s}\ (\varepsilon_{j,t} + \varepsilon_{j,t-1}\ )\ ] = 0 \text{ for } s \geq 2;\ t = 3;\ldots;\ T \quad (6)$$

$$E[lnFert_{j,t-s}\ (\varepsilon_{j,t} + \varepsilon_{j,t-1}\ )\ ]\ = 0 \text{ for } s \geq 2;\ t = 3;\ldots;\ T \quad (7)$$

$$E[lnTot\_emig_{j,t-s}\ (\varepsilon_{j,t} + \varepsilon_{j,t-1})] = 0 \text{ for } s \geq 2;\ t = 3;\ldots;\ T \quad (8)$$

$$E[lnlow\_emig_{j,t-s}\ (\varepsilon_{j,t} + \varepsilon_{j,t-1}\ ] = 0 \text{ for } s \geq 2;\ t = 3;\ldots;\ T \quad (9)$$

$$E[lnMedium\_emig_{j,t-s}\ (\varepsilon_{j,t} + \varepsilon_{j,t-1}\ )] = 0 \text{ for } s \geq 2;\ t = 3;\ldots;\ T \quad (10)$$

$$E[lnHigh\_emig_{j,t-s}\ (\varepsilon_{j,t} + \varepsilon_{j,t-1}\ )] = 0 \text{ for } s \geq 2;\ t = 3;\ldots;\ T \quad (11)$$

To consistency of the GMM estimator, this paper also examined the validity of the moment conditions by using the conventional test of over-identifyingrestrictions proposed by Hansen (1982) and Sargan 1958) and testing the null hypothesis thatthe error term is not second-order serially correlated of the difference in equation (2). Furthermore, we test the validity of theadditional moment conditions associated with the level equation with the difference Hansen test. Besides that, AR(1) and AR(2) are tested to evaluate the validity of appropriate instrumentation (Arellano Bond 1991, Bound, Jaeger and Baker 1995). The purpose to test AR is to determine the error term serial correlation, as far as the assumption of nonexistence serial correlation of $\varepsilon_{j,t}$ .It is important for the consistency for the estimators. If $\varepsilon_{j,t}$ is not serially correlated, there should exist negative series correlation (AR(1)) for the first stage and there is no proof of serial correlation in the second stage (AR(2)).

2.2. Data Description and Sources

This paperused several main variables and control variables as control variables to the problem of omitted variables. This paper used the Human capital Gini coefficient as a dependent variable using two sources. For periods 2005 and 2017, we extended and computed human capital Gini based on average years of education of the population aged 25-64. The average year of education is taken from Barro and Lee's data set updated in 2010 and we used the model suggested by Gersten, Keating, Yovanoff, and Harniss (2001) and also Thomas (2002). However, for periods 1970-2000, we used Castelló and Doménech (2002). They were used in thecomputed human capital Gini used Barro and Lee (2000, 2013) and computed usingthe same model from Thomas (2002). Since the Barro and Lee data set provides information on the average schooling years and attainment levels with four levels of education such as no education, primary, secondary and higher education respectively. The human capital Gini (G^h) can be computed as follows:

$$G^h = \frac{1}{2\overline{H}} \sum_{i=0}^{3} \sum_{j=0}^{3} \left| \hat{x}_i - \hat{x}_j \right| n_i n_j \quad (21)$$

where: *H* are the average schooling years of the population aged 25 years and over, *i* and *j* stand for the different levels of education, n_i and n_j are the shares of population with a given level of education, and x ^x_i and ^x_j are the cumulative average schooling years of each educational level such as follows:

$$x_0 = x_0 = {}_0x_1 = x_1x_2 = x_1 + x_2x_3 = x_1 + x_2 + x_3 \quad (22)$$

From equation (17) and (18) the human capital Gini coefficient can be rewritten as follows:

$$G^h = n_0 \frac{n_1x_2(n_2 + n_3) + n_3x_3(n_1 + n_2)}{n_1x_1 + n_2(x_1 + x_2) + n_3(x_1 + x_2 + x_3)} \quad (23)$$

where: x_0= 0, x_1 is average years of primary schooling in the total population divided by the percentage of the population with at least primary education, x_2 is average years of secondary schooling in the total population divided by the percentage of the population with at least secondary education, x_3 is average years of higher schooling in the total population divided by the percentage of the population with at least higher, n_0 is the percentage population with no education, n_1 is the percentage in the population with primary education, n_2 measures the percentage in the population with secondary education, and n_3 the percentage in the population with higher education. This paper also included the effect of the emigration rate by skill (low, medium and high skill).

The emigration data is extracted by Docquier and Lodigiani (2010). This paper also included public expenditure on education and the average years of education. These data are taken from UNESCO and World Development Indicator (2017). One of the control variables is life expectancy. The fertility rate was obtained from the World Bank (2018) and another control variable used in the analysis is life expectancy. This data is taken from UNESCO (2017). All variables covering 10 periods of starting years 1965-2017.

3. Empirical Result

Table 1. Determinants of human capital inequality on income inequality in the world and developing countries (1965-2017)

Dependent Variable (LnHCgini)	World	Developing
l.lnHCgini	0.839***	0.838***
	(0.0498)	(0.0460)
Lnayrs	-0.272***	-0.173*
	(0.0477)	(0.0862)
Lnpub	-0.122*	0.0469
	(0.0540)	(0.0616)
Lnlifeexpec	0.0126	0.00648**
	(0.00981)	(0.00232)
Lnfertility	0.0281	0.00777
	(0.0231)	(0.0127)
lntot_emig	0.308***	0.0541**
	(0.0619)	(0.0614)
lnlow_emig	-0.157***	-1.221
	(0.0333)	(1.151)
lnmedium_emig	-0.0595*	-0.00820
	(0.0260)	(0.0330)
lnhigh_emig	-0.102***	-0.0347**
	(0.0261)	(0.0127)
_cons	0.124	0.0936
	(0.154)	(0.300)
N	724	521
No of countries	92	66
AR(1)	0.001	0.000
AR(2)	0.155	0.577
Sargan Test	0.000	0.061
Hansen Test	0.487	0.071

Note: Standard errors in parentheses; *p< 0.05, **p< 0.01, ***p< 0.001

STATA 15.0 software is used to estimate the determinants of human capital inequality in developed and developing countries for periods 1965 - 2017 using system Generalized Method of Moment (GMM) with two steps.

Table 1 contained the results of regressions for most countries in the worldand developing countries. We found a strong significant effect of one-year lagged human capital inequality ($lnHCginit_{-1}$) on the current human capital inequality in the world, developing countries at 1% level with a coefficient is 0.839, and 0.792 respectively. For average years of education (lnayrs), we found a constant negative relationship between average years of education and human capital inequality (lnHCgini) and statistically significant at 1% in the world (-0.272), 5% indeveloping countries with coefficient -0.173. Considering other factors on the demand side education fertility rate (infertility) there is an insignificant on human capital inequality at any level in most countries in the world and developing countries. For life expectancy, the developing countries have a significant effect on human capital inequality at 10% level.

On the supply side of education, we found a negative and significant relationship between public spending on education (lnpubspen) and human capital inequality only in the world with coefficient -0.122 at 5% level. For the emigration rate effect, we found the total emigration rate (lntot_emig) are influencing human capital inequality with a positive sign at 1% significant level in the world with coefficient 0.275 and 10% in developing countries (0.0541) in Table 1. After including the effect of emigration rate by skill level, we only found emigration rate by low skill (lnlow_emig) affecting human capital inequality in the world countries with 1% and 5% level significant. However, we also found emigration rate by high skill (lnhigh_emig) is significant in the entire world, and developing countries at 1%, and 10% level significant respectively. For emigration rate by medium skill (lnmedium_emig), we only found a significant effect in the world on human capital inequality. Finally, based on the AR (2) in Table 1, the result found that no error term serial correlation in the second stage, while Hansen Test proves that the instrument used in this model is a valid instrument. Both tests AR (2) and Hansen Test do not reject the null hypothesis for full sample entire world and compared with developing countries.

Conclusion

Based on results as discussed in this paper, the successful policies to address inequality in human capital have approached both supply-side and demand side should be taken and considered. From the empirical results, we found a negative relationship between average years of education with human capital inequality in case developing countries, an increase of educational attainment (average years of education) in the current generation will persuade higher educational attainment in future generations. At the same time, a reduction in the degree of inequality in human capital in the current generation will boost greater equality in educational attainment in the next generation. Hence it is important to increase educational attainment (average years of education and decrease the level of inequality in human capital due to a long-lasting impact on future generations.

Enhancing higher educational attainment (average number of years of schooling) will influence greater equality in educational attainment (human capital). So,the government of developing countries should be abating the population without education and enhancing population with primary education is the first stage for increasing equality attainment. As we know, many previous studies have been providing ample evidence that such bias is ultimately a political decision. Hence, to achieve equalizing in human capital around the world the issue of politics should be avoided and the public provision of education must be accessed at all national levels in a country by agencies and donors. It is because concentrating public spending on primary and lower secondary education at all levels around the world will improve the distribution of human capital in a country. By improving public expenditure on education, it will lead to influence human well-being and economic growth and reduce inequality in the world.

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Exploring the Conventional Ijon Market and its Impact to Strengthen Vegetable Farmers Bargaining Power in Central Java, Indonesia

Dumasari DUMASARI
Faculty of Agriculture
Purwokerto Muhammadiyah University, Central Java, Indonesia
dumasarilumongga@indo.net.id

Budi DHARMAWAN
Faculty of Agriculture
Jenderal Soedirman University, Central Java, Indonesia
b_dharmawan@yahoo.com

Imam SANTOSA
Faculty of Social and Political Sciences
Jenderal Soedirman University, Central Java, Indonesia
Scokronegoro@yahoo.com

Wayan DARMAWAN
Faculty of Forestry
Bogor Agricultural University, West Java, Indonesia
wayandar@indo.net.id

Dinda Dewi AISYAH
Graduate student in Agricultural Economics
Universitas Gadjah Mada, Yogyakarta, Indonesia
dinda.dewi.a@mail.ugm.ac.id

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Abstract:

This study aims to explore the conventional *ijon* market and its impact to strengthen bargaining power of vegetable farmers in rural area of Central Java, Indonesia. The research design was based on narrative synthetics, which uses in-depth case studies method with quantitative qualitative approaches. The results showed that the bargaining power of farmers was positively affected by *ijon* markets with an auction based on mutual reciprocity. However, their personal status was still lower than the middlemen in terms of formal education, business capital, ownership of transport vehicles, storage warehouses and the ability to hire workers. Middlemen compete to bid on pre-harvest vegetables produce at a price determined by farmer. The farmer sells the crop to the highest bidder, who subsequently sells the harvest for a profit in the local market. The reciprocal mutualism underlying the farmers' bargaining power is based on their social interaction, persuasive communication routine, and their strong business cooperation networks. The *ijon* market was originally viewed as detrimental to farmers, but since it has begun to operate using an auction process, it now provides some profit. Another benefits for farmers including market guarantees, reasonable prices, production cost savings, minimization of crop failure, social relationships, and production security.

Keywords: auctions; *ijon* markets; farmers' bargaining power; middlemen; mutual reciprocity.

JEL Classification: Z13; Q13; Y10.

Introduction

Improving the quality of farming community resources is a high priority goal in developing agrarian countries. Well resourced farmers are better at managing their farms in more productive, creative, innovative, and competitive ways. A strong bargaining position in every transaction related to marketing the harvest certainly benefits farmers. One requirement for farmers to achieve bargaining power is the ability to manage reciprocity among market players, including farmers, middlemen, and others (Dumasari *et al*. 2018). Market security and reasonable prices are key benefits for farmers. Even if an agricultural commodity is superior, inadequate market facilities and prices result in

minimal potential value and little contribution to farmers' economic wellbeing (Rahman and Awerije 2016). Furthermore, reasonable prices and accessible markets help farmers to avoid losses due to product damage after harvest.

Farmers need a short path to market. When the path is too long, the price of the produce at the farm level is lower than the market price, and the largest marketing margin is obtained by retailers (Serawai and Adly 2017). Outcomes insuffiency may happen when farmers lack access to price control and market information due to the distance between the farm and the market. This result addressed from some poor communication between the farmers and market participants, which increase uncertainty in price and market value. Middlemen tend to take large profits under high uncertainty by setting prices paid to farmers as low as possible (Courtois and Subervie 2014). In an attempt to address this issue, the mobile Market Information Services (MIS) issues some programs to reduce those unsureness in order to increase more benefits for farmers.

Direct marketing is crucial for agricultural commodities, particularly for vegetables and fruits, as both sustain high levels of damage during the post harvest period. Vegetable and fruit farmers in Ethiopia are prone to financial loss and poverty due to repeated crop losses resulting from weak market access and negligible processing technology (Rahiel *et al*. 2018). The marketing strategy directly will frees farmers from the costs of drying, storage and postharvest processing (Timsina and Shivakoti 2018). It also strengthens farmers' bargaining position. Some marketing strategies are directly motivated by the desire to maintain harmonious reciprocal relationships in the form of partnerships based on mutualism between farmers and middlemen. Partnerships grounded in mutualism serve as alliances that overcome farmers' weak access to prices and markets. Although improvement is still needed, the partnership between farmers and middlemen in Cameroon is sustained because it reduces transaction costs (Tita *et al*. 2012). Partnerships are important for the sustainability of farming in rural areas. Partnership management is inseparable from the existence of reciprocity and the pursuit of relational values necessary to organize and motivate sustainable agriculture (Alan and Berber 2018).

Farmers use mutual reciprocity to form social networks that meet various needs from preproduction, through production, to postharvest (Jana *et al*. 2013, Bétrisey and Mager 2019). The result of reciprocity is the basic principle of cooperation, grounded in interaction and mutual trust (Giorgio 1997). Reciprocity forges a strong bond for business partnerships between farmers and middlemen in the marketing of agricultural crops. A culture of collaboration and mutual trust was established in Vietnam to strengthen reciprocity between farmers and collectors in rice marketing (Do 2017). The business partnership network is based on oral agreements without a formal legal contract. However, the majority (90%) of Vietnamese farmers continue to use middlemen as a marketing channel. The decision to do so is based on the role of middlemen, who serve as intermediaries as well as providers of price and market information for farmers.

In fact, most of the farmers in Indonesia are smallholders who have a low bargaining position when they have to face the unfair marketing system. *Ijon* system, a sort of marketing system which commonly used by small scale farmer which makes them sell their agriculture produce before the harvesting time (Suprehatin 2009). In rural areas of Karangreja, Purbalingga, Indonesia, farmers and middlemen manage mutual reciprocity in the marketing of vegetables. Marketing with *ijon* system and bonded labor goes in harmony. The transaction uses an auction system to strengthen the bargaining position of farmers. *Ijon* marketing strategies apply to certain vegetables that are characterized by annual crops and one harvest. *Ijon* marketing is unique to farmers in various rural areas of Indonesia. It's just that the role of middlemen in the *ijon* market tends to be antagonistic that detriment many farmers. *Ijon* markets are characterized by a transaction process between farmers and middlemen that takes place when vegetables are still not harvested in the garden. Some middlemen as bidgers bid on vegetables before several days of harvest with an auction system. Farmers who have the right to decide who are the middlemen that chosen as the buyers of vegetables.

The selection of middlemen tends to be based on the courage to bargain with the highest bid. Another criterion considered by farmers is the track record of middlemen in terms of honesty, cooperation and the reciprocity of mutual reciprocity. Payment of cash vegetables after the farmer has set the right middlemen as a *pengijon*. If the bondage occurs during the harvest season, then the payment can be paid in installments with a minimum deposit of 50% of the total estimated price. *Ijon* market strategy based on mutual reciprocity has increased the profits of farmers to reach 150% compared to marketing themselves to the nearest agribusiness market. *Ijon* marketing by way of auction relieve farmers of the burden of the costs of harvesting, transportation and storage.

The bargaining power of farmers in the vegetable *ijon* market with mutual reciprocity by auction in rural Karangreja reconstructed the asymmetrical exchange theory that led to the high dependency of farmers to middlemen to weaken their bargaining power and disadvantage farmers (Lwin *et al.* 2006, Hegde and Madhuri 2013, Arsyad *et al.* 2018). The bargaining power in the vegetable market with *ijon* system by means of auction and

reciprocity based are interesting to be studied in depth. The theme is unique, distinctive and relevant as valuable information for the development of the quality of human resources in an effort to strengthen the bargaining position of farmers through the management of values and mutual reciprocity norms.

1. Methodology

The research design employed was narrative synthetics, which uses a deep case study method to analyze social facts with a literature review that combines quantitative and qualitative approaches (Pawson *et al.* 2005).This design is appropriate for reviewing theories and constructs under consideration in this study. The output is a summary of the current state of knowledge about a particular topic based on a formulation of the problem that aims to offer a new perspective on the issue.

This research project was intentionally carried out in the rural Karangreja District, Purbalingga Regency, Central Java Province, Indonesia. Karangreja is a center of vegetable production in Central Java. The majority of villagers in the region (>70%) are vegetable farmers. Recognizing the high potential of rural Karangreja as a vegetable center, the Regional Government of Purbalingga Regency established an Agribusiness Station Market. The aim of the market is to help vegetable farmers' sell their crops at reasonable prices. However, in reality, the majority (>90%) of vegetable farmers choose to sell their harvest to middlemen in the *ijon* market using an auction system.

Primary and secondary data were collected. Primary data were obtained through in-depth interviews with respondents and key informants guided by research instruments, observations while participating in a number of vegetable *ijon* market activities and focus group discussions. Secondary data were obtained through literature searches and content analyses of research results, theories, and related concepts from textbooks, research reports, and scientific journal articles.

The population of this study includes all vegetable farmers who live in rural Karangreja District, Purbalingga Regency, Central Java Province, Indonesia. Respondents were selected from the population to represent all the conditions and problems of the farmer. Determination of respondents carried out purposive sampling technique. Various criteria that underlie the selection of respondents: cultivate annual vegetable crops, non tubers and one harvest, have a reciprocal relationship with several middlemen, use the bonded market with the auction system to market vegetables and get economic benefits from the social *ijon* market.

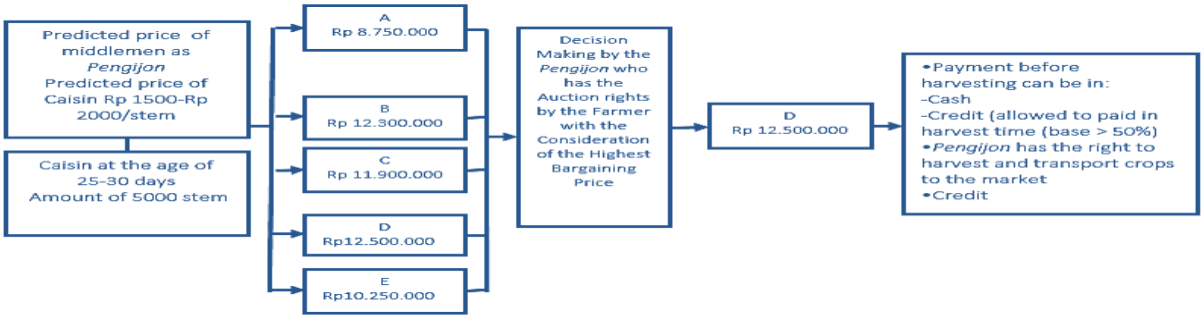
Other primary data sources include key informants from middlemen as someone with enough movement space for activists in rural Karangreja. Determination of key informants is done by rolling snowball technique. Primary data sourced from key informants function to complete and check re-check between types of data. Determination of the number of respondents and key informants using nonprobability sampling techniques to not be strictly limited as a rule in quantitative research. Determination of the number of primary data sources is more emphasized to fulfill the importance of the completeness and depth of the data in order to answer the problem formulation logically.

Data processing techniques carried out qualitatively and quantitatively. Utilization of qualitative data processing techniques through several stages of data entry, data filtering, data grouping, data categorization, inference, retesting and presenting data. The quantitative data processing techniques include the stages: editing, coding, and data entry manually. Qualitative data that has been processed is then analyzed using Interactive Analysis Techniques (Miles and Huberman 1991). The results of quantitative data processing were analyzed using non-parametric statistics: percentage values, tabulation, frequency distribution and scoring. The results of data analysis are then interpreted to be presented in a systematic narrative descriptive discussion.

2. Results

The vegetable *ijon* market in the Karangreja countryside has been in operation for many years. The respondents were invited to discuss the honesty, kindness, and openness of the middlemen in determining the prices offered by the vegetable appraisers. Past experience with mutual reciprocity was also a consideration for farmers in accepting price estimates. The courage of the middlemen' bids were seen in their estimation of the highest price, particularly as they weighed farmers' decisions in determining who would serve as the *pengijon*. The selling prices and payment mechanisms in the *ijon* market are the result of agreements between farmers and middlemen after an auction. *Ijon* markets take place before the harvest, when the vegetables are still in the garden. The auction process in Karangreja is shown in Figure 1.

Figure 1. Auction mechanism in the vegetable market with *ijon* system



Not all types of vegetables can be sold on the bonded market (e.g., no root vegetables), and those that qualify (cabbage, leeks, celery, bok choy, choy sum, and others) must meet some criteria, including a specific age at harvest, being from a single harvest, being healthy without pest damage, and having been harvested from the farmer's own property. In our study, all types of vegetables were cultivated by respondents using monoculture farming. Only a few respondents applied polyculture farming.

Monoculture farming patterns are more attractive to farmers because the process of price estimation by middlemen is easier and more precise. Estimating prices for vegetables grown under polyculture planting patterns is more troublesome for middlemen, and the price is lower and therefore less attractive to farmers. The production of each type of plant is also unclear because it is difficult for middlemen and farmers to predict multiple outcomes. Furthermore, middlemen tend to make flat price estimates for all types of vegetables on the same land. Polyculture farming was carried out by some respondents to avoid continuous attacks by plant pests and by some farmers with narrow strips of land.

In the *ijon* market based on mutual reciprocity, harvest payments were made in cash or in installments. Most vegetable sales transactions (81%) used cash. Only a few (19%) respondents were willing to sell vegetables and be paid in installments. Cash is safer for respondents because middlemen pay for the vegetable yield a few days before harvest. Installments are burdensome for respondents because middlemen only agree to give >50% of the total estimated price at harvest. The rest of the payments are paid in installments after the vegetables are sold to various market segments. Being paid in installments is particularly common during the main harvest season; they are made immediately by the middlemen to maintain a reciprocal relationship based on mutualism with the vegetable farmers. Table 1 summarizes the cropping patterns and vegetables marketed by respondents under cash and installment payment options.

Table 1. Diversity of vegetable cropping patterns observed on the *ijon* market

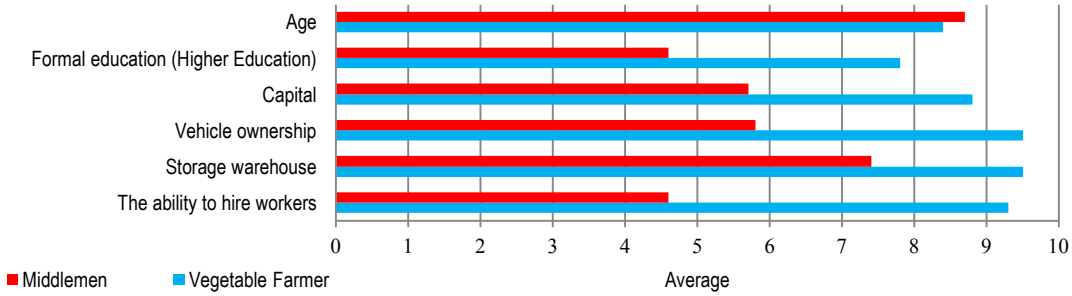
Commodities	Planting pattern					Ijon motived marketing	
	Monoculture	Policulture				Cash	Credit
		Inter Cropping	Mixed Cropping	Multiple Cropping	Relay Cropping		
Cabbage	90,91	2,27	1,14	4,55	1,14	87,50	12,50
Leek	70,45	6,81	4,55	9,09	9,09	70,45	29,55
Celery	79,55	4,55	1,14	7,95	6,81	93,18	6,82
Pakcoy	88,56	3,41	1,14	4,55	2,27	78,41	21,59
Caisim	87,50	2,27	2,27	4,55	3,41	64,77	35,23
Lettuce	73,86	7,95	3,41	9,09	5,68	93,18	6,82
Putren Corn	68,18	11,36	5,68	12,50	7,95	79,54	20,46
Mean	79,86	5,53	2,76	7,47	5,19	81,00	19,00

Diversity of vegetable cropping patterns with *ijon* patterned marketing techniques. The mutual reciprocity of the *ijon* markets begins with an introduction between vegetable farmers and middlemen. The middlemen come from the local village or neighboring village in Karangreja District. The number of middlemen has increased over time. Farmers face offers from an average of 5 middlemen in each season before the vegetable harvest.

The middlemen have higher quality of self characteristics than farmers. The average middlemen are in the productive age, with high education level, adequate business capital, have their own pick-up vehicles, and they are able to hire workers to harvest and transport crops. Middlemen also have a vegetable storage warehouse before being sold to the market or distributor middlemen. Farmers have characteristics in common with middlemen in the same age indicators are still productive. The amount of venture capital for middlemen is higher than for vegetable

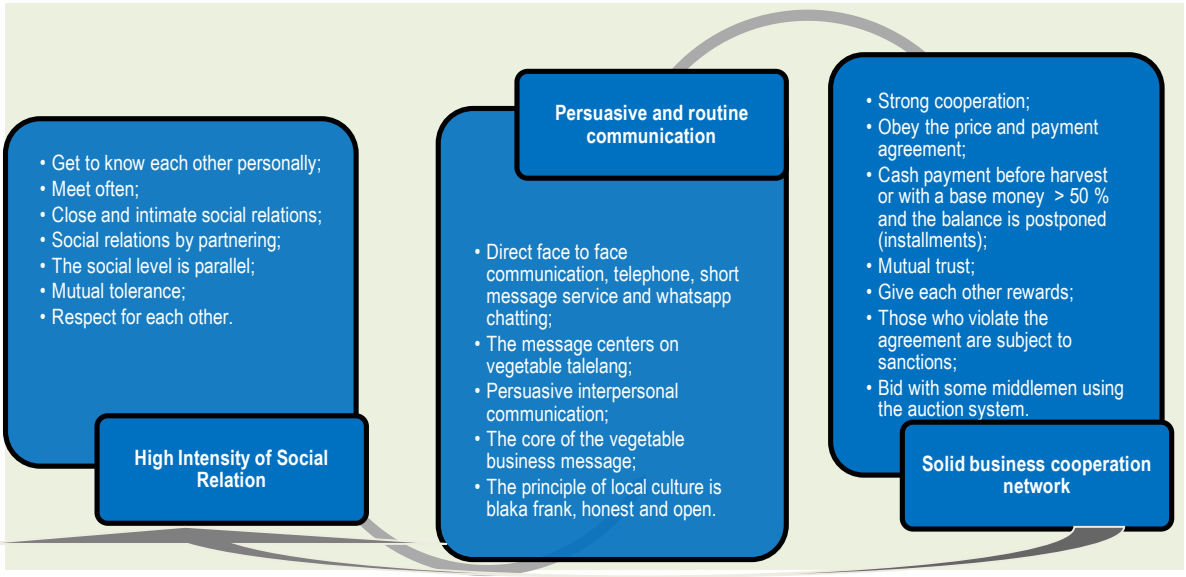
farmers. The diversity of characteristics of middlemen and vegetable growers who have a reciprocal relationship between mutualism in the vegetable *ijon* market by auction in rural Karangreja is detailed in Figure 2.

Figure 2. Individual characteristics of vegetable farmers and middlemen



The main obligation of farmers is to produce healthy vegetables in their own gardens in a location that is clear of other claims. Vegetable farmers are obliged to provide their harvesting permits to middlemen. The middlemen are obliged to pay for the vegetables according to the price agreed upon with the farmer. The prices offered by vegetable appraisers are above the local market price. The bond market based on mutual reciprocity is built on three strong elements: high interaction intensity, routine persuasive communication, and a solid business-motivated social cooperation network between vegetable farmers and middlemen (Figure 3).

Figure 3. Mutualism Reciprocity Strengthening Elements in *Ijon* Vegetables Market



For farmers, the greatest benefit of the cash *ijon* system is that they receive market guarantees and reasonable prices. They also save on labor costs at harvest, storage costs, and transportation costs typically paid to the agribusiness market. The system also minimizes the risk of crop failure, strengthens social relations, and generates production security.

Agreements to be paid in installments also provides significant benefits to vegetable farmers, although it does not tend to strengthen social relations. If a payment is delayed, middlemen may avoid meeting with a farmer, thus straining the relationship. However, it is still advantages compared to a conventional market, where farmers must incur additional costs, for example, paying wages to laborers who harvest their crops and renting transport to move the vegetables to market. Figure 4 summarizes the socioeconomic benefits of the three different markets considered here.

Vegetable farmers get a more reasonable price when marketing vegetables using the cash and installment *ijon* system. Farmers receive multiplied profits to reach an average of 303% when marketing products with cash *ijon* and 185% with *ijon* credit systems. The profitability of marketing vegetables with delayed payments or in installments is lower than cash *ijon* but is still higher when compared to conventional independent marketing. Variations in profits obtained by farmers with three vegetable marketing techniques are detailed in Figure 5.

Figure 4. Diverse socio-economic benefits of three vegetable marketing techniques

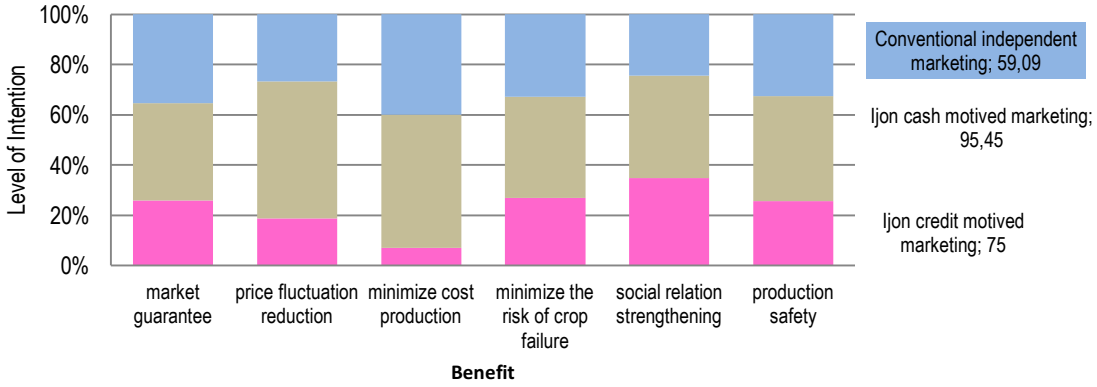
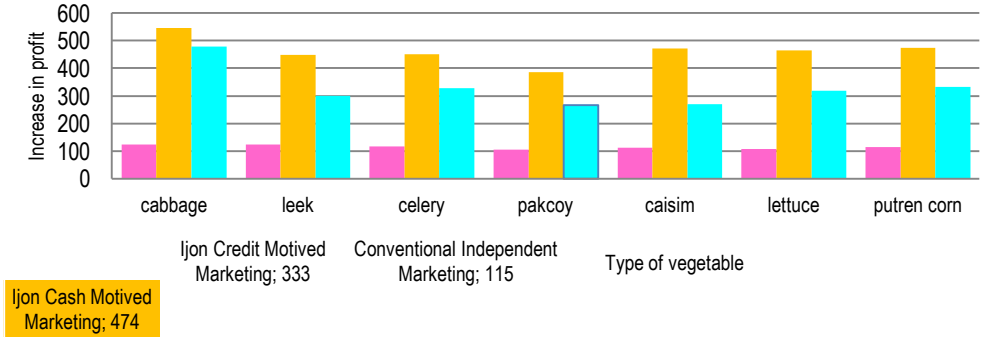
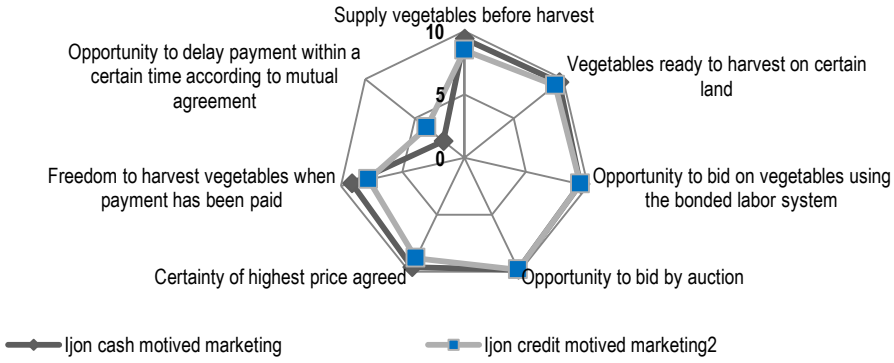


Figure 5. The differences in the benefits of three variations of vegetable marketing techniques



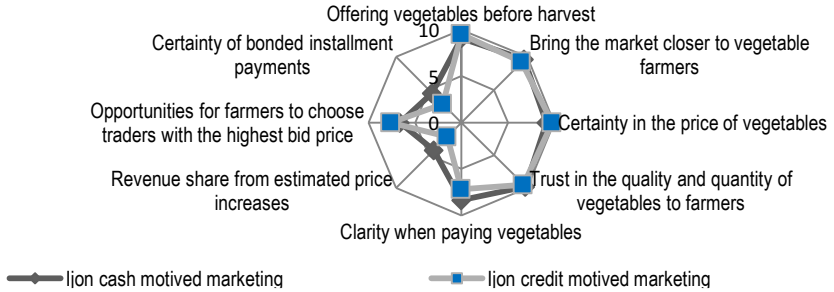
The opportunity to pay cash before harvest is that there is a certainty of the transaction. Farmers are least willing when giving an opportunity to postpone payments to middlemen. Requests from middlemen to pay in installments a heavy payment for farmers, even though it is still implemented. All gifts from vegetable farmers are motivated by social economy to gain bargaining power, profits, connections, reasonable prices, direct market guarantees and business relationships. The level of willingness of vegetable farmers to provide various forms of opportunity to middlemen is listed in Figure 6.

Figure 6. Level of willingness and various forms of giving farmers to middlemen



All of the gifts from vegetable farmers received a balanced response from the middlemen. Middlemen are always friendly, close to family and maintain mutual reciprocal relationships with vegetable farmers. The dominant form of giving from middlemen is accurate and fast market information. Middlemen as *pengijon* try to bring the market closer to farmers in a way known as snowball marketing techniques. Middlemen find it most difficult to share profits with vegetable farmers when prices rise at the level of distributor middlemen or various other market segments. Another gift that is not given up by the middlemen is to pay the installments immediately. The level of willingness and variety of forms of giving from middlemen to vegetable farmers is observed in Figure 7.

Figure 7. The degree of willingness and variety of forms of giving from middlemen to vegetable farmers



3. Discussion

The relationship between mutualism and reciprocity between respondent farmers and middlemen is based on compliance with shared rights and obligations. Respondents have the right to yield security, market guarantees, price eligibility, certainty of income, and profits. The rights of middlemen include harvesting vegetables, selling them at a certain price to the distributors or other market segments, and certainty of income and profits. The rights of the parties are balanced because they are mutually beneficial. From the beginning of the transaction in the *ijon* market, each of the rights and obligations of the vegetable growers and the middlemen is clear and mutually agreed upon. Respondents ownership rights were different from those of other farmers who used *ijon* markets in other villages. *Ijon* markets in Karangreja are indeed unique and distinctive because they are different from the others, price exploitation due to the dominance of bargaining middlemen who are antagonistic to vegetable farmers does not occur. An increasing number of middlemen have led to increasingly competitive efforts to gain the trust of vegetable farmers so as to be chosen as a *pengijon*.

Mutual reciprocity between vegetable farmers and middlemen in the *Ijon* market with an auction system formed from a symmetrical and non-permanent cooperation network. The lasting mutual reciprocity in the vegetable *ijon*market is more profit oriented. The intensity and frequency of negotiations between farmers and vegetable middlemen reach it speak before harvest time. The mutual reciprocity in the vegetable bonded market through an auction in Karangreja villages proves that the bargaining power of farmers has emerged since resisting the dominance of the antagonist role of the gathering middlemen. The reality of the vegetable *ijon* market shows that the dominance of the middlemen can be toppled by the bargaining power of farmers who act as equal partners who have acknowledge their autonomous rights over vegetables.

The relationship between the vegetable farmer and the middlemen is based on the principle of mutual reciprocity that gives and needs to each other. Various forms of gifts from farmers to middlemen are related to the smooth functioning of the vegetable *ijon* market. Farmers are willing to provide opportunities for middlemen to participate in bidding on vegetables that have not been harvested using the auction system. The middlemen who act as *pengijon* collectors can be a subscription or those recently known by vegetable farmers. Farmers also prepare vegetables that are healthy and ready for harvest to be auctioned at the highest price. The right quality products have the potential to increase profits (Dumasari *et al.* 2019). Loyalty factors and discounts are determinants of good relations between market participants (Alimpic *et al.* 2020).

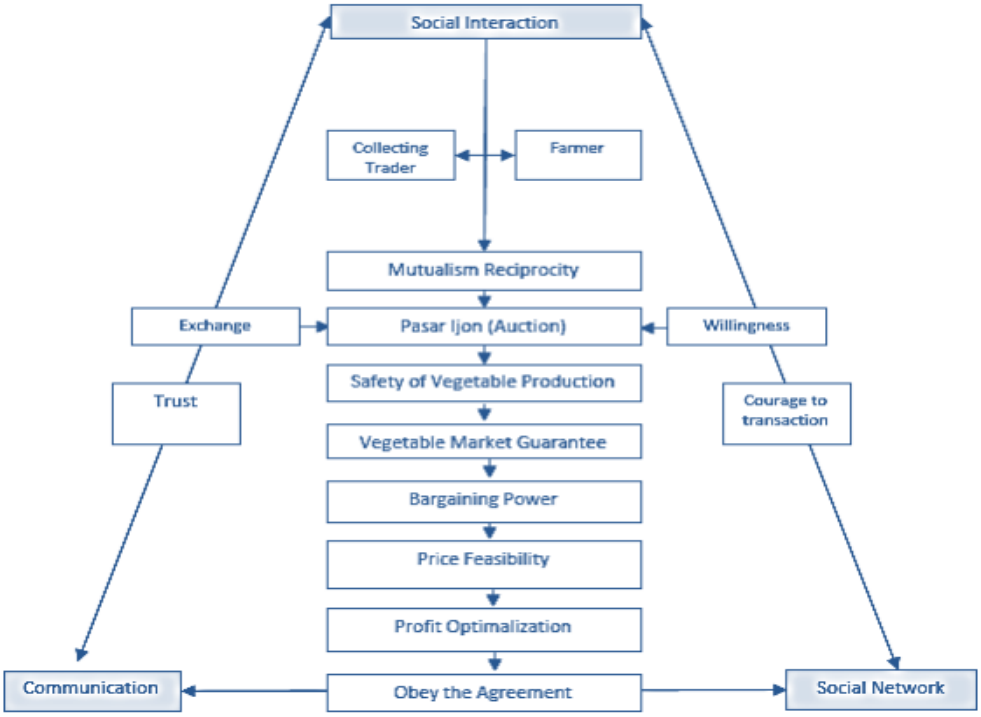
The role of middlemen is no longer an adverse market actor and weakens the bargaining position of farmers in rural Indonesia (Arsyad *et al.* 2018). The existence of *ijon* markets in rural Karangreja has reconstructed the concept of middlemen or intermediaries as market channel players and partners who play an antagonistic role in distributing production from producers to consumers (Kotler 1988, Gadde and Snehota 2001). The limitation of the concept of middlemen as an economic institution and social network structure has locked farmers in marketing their crops through personalized relationships that harm income (Monieson 2001). Development of the concept of middlemen happened due to the reciprocal vegetable market based on mutualism reciprocity which refer the middlemen no longer only as a channel or partner that connects producers with markets and consumers but also plays a role as market connector, price information facilitator and profit contributor.

Ijon markets through auction can strengthen farmers' bargaining power. Utilization of bonded labor markets contributes to the empowerment of vegetable farmers in rural Karangreja. The existence of the bonded market through auction is a form of vegetable economic creative activity. The development of social capital transmission through the sale of agricultural products (rubber) through the auction system is beneficial for the welfare of farmers in Rao District, Pasaman Regency, West Sumatra Province, Indonesia (Badarudin *et al*. 2006). Mutual trust, networks of collaboration and collective values as elements of social capital need to be strengthened through the

use of local institutions. Effective social capital functions as a tool to control farmers' actions to avoid adverse deviations (Hartoyo *et al.* 2013).

Every creative economic activity with an institutionalized value in the social structure of the community has the potential to be a driving force for empowerment (Santosa and Suyanto 2018, Dumasari *et al*. 2019, Dumasari *et al.* 2020). The mechanism design for strengthening the bargaining position of vegetable farmers in the conventional *ijon* market based on mutual reciprocity by means of auction in rural Karangreja is shown in Figure 8.

Figure 8. The strengthening of vegetable farmers' bargaining power mechanism in conventional *Ijon* market



Conclusion

The concept underlying the *ijon* market was originally known as an agricultural product sale transaction conducted before harvest. Middlemen bind farmers by providing them with basic funds from the start of planting. Middlemen take large profits from the bonded market by buying crops at low prices. Farmers have a weak bargaining position in the bonded market because they feel indebted to middlemen, who are always ready to provide loans as needed. This results in weak bargaining power for farmers. The concept of bonded markets, which initially viewed as seen as having detrimental effects on farmers, in fact produces a different reality for vegetable farmers in Karangreja village. The farmers are able to exercise bargaining power in the vegetable bonded market based on mutual reciprocity and using the auction system. A periodic increase in the number of middlemen results in greater competitive power as they strive to gain the trust of farmers and to be chosen as a party to the *ijon* process.

The vegetable bondage market based on mutual reciprocity is formed from the management of elements of social interaction with high intensity accompanied by persuasive communication routinely and maintaining a solid business cooperation network between farmers and middlemen. Farmers get socio-economic benefits from the bonded market, both in cash and in installments. Socio-economic benefits of the cash *ijon* market are higher than that of the *ijon* installment market and the conventional market. Farmers who sell vegetables in the garden with the *ijon* cash market gain socio-economic benefits in the form of market guarantees, reduction in price fluctuations, saving production costs, minimizing the risk of crop failure, strengthening social relations and production security.

Farmers get a higher profit if the vegetable transaction uses the bonded market than the conventional market. The increase in farmers' profits reached 303 percent from the cash *ijon* market and 185 percent from the green installment market. The increase in profits encourages vegetable farmers to maintain the existence of the bonded market with an auction system. The bargaining power of farmers regulates the mechanism for selecting vegetable prices, which is the highest.

Bonded market management cannot be separated from the willingness of vegetable farmers and middlemen to carry out a balanced exchange. Farmers are most unwilling when giving middlemen the opportunity to postpone vegetable payments within a certain time period. Middlemen are also hardest when faced with the event of sharing

profits with farmers when the price of vegetables rises. The obligation to pay the installments until they are paid off is among the things that are less willing for middlemen.

The bargaining power of farmers in the bondage market based on mutualism reciprocity with the auction system can be developed by maintaining high intensity of social interaction, routine persuasive communication and social networks for solid business cooperation. The mechanism design is in the form of a dynamic process that is cyclical and flexible. The commitment of the vegetable farmer and the middlemen is important to maintain the elements of balanced exchange, trust, willingness to share, dare to deal and adhere to an agreement so that the bonded market will remain as a profitable transaction for both.

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The Role of Credit Weapon and Income/Wealth Inequality: A Sri Lankan Case Study

Candauda Arachchige SALIYA
Department of Banking and Finance, School of Economics and Finance
CBHTS Fiji National University, Fiji
ca.saliya@fnu.ac.fjsaliya.ca@gmail.com

Keith HOOPER
Department of Accounting
UNITEC, Auckland, New Zealand
khooper@unitec.ac.nzKeith.c.hoopernz@gmail.com

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Abstract:

This research paper shows that credit mechanisms sometimes thrive towards strengthening socio-economic powerbase of the capitalist class and form a mutually reinforcing function, which, from a Marxian point of view, could intensify concentration of wealth aggravating income/wealth inequality in society.

We applied a critical ethnographical approach using the case study research design. Empirical data was extracted iteratively from participants and presented as thick-descriptive case studies. We argue that certain credit decisions enhance the socio-economic power base of influential individuals, making them richer and powerful while ordinary credit applicants are discriminated against by strict application of credit evaluation rules. These observations bolster the Marxian claim that credit systems work as an exploitation mechanism towards concentration of wealth. These findings provide insight for policy formulators to design more productive financial capital mobility systems with the help of state-intervention to minimize credit-oriented exploitation and growing inequality.

Keywords: capitalism; causal mechanism; corruption; discrimination; entrepreneurship; inequality; Sri Lanka.

JEL Classification: G21; G41; P1.

Introduction

Oxfam International Report (2019) revealed that world inequality is greater than was feared and that eight individuals own as much as half of the people on the planet. The wealth concentration is so intense that these eight men possess the same wealth as 3.6 billion people, and this figure is down from 62 individuals a year ago, and from 388 individuals in 2010 (Oxfam 2016). The reasons given for progressing inequality and privileging of wealth are varied and include tax avoidance, political influence, and this paper would add discriminatory lending practices. Credit systems play a significant role in providing the necessary financial capital for enterprises to start, to grow and to achieve economies of scale (Morselli 2019, De Brunhoff 2003).

Many researchers have discussed on the links between poverty, inequality, sustainability, and financial capital and exposed existence of disproportionate access to financial capital and its role in reinforcing discrimination (for example, Wahyuningsih *et al.* 2020, Amaluddin 2019, Thao *et al.* 2019, Aracil 2019, Anthony and Roy 2017, Haber 2004, Saliya 2009, 2019a, Saliya and Jayasinghe 2016a, 2016b, Saliya and Yahanpath 2016, Zhuang *et al.* 2009). These researchers argue that access to loan capital is a privilege mainly to the rich and well connected groups in the society and therefore, less affluent SMEs are at disadvantaged. The Governor of the Bank of England (1999) also asserts that there is a problem of obtaining start-up or early-stage finance for poor entrepreneurs. As a result, this phenomenon could contribute towards widening the gap between rich and poor as argued in this paper.

Concentration of capital denotes reproduction of capital on an enlarged scale, whereas centralization merely supplements the work of accumulation (Marx 1933). Credit or loan-capital provides huge potential power for concentrating capital. However, the mechanics of the credit system – how and why it facilitates concentration of capital – has not been studied sufficiently from Marxist exploitation perspective. Nor have researchers, who often use a Marxian theoretical framework in their inquiries and advocate emancipation from capitalism, paid adequate

attention to the role played by credit in concentrating capital. Therefore, this paper attempts to provide insight towards filling this knowledge-gap; the research is from a Sri Lankan perspective.

1. Literature Review

Powell (2008) suggests that encouraging small-business entrepreneurs is the best way to achieve and maintain general affluence. However, many researchers argue that there are not sufficient finance providers for small and medium-sized enterprises (SMEs) and banks are blamed for their dominant role in providing finance to enterprises and not providing adequate finance to small or budding enterprises to start and grow (see Rachid 2019, Stevenson and Pond 2016, Whincop 2001). Quoting from several researchers, Cavalluzzo *et al* (2002, 641) elaborated that owners of small businesses from some demographic groups may have less access to institutional financing. This theory suggests that some demographic groups are discriminated against in their efforts to gain access to loan capital (credit) because they lack certain qualities and factors that are the prerequisites for obtaining credit.

DeBrunhoff (2003) insists that credit systems are also social mechanisms that are structured for the continuous accumulation of capital to its owners. Marx (1933) had already identified this credit system as an emerging new power in Volume II of Capital. Lack of access to credit, as a means of financial capital, especially in the Third World, acts as a road-block for development of SMEs, which contribute significantly to GDP and employment generation in any country. Borrowing is the major source of financial capital for many enterprises, small or large, and it is argued that poorer credit-seekers are neglected. This is a social injustice and Marxism provides a good framework to analyze such social systems and to expose the root-causes of such injustices. Therefore, many critical-finance researchers use such Marxist theories as alienation, exploitation, accumulation, modes of production and hegemonic discourses in most of their inquiries. According to Marx (1933), banks can create credit money without limit, leading to accumulation and centralization of capital (… capital creates capital, that money breeds money, Chapter XXII of Capital Volume II). This process intensifies enhancing the social power of the capitalist class to suppress the working class. Accessibility to consumer credit is higher in the developed world than in developing countries through means such as credit cards, hire-purchase schemes and even for 'capital nature' credits such as mortgages and leases for motor vehicles. However, there is a growing body of evidence attesting that access to enterprising finance is problematic, especially to the poor segments of a society, irrespective of the level of development of a country (see Bank of England 1999). According to the Manifesto of the Communist Party, the capitalist class constructs values and social relationships in their own interests using the means of social production, which they own (Marx and Engels 1848).

More relevant to this research, Marxian interpretations inspire empirical and historical research and Marxism has been used extensively to explain inequality or uneven development and, therefore, has evolved through different perspectives, especially addressing its weak points, such as bi-class society and the inevitable victory of the proletariat. Therefore, the privileged position of Marxism as a mode of analysis and interpretation of the capitalist system and its consequences became dominant and legitimate (Jameson 1984).

1.1. Marxism and Critical-Finance Researchers

Marxism has earned vast acceptance as one of the grand theories which tell the story of social history (George 2003), and Tinker (1999) asserts that: '… Marxist value theory provides a rich vein of research analysis and practical engagements …'(p. 643).

Prominent scholars argue that Marxism provides strong lenses for critical accounting scholars. For example, Tinker (1999) uses Volume I of Marx's Capital to underpin and guide critical accounting; Dominelli and Hoogvelt (1996) emphasize that identifying the problem is a major intellectual responsibility and exposing the roots of exploitation is a precondition for liberation; Dillard and Tinker (1996) insist that bringing structural contradictions into consciousness and to develop them to the highest level of instability is one purpose of critical research. Exposing the roots of exploitation is a precondition for emancipation, Neimark (1990) refers to Marx's notation that the role of philosophy is not to describe the world but to change it and suggests that: '… the aspirations of critical accountants should be no less…' (p.111). According to Therborn (1996), Marxism became the theoretical perspective for a generation of radicals who found it the best way to understand social and economic injustice (Tinker 1999).

This reasoning process is based on the Marxist concept of alienation and provides a good lens to investigate techniques and means of protecting and/or strengthening one group of people at the cost of another group in a society. Based on the Marxian theory of alienation, James (2008) argues that, in the contemporary context, capitalism promotes separation of the worker from the whole environment and everything now popularly encompassed by the term 'commodification of every-day life' (Dominelli and Hoogvelt 1996, Tinker 1999).

In a study on Third World enterprises, Alawattage and Wickramasinghe (2008) rely on a theoretical framework drawn from Marxist hegemonic discourses to explain the emergence and sustenance of political hegemony as the dominant mode of control in these enterprises. Research on a microfinance scheme in Sri Lanka revealed that post-microfinance incomes have not increased as claimed by its promoters (Shaw 2004). This claim concurs with Marx's interpretation of credit with regard to lenders towards centralizing capital. This type of credit works against the borrower because terms and conditions are exploitive.

1.2. Money Power and Credit Mechanism

Marx ironically describes the power of money thus: The stronger the power of my money, the stronger am I. The properties of money are my, the possessor's, properties and essential powers. Therefore, what I am and what I can do is by no means determined by my individuality. I am ugly, but I can buy the most beautiful woman. Which means to say that I am not ugly, for the effect of ugliness, its repelling power, is destroyed by money. As an individual, I am lame, but money procures me twenty-four legs. Consequently, I am not lame. I am a wicked, dishonest, unscrupulous and stupid individual, but money is respected, and so also its owners. Money is the highest good, and consequently its owner is also good (Marx 1975, 377).

Harvey (2006) argues that Marx's theory of accumulation has for too long been ignored and, using locational analysis, he tries to establish the missing link between the theory of accumulation and the theory of imperialism: the final stage of capitalism. Similar to Harvey's claim, Hein (2002) points out that Marx's discussions of the centralization of capital do not adequately deal with interest. Marx (1972) distinguishes commercial credit from bank credit in Volume III of Capital and assumes that the credit supply of commercial banks can create credit without limits and is not confined to private savings or to internal reallocation of idle funds (see Hein 2002, Lapavitsas 2000). Marx (1972) identifies credit supply as loanable capital that is proliferating but its link to enhancing power of and access to credit (repeatedly) by the capitalist class, in our estimation, has not been discussed explicitly and sufficiently. Therefore, this paper demonstrates, inter alia, how Marx's theories of bank credit and capital accumulation are co-integrated, enhancing the power of the capitalist class while suppressing the working class.

According to Marxian analysis, the distribution of profits between venture capitalists and finance providers is problematic but the accumulation of capital needs both of them (Lapavitsas 2003). Consequently, the banking system has become a crucial instrument that creates a powerful social mechanism for the centralization of capital (De Brunhoff 2003) through exploitation of public funds. Critical analysis shows that pressure from the owners of finance on the management of production is very common. The most common example of this is the a, ointment of bank officers to the boards of directors of heavily indebted customers. According to De Brunhoff (2003):

These directors not only have high salaries, but also obtain important share portfolios by means of stock options or in other ways. And they agree to change the organization of industrial production in order to maximize both profits and financial rewards. This is the objective basis for a coalition of financiers and top industrial directors (p.147). It is common that bank officers sit on the boards of their highly indebted clients in order to look after the banks' interest. Though there is no compelling evidence that they are paid for that service, they often enjoy various other benefits such as fully sponsored holidays, free holiday homes, job opportunities for their friends and relatives and large hampers in the festival seasons. Marx (1978) says, the loanable money capital is no longer passive but active, usurious and proliferating capital. In societies where commodity exchange is widespread, the economic power afforded by money naturally leads to social power.

Marx affirms that the credit system is a 'formidable weapon in the competitive struggle; and in the end it manifests itself as a gigantic social mechanism for the centralization of capital '(1933, 691) which, in turn, results in the enhancement of the social powerbase of the rich. According to this theory of accumulation, bankers may naturally prefer to lend to rich people, enabling them to compete more effectively while eliminating new entrants to the market. In Chapter XXV of Capital - Volume III, Marx asserts that the credit system also acts as a middle-man, facilitating the way for banks to become the general Officers in Charge of money-capital. He argues that 'the bankers confront the industrial capitalists and commercial capitalists as representatives of all money-lenders' (1972, 402). On the other hand, In Chapter XXVII of Capital - Volume III, Marx elaborates on the characteristics of the credit system and argues that it enriches exploitation while intensifying accumulation by collaboration between industrial capitalists and bank capitalists as implied in Chapter XXIII of Capital - Volume II.

2. Methodology

A case study research strategy is used here to explore how one private commercial bank provides financial capital to enterprises in Sri Lanka. In this research, data were extracted iteratively from participants (who had been in the banking system for more than 10 years), and simultaneously, documents such as circulars, management reports,

directives issued by the regulatory authorities, annual reports, rating reports, research reports, and newspaper and magazine articles were mined for additional information. Because there were some restrictions on access to data in banks, a retrospective study of several life experiences was also carried out using multiple techniques to make the participants comfortable in this process.

The selection of the two cases discussed in this research is purposively deliberate rather than random (Silverman 2000) because both cases were expected to illustrate a comparative analysis of double standards a, lied in credit evaluation. The case-stories have been constructed as though staging a play, using plot and characters, so that a drama-like description becomes more plausible and interesting to read (Myers 2009). However, maintaining anonymity makes the mechanics of composing the case difficult, and some important background information had to be eliminated (Yin 2003). A Marxian theoretical framework was used to analyze and interpret the case-stories (Saliya 2017). Since one of the objectives of this research is to expose an inequitable and unjust situation, a measure of success or credibility will be how useful the research outcome is in proposing a remedy (O'Leary 2004). Description and justification of the research methods used. Normally, the methods will be selected from known and proven examples. In special cases the development of a method may be a key part of the research, but then this will have been described in Introduction section and reviewed in first one.

3. Case Studies

3.1. Background

There is a popular credit system in Sri Lanka known as Seettu, the pooling of money by a group of people, each of whom in turn enjoys the total amount of money; the order of turn-taking is determined by a lottery system. If anyone is in urgent need of money, he or she can demand a turn offering a discount, which is distributed in proportion to the contribution to the pool. It is similar to a zero-coupon bond where the interest is paid up front.

The perception of the people in Sri Lanka is that informal approaches through connections are more effective to be successful in any venture. Even though only some of the banks are private, the belief that to obtain a credit facility one must have a personal connection remains strong. For members of parliament to issue letters requesting senior officers of various institutions to accommodate their (the politicians') supporters is very common in Sri Lanka.

More than 50 percent of banking business is controlled by state-owned banks; however, powerless poorer groups still prefer private banks for their credit needs as they believe private banks are more customer friendly because the Branch Officers of private banks normally enjoy higher credit approval authority limits than those of state-owned banks. However, patronage towards powerful people is common for all banks, irrespective of their ownership.

The poor in the developed world are not denied consumer credit facilities (credit cards, hire purchase for furniture and appliances and leases for automobiles and so on) if they have a regular income, so long as their earnings are adequate to service those tiny loans. But consumer credit is a luxury to the majority in low-income countries like Sri Lanka. This paper tackles the issue of access to credit for enterprise development. However, the major difference between the credit cultures of low-income and high-income countries is observed as to the nature of patronage they advocate. 'Traditionalism', now termed 'patronage', is common in low-income countries, while patronage (UK) and clientelism (US) are, in a business sense, merely dyadic relationships. Yet there is evidence that poor neighborhoods are neglected for enterprise credit, even in developed countries.

Patronage has been defined as a cultural trait and as a dyadic relationship, a reciprocating mechanism, in which two individuals agree to exchange favors and come to each other's aid when they are in need (Szaftel 2000). In today's democratic environment this 'help' is primarily economic and not considered to be corruption (Roniger 2004). Compared to the developed world, patronage has become a normal ingredient of social systems in the low-income Third World countries, especially in the Indian subcontinent. Clientelism and patronage denote the same phenomenon, with the term patronage being used more commonly in Britain while clientelism is used more in the US (Jayasundara-Smits 2010). It is also observed that patronage, as a form of accumulation, exploitation, allocation of resources is a strong weapon of social control and domination. Jayasundara-Smits (2010,7) argues that one of the reasons for this continued trend in renewed patronage links is the constant dependence of various social forces on traditional benefaction bonds; also, she points out that: '… these relationships have not had always contributed to significant improvements in the overall quality of life of the majority that continued to live under unfavourable structural and cultural conditions in the periphery …' As a result, such traditionally developed patronages promote the socio-economic power base of each other and establish their dominance over the lower classes in the society.

Jayasundara-Smits (2010) also reveals that almost all the respondents in her field research confessed that the majority of the society is helpless in everyday politics and asserts that this dependency syndrome is created by patronage. However, insufficient income, higher risk, lack of collateral and providing guarantors do also play

significant roles in credit approval processes according to the credit policy manuals of banks. Jayasundara-Smits says that, during pre-colonial times, in the feudal era under 'kingship', the patronage relations were vertical and 'the contemporary institutionalized form of political clientelism in Sri Lanka is a reincarnation of the traditional patron–client relations of the past …' (2010, 30). During the colonial period, horizontal patronage relationships emerged and these were further strengthened in the post-colonial period. These horizontal patronage ties further enhanced the powers of the bourgeoisie class and the vertical front, the peripheral peasantry and other lower classes were pushed into more hardship in a structurally imbalanced economy.

The CSB Group is owned by a well-known business tycoon, Mr. H. CSB bank is the financial arm of the CSB group. The CSB bank was desperate to canvass new clients as it was running with excess liquidity. Mr. H, the President of the CSB bank, initiated a novel marketing programme to attract his fellow high-class businesspersons and started to become actively involved in lending. The CSB bank President Mr. H was very popular among his friends as a friend in need. With little knowledge of banking regulations such as capital adequacy, single-borrower limits and liquidity requirements, President H. of CSB bank commonly ignored the essential criteria of credit evaluation and acted with an attitude of 'catch me if you can' towards regulators.

3.2. Case Study

Case Study I: Exporting Tea Business

Exporting tea under the brand name, Ceylon Tea, is one of the main sources of foreign exchange earner for Sri Lanka. Tea exports accounted for 2 per cent of GDP and contributed over US$1.5 billion in 2013 to the economy of Sri Lanka. The total numbers of direct and indirect workers exceeded 1 million people. The highest level of tea produced was reported in 2013 as 340 million kg, while production in 2014 was reduced to 338 million kg (Business Times 2015).

Recently the tea industry started facing problems for a combination of reasons and tea prices have collapsed in the order of over LKR100 per kg (Sri Lankan rupees) over the past year while the national average price of tea in 2015 was at LKR404 per kg versus LKR 510 per kg in 2014. The most significant contributing factors for this situation have been identified as falling oil prices leading to less demand in West Asia; conflict both in this region and Russia; unsold stocks; shipping and trading complications due to the war; and buyers taking more than seven months to settle payments (Rajadurai 2015).

Roshan Rajadurai, the Chairman of the Plantation Association announced that the 'situation is now [further] aggravated leading to further accumulation of losses with the average tea prices declining sharply at the Colombo Tea Auction within the first two months of 2015. Prices have slumped below corresponding levels in 2014 (Business Times 2015, para 2), buckling under an avalanche of debt of LKR4 billion last year for the 20 regional plantation companies (RPCs) with losses estimated at LKR6 billion (Rajadurai 2015).

Tea workers' wages were more than doubled a few months ago following union negotiations. However, Mr. Peryasami Muthulingam, director of the Tea Plantation Workers' Museum reports that most companies are making losses (Muthulingam 2016). Due to this high level of losses as well as debts, banks were reluctant to extend further credit to tea manufacturing companies.

The Mandes estate is a tea estate in the middle of the country (low grown) in Sri Lanka, employing over 15,000 workers. Mr Mandes (Mr. M.) was a golf-playing friend of the CSB bank, President H., and they, together with other affluent business people are members of a prestigious Golf Club. They all belong to the elite circle in the social network of Colombo. Mr. M. was the owner of The Mandes Tea Estate (which was affected badly by severe drought coupled with increased wages, increased power and fertilizer costs).

Mr. M.'s main problem was that he was not getting adequate green leaf to allow the factories to work at least at break-even capacity. One fine golf-playing day Mr. M. casually discussed his problem with the CSB President and was able to win empathy for the desperate situation of his business and the devastating situation of the workers. He convinced the President that a slight rainfall would resolve all his liquidity problems. The following day the CSB President called for a meeting with the Deputy General Manager Credit (the DGM) and advised her to look into the situation. By this time, The Mandes group was indebted to many banks and had pledged all his business assets as collateral. Therefore, credit officers of the CSB Bank had already rejected the formal credit application of Mr. M., based on an official credit-default investigation report and the situation of the tea industry.

The total liabilities of the Mandes Group to banks were more than US$10 million. Due to substantial overdue-interest, the banks had classified The Mandes Group as a defaulter and had reported this to the central monitoring authority for defaulters. Yet, President H. assessed Mr. M.'s claim as a business development point of view and a, roved US$2 million at once.

The newspapers reported that the CSB Bank was a truly helpful bank. President H. was ha, y and the board members were convinced of two things; first that the President had rescued a business with 15,000 workers, and he was helping the tea industry which was, at one time, known as the spinal cord of the Sri Lankan economy.

Eventually, Mr. M. defaulted and the regulators directed the CSB Bank to make full provision for many such unsecured loans, including Mr. M.'s (who had not serviced the loan for three months), together with the unearned interest which had accumulated in the interests-in-suspense account. The CSB Bank was in trouble, profits slashed and their liquidity position was not up to the statutorily required level. The share price plummeted almost by 50 per cent and small shareholders suffered. Resulting negative publicity could not be stopped and the bank nearly faced a 'run situation' (withdrawal of deposits prematurely due to loss of public confidence). Then the Central Bank of Sri Lanka quickly intervened, removed the whole board of directors including the President H., and handed over the management of the CSB bank to the B bank, the country's largest bank.

Case Study II: The Taxi Business

Mr. Sarana (S.) was a rural peasant and both his parents belong to the Kumbal caste, mean 'Clay-Pot-Makers' (treated as one of the lowest castes in the caste system in Sri Lanka). Many regions have separate areas called Kumbal Goda (Clay workers' village) in an isolated corner of the region. They make clay items during the week and bring them to the weekend fairs in towns to sell. In later times, they have realized the value of education and now there are professionals such as medical doctors that belong to this caste. Mr. S. did have education up to high-school level but was helping his parents make clay items and was without proper employment. He decided to run a Tri-Show (aka Three-Wheeler; aka Tuk-Tuk in India) which is the most popular private transport mode in every part of Sri Lanka, mainly due to their low fares. The Tri-Show can carry only three passengers excluding the driver. The price of such a vehicle was around LKR300,000 ($3000). He a, roached almost all the banks to lease a Three-Wheeler but without success, mainly because banks wanted additional securities and guarantors.

Due to the fact that he was significantly alienated because of his social status, it was impossible for him to find guarantors acceptable to the banks. The bank officers did not even care to prepare realistic cash flow statements for him to assess the repayment capacity of his taxi project. Finally, he had to confine himself to his traditional profession, clay-work, and start to accumulate his wealth slowly.

His ambition was so strong however, and he decided to try another avenue by acquiring a different set of skills. He attended the regional technical college to follow motor mechanics course, specializing in Three Wheelers and motorcycles and completed it with much enthusiasm. He was contemplating setting up a mechanical workshop for Three Wheelers and motorcycles targeting the lower-middle class. Mr. S. again a, roached banks to get the initial capital to set up a workshop with minimum equipment and the key money for suitable premises in the town. Although he is a talented motor mechanic, because of his caste, the formal credit application of a mere LKR100,000 ($1000) was rejected for the same reasons; no guarantors, no adequate equity and no tangible assets to offer as collateral.

Then he started a very small workshop specializing in Tri-Shows and motorcycles in his own home garden, almost 2 km away from a small town. The cost of his services was very reasonable because he did not have overheads. Therefore, he became very popular among the target clientele, who were also from the poorer castes in the town. Though his business boomed, he lacked the accounting expertise to prove evidence of his cash flows and still lacked any accommodation from banks. Thus, he could not expand his business and bring his workshop into the city where he could enjoy a wider clientele market. Arguably, if he were from an 'acceptable' caste, his story would have been a different one and he may have had a leading workshop in the town. It is argued that he was deprived of this mainly due to his outcast status, social exclusion and alienation.

4. Discussion

The credit decision in Case I provides evidence of exploitative use of depositors' funds in the CSB Bank for the purpose of capital accumulation of a fellow capitalist. It also shows the abuse of regulatory directions and ignoring proper banking procedures for the same purpose. The borrower used his civil powers to induce the bankers while the President used his powers to convince the board of directors to authorize the credit line, without proper credit appraisal, which is a form of exploitation of public savings.

The evidence observed in this research brings structural contradictions into consciousness. These cases identify the problem and deep analysis of it might help to expose the roots of exploitation as a precondition for liberation. In Case II, where the credit applicant was neglected, brings the alienation process to the surface and underlines the increasing importance of intellectual systems (Dillard and Tinker 1996).

Both case studies provide evidence to substantiate the claims discussed in the introduction to this paper; the access to start-up or early-stage finance for disadvantaged groups in poor neighborhoods is a problem. Mr. Sarana in Case II is from a 'disadvantaged group' in a 'poor neighborhood' and access to credit was truly a problem for him. This research adds to a growing body of evidence to the argument that there is an interrelationship between status-based lending and the economic power of richer classes. This means poor and powerless groups are alienated in the provision of credit because they lack certain qualities and factors such as money, social inclusion and networks, which are effectively prerequisites for obtaining credit.

The criticism of banks for their dominant role in providing finance to SMEs (Whincop 2001) is also substantiated by the case-study stories in this research. Banks, when run under autocratic leadership, especially where normal systems and processes are disregarded and management is weak, put small credit applicants such as Mr. S. in Case II at a severe disadvantage.

Case study II provides verification for alienation, discussed by James (2008), where agents discriminate against or deny the rights of one group of people to protect and/or strengthen another group in society. The fundamental human right to credit (Yunus 2007) was denied to Mr. S., who was desperate to start his business and to prosper. Mr Sarana's record proved his courage and enterprising skills. What he lacked was the social status or membership of at least an ordinary social network to su, ort him in accessing finance capital when he was in need.

In the Mandes case study, the credit facilities were granted casually, on a personal basis, without following the normal credit policies and procedures of the bank. Favorable credit decisions like this help the borrower to remain in the market doing 'trial and error' businesses, masquerading as 'successful' businesspersons and enjoying such government concessions in business development programmes as long-term land leases, export-promotion incentives and tax advantages. Not all applicants, however well connected, may enjoy such outcomes, but the prevailing ethic enables industrial capitalists to accumulate their wealth even though they and their loans are classified as 'bad' by banks. The loans are serviced with further borrowings. De Brunhoff (2003) argues that owners of small savings are passively involved in the process, while the ownership of financial assets is highly concentrated in the hands of a few wealthy people, including some industrial capitalists.

These case-study stories substantially confirm the claims already documented that most individual, social–cultural and economic–political factors are collectively directed towards protecting the social power of an advantaged class of the capitalist society (see Saliya and Jayasinghe 2016a, 2016b also Saliya 2019a, 2019b). Social power in numerous functions are intertwined with money, and such economic power ultimately steers to social power. Therefore, social power becomes the fundamental driving force for decision-making based on preferred social norms in the state and private institutions, particularly in the finance sector. 'Money is the monopolist of the ability to buy, or in Marxist terminology the 'universal equivalent …' (Lapavitsas 2003, 70-71). Case I provides evidence to strengthen the argument that, as a result of favorable credit decisions, influential groups of people could become richer and more influential. They have the ability to obtain credit and such class relationships seem mutually reinforcing. Based on these cases, we theoretically argue that there is a propensity to make credit decisions based on associations when the credit applicant is socially and economically powerful. According to Saliya (2019b), such lending decisions for the connected are made by abusing legitimate authority overruling the normal banking practices of credit evaluation. This process of privatizing gains and socializing private losses is a clear win-win situation for capital and a lose-lose for everyone else (Foster 2008) – especially the taxpayers.

Conclusion

The findings of this research are useful in optimizing understanding of the credit mechanism, its contribution to disproportionate exploitation of resources and some discriminatory aspects of credit decision-making in the Sri Lankan banking industry. The CSB bank crisis showed that crony capitalism, which facilitates the exploitation mechanism and enables the credit mechanism to work mainly for the rich, is not sustainable. Such credit mechanisms, which cause enormous waste in resources and ignore the need for nurturing potential projects, are not just.

While the cases evidenced reveal a credit culture in Sri Lanka that has a structural bias that favors the wealthy, it can be argued that the cases in themselves are not sufficiently conclusive. Further, it can be argued that the poor are, by definition, credit-risky, and they lack collateral assets and incomes. However, the cases draw out another factor, which is in line with Marxist thought: connections. Society is structured to privilege those with connections.

Individual traits are super-structural. Structure plays a vital role in shaping one's motives. According to Marx, structure is class-based and the President, a powerful capitalist, tactically hooked other socially powerful individuals

into his social network which, in turn, boosted his own socio-economic power base. While it is true the poor without connections represent a high risk for lending, as the capitalist argument exemplified in this paper maintains, the claim that thousands of jobs depended on further credit being provided is disingenuous. It is a disingenuous claim because such privileging preserves the status quo and stifles collective self-determination. It also diverts finance into weak industries.

Finally, Marx observed that, although there is a human drive to cooperation, many are alienated because capitalist social relations dispossess the majority of producers. The paper has shown how such dispossession may occur within the context of the provision of credit to enterprises. As such, the privileging of connected parties is detrimental to the economic well-being of the general population. This situation frustrates the poor entrepreneurs. Nor it is, in any way, just. These findings provide insight for policy formulators in developing policies for more productive financial capital mobility systems in Sri Lanka. The conclusions of this research emphasize the need for radical changes in the system of credit allocation for SMEs. It is suggested that state intervention in regulating enterprise financing could minimize such credit-oriented exploitation and growing inequality. Conclusions must have wider perspective-implications for other broader areas and domains. Future Work and Outstanding Questions must arise from Conclusions.

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The Effect of Project Quality and Level of Uncertainty on Micro, Small, and Medium Enterprises' Funding in Equity Crowdfunding

Sekar ANINDYASWARI
Department of Business Administration
Faculty of Administrative Science, Universitas Indonesia, Indonesia
sekar.anindya30@gmail.com

Chandra WIJAYA
Department of Business Administration
Faculty of Administrative Science, Universitas Indonesia, Indonesia
wijaya@ui.ac.id

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Abstract:

Project quality and level of uncertainty are two factors that can influence investors in providing funding to a business. This study concentrates on Micro, Small and Medium Enterprises (MSMEs).

The study aims to analyse the influence of project quality factors and the level of uncertainty on MSMEs' funding, focusing on the equity crowdfunding platform in Indonesia. This study uses a sample of MSMEs found in equity crowdfunding in Indonesia in 2018–2019. This research,employing ordinary least squares, indicates that there is an influence between executive experience, business experience and financial projections on the submission of MSMEs in equity crowdfunding. However, no effect was found between equity share, educational background and non-financial forecasts.

Keywords: project quality; level of uncertainty; MSMEs; equity crowdfunding.

JEL Classification: O12; O33; O35.

Introduction

The development of technology in Indonesia moves rapidly in line with the increasing demand for public needs. Financial technology (Fintech) is one of the technological innovations in the financial services industry. Fintech is carried out by financial services companies that can produce business models, applications, processes or products with material effects related to the provision of financial services. Fintech consists ofthree types: third party payment systems, P2P lending and crowdfunding. In Indonesia, fintech actors are still dominated by businesses in the payment sector by 43%, lending by 17%, aggregators by 13%, and the remainder financial planning, crowdfunding, and others (Nugroho and Rachmaniyah 2019). The definition of crowdfunding that is often used is an open call through the internet to collect capital resources, either in the form of donations or exchanges such as gifts and rewards or voting rights (Bouncken, Komorek and Kraus 2015).

In the scope of entrepreneurship, crowdfunding is defined as an effort by individuals and groups to find funds for their work in terms of cultural, social and profit-making, through withdrawing small contributions from a large number of people who use the internet, without any limits or financial barriers (Mollick 2014). Equity crowdfunding is one of the fintech platforms in Indonesia that has recently been launched on December 31, 2018. Equity crowdfunding is a platform to provide funding for start-ups or provide certainty for small companies to obtain funds by selling their 'shares' to investors (Xue and Sun 2016). Equity crowdfunding itself consists of small companies or start-ups who put their business into an already available platform, hoping to attract investor interest in providing funds for the survival of the business. In attracting the interest of these investors, business persons can provide the company background such as executive experience, business experience and educational background, as well as projections of the company's financial statements for the future such as equity share, financial and non-financial forecasts (Bradford and Bradford 2012).

1. Literature Review

Equity crowdfunding is where investors expect returns in the form of equity or shares from the results of the funding project. As mentioned above, the purpose of equity crowdfunding is to provide initial funding for start-ups or provide certainty for small companies to obtain funds by selling their 'shares' to investors on existing platforms. Platforms such as equity crowdfunding are essential in Indonesia because they can help provide capital for Micro, Small, and Medium Enterprises (MSMEs). Data from the Ministry of Cooperatives and Small and Medium Enterprises indicates that in 2014, there were around 57.8 million MSMEs in Indonesia. In the future, it is estimated that the number of MSMEs will continue to grow. Data from the Central Statistics Agency shows that after the 1997–1998 economic crisis, the number of MSMEs did not decrease; instead,they continued to increase. In 2012, MSMEs were able to absorb 85 to 107 million workers. In the same year, the number of MSMEs in Indonesia amounted to 56,534,592 entities, or 99.99% of all businesses, with the remaining 0.01% as big businesses (Putra 2018). Based on Bank Indonesia, the growth of MSMEs in Indonesia in 2017–2018 increased from 62,922,617 to 64,194,057, or increased by 2.02% (Bank Indonesia 2019). This growth in MSMEs is not in line with the provision of capital requirements from the government, which is still less than needed. According to Bank Indonesia, in 2018, loan funds for MSMEs increased in each period. That is, the first period (Januarty, February and March) of loans was Rp987 trillion and in period four (October, November, and December) it reached Rp1,086 trillion (Bank Indonesia 2019).

In attracting investors, MSMEs must be able to demonstrate their superiority compared to other MSMEs so that investors will be interested in providing equity or debt financing. MSMEs actors need to provide a company background, vision and mission as well as projected financial statements to attract funding from investors (Bradford and Bradford 2012). Investors interested in providing capital can view project information in virtual data rooms to see the quality of the business. If the project matches several characteristics investors are looking for, they will provide capital to the business (Baum and Silverman 2004). Project quality is a measure of whether a project will be successful and whether the project will bring benefits to investors. In measuring this project quality, there are three characteristics that can be used, namely, human capital, social capital and project valuation.

According to Doms, Lewis and Robb (2010), human capital is a measure of the team's basic quality and comprehensive strength. Investors will give more attention to aproject with a team that has management experience, a convincing educational background and so on, as they believe these factors will represent project performance. Second, social capital, according to Baum and Silverman (2004), is the ability of small companies to access other social resources. Small companies that have social networks will be able to provide information about the business to investors. A good level of social relations can bring potential supporters and consumers, which can help companies expand the market and the impact of their products. Therefore, the level of social capital has an impact on developing the quality of the project. Finally, project valuation represents the size of the market value of the project, which is important for investors in assessing a project. In general, the greaterthe project's assets, the higher the quality of the project.

Another factor in attracting investors is information asymmetry: some information will reflect the level of uncertainty of the company. Ahigh level of uncertainty will reducethe probability of investors lending funds (Xue and Sun 2016). According to Ahlers *et al.* (2015), although investors have different preferences regarding the level of risk, investors will not like it if the future of the project is unpredictable. If investors cannot predict the project's future, then the investor will lose interest in investing because of a lack of control over future outcomes (Xue and Sun 2016). Borrowers have better information about the potential returns and risks of investment projects than investors. Information that is known by the borrower is information about what loan funds will be used for what purposes. If there is a lack of information on the use of these funds, it will create problems in the financial system before and after the transaction (Zafar and Siddiqui 2019). In measuring this level of uncertainty, there are three tools, namely, equity share, lead investment proportion and project forecasts. Equity share is the proportion of shares sold by the project owner. Shares offered by companies are valuable signals for investors. Entrepreneurs can give a signal to investors with the amount of equity that they maintain after offer. In one percentage point increase in equity offered reduces the number of investors expected (Ahlers *et al.* 2015). Second, the lead investor, Information about lead investors can serve as a mechanism for building trust to motivate people to invest in the project (Li *et al.* 2016). Finally, project forecasts are descriptions of future project development. Detailed and well-planned financial projections and good market prospects can reduce investors'perceptions of uncertainty (Ahlers *et al.* 2015).

Based on the issues above, this study was conducted to analyse the effect of project quality and the level of uncertainty on MSMEs funding. This research was conducted on MSMEs that were registered onan equity crowdfunding platform in Indonesia in 2018–2019. The benefits of this research are first, to add insight into the field

of equity crowdfunding regarding what factors need to be considered in channelling funds to MSMEs. Second, as consideration for decision-making in selecting MSMEs to be funded; and third, this research can be used as theoretical study material for further similar work. This study uses the ordinary least squares (OLS) model, and builds upon work by Xue and Sun (2016). This work also references previous studies such as by Xue and Sun (2016), Ahlers *et al.* (2015), and several other studies regarding funding in equity crowdfunding.

Equity crowdfunding is a funding model where investors arerewarded in the form of equity or profit-sharing from projects or businesses they fund (Bradford and Bradford 2012). According to Mollick (2014), equity crowdfunding is a funding method used by entrepreneurs to raise funds from public investors via the internet. Project quality is a measure of whether a project will be successful and whether the project will benefit investors (Xue and Sun 2016). Investors will look more at the characteristics and background of a project than to see the latest conditions of the project and the products produced (Ahlers *et al.* 2015). In this study, the authorsemploy the theory used by Xue and Sun (2016)and Baum and Silverman (2004), which is choosing two characteristics to measure the quality of the project: human capital and social capital.

The uncertainty of a project is dependent on whether the future level of project's development can be predicted. Investors will continue to provide funding despite a high level of risk if investors discover there is a high probability of premium returns. If investors cannot clearly predict possibilities, they will lose interest in investing in the project (Ahlers *et al.* 2015). Referring to the researchby Xue and Sun (2016), measuring the level of uncertainty may be accomplished by assessing three factors: equity share, lead investors and the project's forecast (divided into financial and non-financial forecasts).

2. Methodology

This study analyses the effect of project quality and level of uncertainty on MSME funding in equity crowdfunding using OLS regression The reason for using the OLS regression method is because the estimation made aims to predict the dependent value of variables in the form of values or pure numbers (percentage of project funding) using independent variables. By using an OLS regression, a threshold variable is needed. The independent variable (threshold) of this study is the quality of the project, determined by examining the factors of human and social capital, and the level of uncertainty by examining equity share, financial forecast and non-financial forecast. Following the objectives of the study, the dependent variable used is the ratio or percentage of funds obtained. Some previous studies used the number of funders as the dependent variable, as in the study of Lukkarinen *et al*. (2017) and Bi *et al.* (2017). In comparison, Mollick (2014) employedthe ratio or percentage of funds that can be obtained as the dependent variable in measuring MSME funding in equity crowdfunding. Table 1 below explains the variables and the method of calculation used in the study.

Table 1. Variables, definitions and variable calculations

Variable	Definition	Variable calculation
Human Capital	Human capital is a measurement of the basic quality ofan organisation and comprehensive strength (Doms *et al.* 2010).	Binary variable, meaning that if the business founder has executive experience, then the variable is worth 1, and if not, then 0.
		Binary variable, meaning that if the business founder has business experience, then the variable is worth 1, and if not, then 0.
Social Capital	Social relationships owned by business groups can provide additional information to start-ups, this information and resource isusually more efficient, richer and more valuable (Baum and Silverman 2004).	Binary variable, meaning that if the business founder has a bachelor's degree, then the variable is worth 1, and if not, then 0.
Equity Share	Equity share is the proportion given by entrepreneurs to be sold to investors to gain funding (Ahlers *et al.* 2015).	The measurement is the lower limit that the project is willing to sell.
Financial Forecast	Information about project estimates can provide a more precise picture of risk, and can help reduce asymmetric information because investors will have a better basis for forming earnings expectations (Epstein and Schneider 2008).	Binary variable, meaning that if the business has a financial forecast, then the variable is worth 1, and if not, then 0.
Non-financial Forecast	Estimated information on non-financial projects is needed to assist investors in seeing the development of the project in the future (Xue and Sun 2016).	Binary variable, meaning that if the business has a non-financial forecast, then the variable is worth 1, and if not, then 0.

Source: Processed by the authors (2020).

The sample in this study was selected using the purposive sampling method. The sample included was MSMEs in equity crowdfunding in Indonesia. The MSMEs included in the sample are businesses that have the information needed by researchers such as business owners, shares sold and business prospectuses, both financial and non-financial. The period used for this study sample is 2018–2019. To determine the results of the study'shypotheses, researchers used the OLS model. The OLS method is used for estimating a regression line by minimising the number of error squares of each observation of that line.

$$KP_i = \beta_0 + \beta_1 Executive + \beta_2 Business + \beta_3 Degree + \beta_4 Shares + \beta_5 Fin + \beta_6 Non - Fin + \varepsilon_i \quad (1)$$

Refers to Table 2 below.

Table 2. Formula explanation

Variable	Definition
KPi	Percentage of project funding
Executive	Whether the founder has an executive experience (0/1)
Business	Whether the founder has a business experience (0/1)
Degree	Whether the founder has a bachelor's degree (0/1)
Shares	The lower limit that the projectis willing to sell
Fin	Whether there is financial growth data in the project's information (0/1)
Non-Fin	Whether there is non-financial growth data in the project's information (0/1)
ε_i	Error factor

Source: Processed by the authors (2020)

This work uses hypotheses developed from several previous studies, namely:

H1: Executive experience has a positive effect on MSME funding in equity crowdfunding.

H2: Business experience has a positive effect on MSME funding in equity crowdfunding.

H3: The educational background of the owner (bachelor's degree) has a positive effect on MSME funding in equity crowdfunding.

H4: Equity shares havea negative effect on MSME funding in equity crowdfunding.

H5: A financial forecast has a positive effect on MSME funding in equity crowdfunding.

H6: A non-financial forecast has a positive effect on MSME funding in equity crowdfunding.

3. Research Findings

3.1. Result

In this study, each variable has a statistic descriptive as initial information consisting of the average value, median, maximum value, minimum value and standard deviation. After processing data on the research variables, there is a descriptive statistical analysis as follows.

Table 3. Result of statistic descriptive test

Variable	Mean	Median	Max.	Min.	Sta. Dev.	Obs.
Executive experience	0.3729	0	1	0	0.4877	59
Business experience	0.8474	1	1	0	0.3626	59
Bachelor's degree	0.6779	1	1	0	0.4713	59
Equity share	0.3958	0.4	0.65	0.1	0.1351	59
Financial forecast	0.8305	1	1	0	0.3784	59
Non-financial forecast	0.3898	0	1	0	0.4919	59
Funding for MSMEs	0.9110	0.9	1	0.75	0.0876	59

Source: Processed by the authors (2020).

Table 3 above shows results obtained from processing 59 observations on the research variables. The results in Table 3 reveal that funding for MSMEs has an average (mean) of 91.10% with a median value of 90%. The highest value (maximum) for MSME funding is 100%, and the lowest value (minimum) is 75%. The standard deviation is 0.0876. Linear regression is suitable for exploring the relationship between financing and other factors. The R^2 test shows that 34.35% of the independent variables can explain the MSME funding activities in equity crowdfunding. It can be interpreted that 34.35% of the variancein the funding variables is influenced by executive

experience, business experience, bachelor's degree, equity share, financial forecast and non-financial forecast, while the rest is influenced by other variables outside the model. The results of the F Test show that the F statistic (probability 'prob') has a value of 0.000074. This value is less than 0.05, which meansthat the funding variable has a significant relationship with the independent variable.

Table 4. Result of linear regression test

Variable	Coefficient	Prob.
Executive experience	0.0459	0.0382
Business experience	0.0808	0.0068
Bachelor's degree	0.0237	0.308
Equity share	0.0287	0.7122
Financial forecast	0.0776	0.0059
Non-financial forecast	0.0145	0.5522

Source: Processed by the authors (2020)

The results shown from Table 4, Linear Regression Test, show whether there is a significant effect individually for each variable of the research model. The result of the significance of each variable is seen from its probability value. This study useda 5% alpha; thus, if the probability of each of these variables has a value of less than an alpha of 5%, it can be concluded that the independent variable has a positive or negative significant relationship with the dependent variable.

As seen in Table 4, the results of the test on the model for independent variables, namely executive experience,hasa coefficient of 0.0459 and a probability of 0.0382. The probability is categorised as less than 0.05, or a 5% significance, demonstrating that the executive experience variable has a significant effect on the dependent variable, funding. Next, the second independent variable, business experience, has a coefficient of 0.0808 and a probability of 0.0068. The probability is categorised as less than 0.05, or 5% significance, showing that the business experience variable has a significant influence on the dependent variable, funding. Next, the third independent variable, a bachelor's degree, has a coefficient of 0.0237 and a probability of 0.308. The probability is categorised as more than 0.05 or 5%; thus, the bachelor's degree variable does not have a significant effect on the dependent variable,funding.

Furthermore, the fourth independent variable, namely, the presence of a financial forecast, has a coefficient of 0.0776 and a probability of 0.0059. The probability is categorised as less than 0.05, or 5%, revealing that the financial forecast variable has a significant influence on the dependent variable, funding. Next, the fifth independent variable, equity share, has a coefficient of 0.0287 and a probability of 0.7122. The probability is categorised as more than 0.05, or 5%; therefore, it does not have a significant effect on the dependent variable, funding. Finally, the sixth independent variable, namely, a non-financial forecast, has a coefficient of 0.0145 and a probability of 0.5522. The probability is categorised as more than 0.05, or 5%; thus, having a non-financial forecastdoes not have a significant effect on the dependent variable, funding.Results of the completed tests indicate that there is a positive influence from executive experience, business experience and a financial forecast. Whereas, for educational background, the offered equity and non-financial projected reports have no influence on MSME funding in equity crowdfunding.

3.2. Discussion

The coefficient of determination test, or R^2, is the feasibility test of the model. The adjusted R^2 value of the research model shows that 34.35% of the dependent variable can explain the effect of the independent variable. It can be interpreted that 34.35% of the types of funding variables are influenced by variables of executive experience, business experience, bachelor's degree, equity share, financial forecast and non-financial forecast. Meanwhile, the additional65.65% is other variables not included in the calculations of this study. Other variables are projected dividends, the period in which dividends will be provided and the background of the business.

An F test was conducted on the research with the aim of seeing that the model used has independent variables that have a relationship with the dependent variable as a whole. The results of the F Test on the model, seen in Table 3, produces a value of 0.000074. The level of confidence used in the F Test of this study was 95%, or an alpha of 5%. The results of the F Test are smaller than an alpha of 0.05, or 5%. This can be interpreted that as an overall model, the independent variable has a significant relationship with the dependent variable, namely funding.

In Indonesia, the executive experience business owners have in improving company performance will have an impact on investor confidence in funding the business. The first independent variable is executive experience,

it has a probability result of 0.0382. Thus, the executive experience variable has a significant influence on MSME funding in equity crowdfunding. The *t*-test showed that the coefficient value is equal to 0.0459. This value explains that the executive experience variable has a positive effect on MSME funding in equity crowdfunding. The results of this study have the same conclusions as the research of Xue and Sun (2016), which shows a positive and significant influence between the executive experience variable on the funding variable. The executive experience variable in this study is a derivative of human capital measurement. Companies that have quality human capital will be able to create higher added value, which can improve company performance (Virna, Sari and Suprasto 2018). Looking at research from Virna, Sari and Suprasto (2018), human capital has an influence on the value of the company. A company that can manage its human resources properly will be able to increase the value of its company. Increasing company value will also cause investors to realise that the existing human resources in the company are well controlled, which can raise the market valuation of the company. This also will improve the level of investor confidence in the company (Virna, Sari and Suprasto 2018)

The second independent variable is business experience, it has a *t*-test result of 0.0068, indicating that the business experience variable has a significant influence on MSME funding in equity crowdfunding. The *t*-test revealed a coefficient value equal to 0.0808. This value explains that the business experience variable has a positive effect on MSME funding in equity crowdfunding. The results of this study differ from research conducted by Xue and Sun (2016), which showed no significant effect between the business experience variable and MSME funding. The difference in the results of the two studies lies in the location where Xue and Sun conducted research in China. According to the study, perceptions found in Chinese society do not reveal the actual abilities of the team members because these considerations cannot effectively demonstrate the human resources values in the company.

Investors will provide capital to the business after assessing the added value contained in the business, such as the business experience of the owner. In Indoneisa, this concept is also in line with resource-based theory, which states that the company's performance will be maximal if the company has a competitive advantage, such as an owner who has business experience. Wahyuni, Pradhanawati and Hidayat (2015) examined the experience of entrepreneurship in the development of the spring roll skin business. The authors showed that entrepreneurial experience can have a positive impact on business development. The better the level of experience of business entrepreneurs; the better the business development that was undertaken. According to Iskandar Simongkir, Deputy for Macroeconomics and Finance at the Coordinating Ministry for the Economy, one of the obstacles to the lack of business development from MSMEs was the lack of competent human resources. Therefore, the survival of a business can be seen from the business experience of the business owner.

For the third question, the researchers wanted to see the influence of the educational background of the owner on MSME financing from equity crowdfunding. The third independent variable is the bachelor's degree, with the owner having an educational background (undergraduate) of 54%. The bachelor's degree variable has a *t*-test result of 0.308. Therefore, the business experience variable does not have a significant effect on MSME funding in equity crowdfunding. The coefficient value seen in the t-test was equal to 0.02369. This value explains that the business experience variable has a positive effect on MSME funding in equity crowdfunding. The results of this study agree with the findings of Xue and Sun (2016), which showed that there wasno significant effect between having an MBA degree variable on the funding variable. Results from Xue and Sun revealed that educational experience (an MBA Degree), makes investors who do not see an value in tend to feel suspicious rather than trust the business.

In Indonesia, the MSME sector provides the economic support to the middle and lower classes, and the lower middle class usually does not complete their education up to college or undergraduate level. Therefore, the educational background of business owners shows no significant influence on MSME funding. According to the Central Bureau of Statistics, the average duration of education of the school population can reach 8.3 years, that is,the completion of junior high school education (Central Bureau of Statistics 2020). For groups of people with relatively low household incomes, only elementary school is completed on average. MSMEs are predominantly managed by the middle andlower classes, which may explain why they do not complete their education to the graduate level. Therefore, the educational background of business owners is considered less important by investors.

In the fourth problem, researchers wanted to see the influence of the equity share on MSME funding in equity crowdfunding. The independent variable is equity share, and results of the *t*-test were equal to 0.7122. Thus, the equity share variable does not have a significant effect on MSME funding in equity crowdfunding. The *t*-test demonstrated that the coefficient value was equal to 0.0287. This value shows that the equity share variable has a positive effect on MSME funding in equity crowdfunding. This result differs from the results of research by Xue and

Sun (2016), which showed a significant effect from the equity share on business funding. The research is in line with the previous assumption that a small amount of equity offered indicates that entrepreneurs have a strong confidence intheir future, so they want to control their project. This optimism likewise gives strong confidence to investors. In Indonesia, the understanding of investments is still low among the populace. In 2017, only 4.4% of Indonesians were familiar with investing in the capital markets, and only 0.4% of the 250 million population invested in the capital markets (Rahmawati 2018). The wide spread lack of knowledge about investing can be one of the causes of the absence of a significant influence on the ratio between equity sold to funding obtained. This may be because investors who lack investment knowledge will continue to buy equity even though the equity price is high. The same is true for investors who provide funding to MSMEs: the majority of crowdfunding equity comes from the lower middle class. This income group still does not understand the importance of the equity factor offered to investors. Therefore, investors do not matter how much equity is offered by MSMEs.

In the fifth question, the researchers desired to assess the influence of the financial forecast on MSME funding in equity crowdfunding. The fifth independent variable is the financial forecast, which demonstrated *t*-test results of 0.0059. Therefore, the financial forecast variable has a significant effect on MSME funding in equity crowdfunding. The *t*-test resulted in a coefficient value of 0.0776. This value explains that the financial forecast variable has a positive effect on MSME funding in equity crowdfunding. The results of this study echo the results of research conducted by Xue and Sun (2016), which showed that there is a positive influence of financial forecasts on business funding. The study explains that investors who have knowledge of financial forecasts know which businesses are profitable or challenged by examining the financial estimates. According to Xue and Sun, investor confidence will increase in a business because there are clear financial projections, making it easier for investors to understand the use of capital provided through the purchase of equity (Xue and Sun 2016). This conclusion is in line with the results in Indonesia, which demonstrated that there is a positive influence of financial forecast variables on MSME funding in equity crowdfunding.

For the sixth issue, researchers wanted to see the influence of non-financial forecasts on MSME funding in equity crowdfunding. The sixth independent variable is a non-financial forecast, with *t*-test results of 0.5522. The non-financial forecast variable does not have a significant effect on MSME funding in equity crowdfunding. In the *t*-test results, it can be seen that the coefficient value is equal to 0.0145. This value reveals that the non-financial forecast variable has a positive effect on MSME funding in equity crowdfunding. The results of this study are the same as the results of research conducted by Xue and Sun (2016), which explains that non-financial forecasts have a tendency only to beautify data. The credibility of the non-financial forecast is doubtful, so investors pay little attention. In line with Xue and Sun, this research shows that investors pay less attention to non-financial forecasts than to other factors. The lack of influence of the non-financial forecast itself can also be caused because the majority of MSMEs registered in equity crowdfunding do not include non-financial projections in proposal reports (business prospectuses).

Conclusion and Recommendations

This study intended to investigate and analyse the effect of project quality and level of uncertainty on MSME funding in equity crowdfunding. Of the six research hypotheses, three of them explain the influence of MSME funding on equity crowdfunding. While the other three variables have no influence on MSME funding, namely:

- There is a positive influence from managerial experience (executive experience) on MSME funding in equity crowdfunding.
- There is a positive influence of business experience on MSME funding in equity crowdfunding.
- There is no positive influence from the educational background (bachelor's degree) on MSME funding in equity crowdfunding.
- There is no negative effect of the equity offered (equity share) on MSME funding in equity crowdfunding.
- There is a positive effect of financial projections on MSME funding in equity crowdfunding.
- There is no positive effect of non-financial projections (non-financial forecasts) on MSME funding in equity crowdfunding.

Our findings have particular significance for entrepreneurs, crowdfunding platforms and investors. The research is recommended background for investors before they invest funds into MSMEs in equity crowdfunding. Investors need to consider factors of project quality and level of uncertainty, such as executive experience, business experience and financial projections listed by businesses. This focus is necessary because, with a higher quality of MSME human resources, the success of the business will also increase. Meanwhile, through examining financial projections, investors will better anticipate returns from funding the business. Furthermore, this study will be of interest to the equity crowdfunding platforms to determine which details need to be provided by MSMEs to register

their business. For example, the platform can providere quirements for MSMEs about what proposals can be displayed on the crowdfunding website. Finally, for MSME owners, as business owners who will be funded later, MSMEs can list vital factors on the crowdfunding platform shown to have an impact on fundraising, such as including financial statements for investor review, executive experience, and the business experience of owners.

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Immiserizing Growth Pattern of Pakistan's Export 2014-2018. Analysis Based on Comparative Advantage and Unit Value Structure

Aamir Hussain SIDDIQUI
Applied Economics Research Centre, University of Karachi-Pakistan
ahseconomics@gmail.com

Syed AMMAD
Applied Economics Research Centre, University of Karachi-Pakistan
ammadsyed@aerc.edu.pk

Faisal Sultan QADRI
Applied Economics Research Centre, University of Karachi-Pakistan
faysalsultanqardi@yahoo.com

Javed Akbar ANSARI
SBB Dewan University, Karachi-Pakistan
mahrukhrahilansari@gmail.com

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Abstract:

This study aims to specify the changing pattern of comparative advantage of Pakistani exports at the sector and product levels. Export unit value is also used, which is an additional and important factor for this research work. Furthermore, the analysis would check the presence of immiserizing" export growth. The paper estimates Balassa's RCA Index and compares it with aggregate export value and growth in value and unit value growth in Pakistan over the period 2014-2018. Estimates are presented at the sectoral level as well as the HS six-digit product level.

The study finds that Pakistan has been experiencing "immiserizing" export growth. Unit value growth is not associated with growth in export value or RCA growth. Even in sectors where RCAs are rising, the country is exporting products mainly with low or negative unit value growth. The findings suggested that Pakistan's trade strategy should focus on vertical export diversification - *i.e.,* moving up the value chain in sectors and markets in which we already have significant presence.

Keywords: immiserizing growth; export growth; RCA, unit value; competitiveness; exports.

JEL Classification: F14; F43.

Introduction

Export is considered as life line of any economy in the world. This is one of the basic indicators of prosperity and the development. Every country has comparative advantage in certain products and therefore likely to export to the world. For this purpose, they import the input materials from both domestic as well international sources. Producers involve in export are not limited to domestic markets, the whole world is their targeted market, where opportunities are unlimited. It is therefore given special significance in the developing countries for economic growth.

A country's production depends upon factors of production (land, labor and capital) and the factors which increase productivity. So, every country has difference in factor endowment, which determines the supply of goods both for domestic market and international markets. This phenomenon is considered as "competitiveness". Though there is no agreement on the definition of competitiveness among the scholars[1], however, Reveal Comparative Advantage widely consider as export competitiveness. Low income developing countries have low quality of factor endowments, thus they produce low technological and labor intensive manufactured goods. These characteristics determine its level of comparative advantage and exportable baskets.

[1] World Economic Forum, Global Competitiveness Report 2016-17

Pakistani policy makers and economic management give special attention to the export sectors. However, it is a fact that Pakistani exports are on a declining trend from 2014. During 2013 Pakistan exports was US$ 25.1 billion, which in 2016 dropped to a level of US$ 20.5 billion and showed a little improvement of US$ 23.5 billion in 2018. Its GDP is progressing with a comparatively moderate growth rate in the region, but export growth going in opposite direction. Pakistan has signed preferential trade agreements with important countries of region, which include China, Malaysia, Sri Lanka and Indonesia. The country has get the zero rated market access in European markets under GSP+ program, but its positive impact is still not seen. Low competitiveness and low comparative advantage may be the reasons of our declining export trend.

This study is concerned to specify the changing pattern of comparative advantage of Pakistani exports at the sector and product levels. Export unit value also use for our analysis, which is an additional and important factor for this research work. Furthermore, the growth in export seems immiserizing" export growth[2], this phenomenon suggests that Pakistan experiencing low export growth in the products which RCA is high. This is the first study which has worked on RCA with the above stated phenomenon.

This paper is organized as follows. Section II presents an eclectic review of RCA related literature. Section III presents the methodology of this study and Section IV discusses our findings. Section 4 concludes.

1. Eclectic Review of the literature on RCAs:

The concept of comparative advantage has a time honored history beginning with the writings of David Ricardo. Comparative advantage is attributed to differences in technological development among trading partners (Khatibi 2008) – these are reflected in cost differences due to differing factor endowments and factor intensities of production – the well-known Heckscher-Ohlin and Samuelson-Stolper theorems follow from Ricardo's theory. The pattern of comparative advantage in global markets that a country has changes as factor productivity changes resulting in changes in factor proportions employed in the production of different exportables. Changing product RCA patterns are an index of changes in factor productivity, reflecting technological adaptation. Comparative advantage should be seen as a dynamic concept. National policy must aim at producing changes in comparative advantage product structure which reflect increasing levels of technological sophistication in exportable. The Revealed Comparative Advantage (RCA) concept reassures mainly supply side determinants of the export structure. Equally important are demand related determinants of export performance (Bender and Lee 2002). As discussed at length by Porter (2009) comparative advantage is distinct from competitive advantage – the latter reflects a country's ability to produce exportables[3] that have high income and low price elasticity of demand in targeted markets. Determinants of comparative advantage and competitiveness factors overlap but are not identical. In particular the export strategies of the major firms and the institutional infrastructure which sustains these strategies is of vital importance in determining global competitiveness level and growth, Ezoala-Hamison (2009) (Wu and Chen 2004).

Thus changing patterns of RCAs are a rough and ready measure of changes in the competitiveness of firms in global products (and services) markets. Roughly it may be said that if RCA's are increasing for products the unit value of which is also rising over time, the country's global specialization pattern is synchronized with its ability to export products with the 'right' demand elasticity. Theory then predicts a correspondence between the growth of comparative advantage and competitiveness measures – which should be reflected at least partially in correspondence between rising RCA values and rising unit value product (HS 6-digit level).

French (2014) accepts the widespread use of the RCA measure. In his view the usefulness of the RCA measure emerges from its ability to reflect changes in trade barriers (both tariff and non-tariff). He therefore advocates an RCA bilateral index which measures effects of trade barriers of specific trade partners (say China) on a country (Pakistan's) exports. Given the availability of appropriate data French advocates that a trade responsiveness index based on the RCA concept can be calculated to estimate the relative sensitivity of trade flows to changes in trade costs of different suppliers to a particular destination.

Brakman and Marrewijk (2015) argue that while the conventional RCA concept is an appropriate measure of the structure of international trade if such trade is not fragmented – *i.e.,* computers are made and exported exclusively in country *X* rather than assembled in *X* from inputs manufactured in countries *Y*, *Z*, …. *n*. However, commodity trade has become increasingly fragmented. Brakman and Marrewijk (2015) therefore advocate that RCA should be calculated using value added rather than gross export value data (Johnson 2014, Johnson and

[2] The term immiserizing growth first introduced by Bhagwati (1958) and further explained in Bhagwati (1987). The detail explanation is also given by Shaffer (2018)

[3] That is both goods and services

Norgura 2012, Tremer *et al*. 2013). Value added trade data has been provided by WIOD for the period 1995-2009 for 40 countries – including 28 EU countries, Australia, Brazil, Canada, China, India, Indonesia, Japan, Mexico, Russia, Taiwan, Turkey and the USA. It is shown by several authors utilizing this data that there is a significant difference in RCA patterns when calculated on the basis of gross output and value added basis.

Slike N. and Lu Benli (2014) estimated RCA measures for 27 products exported by Nepal – 11 of which were found to have RCA values greater than unity. Herciu (2013) compared Romania's trade competitiveness with that country's international competitiveness. RCA's exceeded unity in three out of 7 sectors but Romania ranked very low on almost all the 12 competitiveness pillars of the Global Competitiveness Index reported in 2012 Global Competitiveness Report. This shows that RCA's are a relatively weak measure of world market competitiveness. Mzumara, and colleagues, has estimated RCA structures for several African countries - Uganda and SADC member countries including Angola, Malawi and South Africa. (Mzumara 2013, Mzumara *et al.* 2013a, Mzumara *et al.* 2013b, Mzumara 2016). He finds significant differences in South Africa's RCA structure than that of other African countries. South Africa's comparative advantage is in the chemicals, metals and machinery sectors, while other African countries had high RCA values in textiles and food products.

There is another view of considering RCA as a level of competitiveness, for example studies by Abbas and Waheed (2017), and Munir and Sultan (2019) has analyzed Pakistan's trade competitiveness in selected products group and selected markets. The former study concluded that Pakistan has more competitiveness in Agriculture commodities than manufacturing commodities; however, there are serious in its methodology of conducting estimation. They have selected 2-digit HS level and claiming to represent different product sector, which are obviously nor representing any product neither representing any particular sector. Further, they considered Chapter 52 and 41 as products in agriculture sector, which misleading, as these Chapters represent Cotton yarn and fabrics and prepared leather. The later study analyzed the RCA of Pakistan's products at 3-digit SITC level in its border sharing countries. Though the products were selected at significant disaggregate level, but price of the products is not considered for making final conclusion. This study is distinct in the sense that have considered the products at most disaggregate level of 6-digit HS level and export unit price for Pakistan's changing export pattern.

Despite the limitations of the RCA concept, particularly as a tool assessing trade and macro policy its continued use illustrates the prevailing resilience of Ricardo's path breaking, insight regarding the impact of differences in factor productivity in determination of enduring trade structures at the international level. Building on the several contributions of Eaton and Kortum (2002) Costinot and Donaldson (2012) have provided some theoretical foundations for this insight relaxing the most stringent assumptions underlying Ricardo's two country model. Habib (2019) analyzed the export performance and potential through trade, reciprocity and intensity indexes, While Santos and Khan (2018) considered RCA and one of the key factor of inward FDI. If we accept the RCA measure as an (at least partial) estimator of productivity its relevance remains evident.

2. Methodology

Due to the unavailability of value added trade data we use Balassa's (1965) formula for estimating changes in Pakistan's RCA pattern at HS 6-digit level. The formula is:

$$RCA_i = \frac{X_{ij}}{X_{wi}} / \frac{X_{iw}}{X_{w.tot}} \quad (1)$$

where: X_{ij} = export of commodity *j* by country *i*; X_{wi} = country *i's* total exports; X_{jw} = the world's export of commodity *j*; $X_{w.tot}$ = the world's total exports

RCA with values greater than one show that the share of a country *i*'s export (*j*) in its total export value exceeds the corresponding share of the same commodity (*j*) in global exports, in a given year. This has been traditionally interpreted as reflecting country *i*'s specialization in commodity *j*. RCAs < 1 indicate that country *i* has no comparative advantage in the exports of commodity *j*. (Krugel and Mathew (2009)

RCA levels at 6-digit commodity level were than compared with unit value[4] trends at the same level over the same time period. This was done to estimate whether Pakistan's RCAs pattern is evolving in accordance with appropriate global market trends. Data was obtained exclusively from the TDAP and WITS data base on national

[4] Unit value calculated Pakistan's export value of a specific commodity at 6-digit HS-level divided by export quantity in KG. Therefore, the unit value is in US$ per Kg., there are some commodities which unit value is given in $ per specific quantity, for example, leather gloves (HS420329 and 420321) unit value is in $ per dozen *etc*., this is calculated by using data of PBS.

and global exports and price trends.

3. Results

Table-1 presents RCAs for the 2014-2018 period for the major sectors of the economy (defined at 2-digit level). RCAs with values greater than one in each of the five years (2014-2018) are to be found in (a) textiles (b) apparel (c) cereals (rice), (d) live animals and fish, and (e) horticulture sectors. Spices have RCA>1 values in three years as did edible products (especially sugars and confectionaries). The gems and jewelry sector recorded an RCA above unity in only one year (2014).

Table 1. RCAs at 2-digit sectoral level 2014-2018

Sectors	HS Chapter	YEARS				
		2014	2015	2016	2017	2018
Live animal, meat and fish	01-03	1.325	1.427	1.631	1.593	1.832
Dairy and honey	04-05	0.950	1.082	1.065	0.904	0.925
Horticulture	06-08	2.372	2.163	2.737	2.369	2.572
Spices	09	0.773	0.979	1.256	1.139	1.219
Cereals and products	10-11	15.842	11.433	11.966	12.534	13.201
Oil seed and veg oil	12-15	1.138	1.609	1.364	1.218	0.802
Edible products	16-22	0.859	0.965	1.896	1.544	1.395
Meals	23	0.377	0.508	0.599	0.693	0.392
Tobacco	24	0.583	0.426	0.450	0.405	0.218
Minerals petroleum	25-27	0.430	0.270	0.303	0.346	0.335
Chemicals and Pharma	28-38	0.161	0.170	0.182	0.191	0.174
Plastic and rubber	39-40	0.482	0.491	0.421	0.347	0.305
leather and fur	41-43	7.923	7.797	7.986	8.200	7.454
wood and products, paper book	44-49	0.144	0.182	0.221	0.235	0.215
Textiles	50-60	14.381	15.637	15.314	14.192	12.879
Apparel	61-63	11.784	11.863	11.996	12.536	12.917
Footwear and hedger umbrella	64-67	0.618	0.562	0.555	0.623	0.562
Stones and glass products	68-70	0.232	0.259	0.269	0.282	0.195
Gems/Jewel	71	0.579	1.756	0.430	0.152	0.016
Metal and products	72-83	0.266	0.354	0.309	0.308	0.249
Machineries	84-85	0.037	0.034	0.044	0.039	0.028
Transportation	86-89	0.032	0.033	0.031	0.025	0.019
Miscellaneous	90-99	0.372	0.438	0.316	0.339	0.316

Source: UNCOMTRADE through WITS, author' calculation

Sectors with increasing RCA value trends included (a) live animals and fish, (b) edible products and food manufactures, (c) food residues and wastes (meals), (d) chemicals and pharmaceuticals, (e) cereals and products, (f) leather, (g) stones and glass and most importantly (h) apparel. On the other hand, RCAs are relatively stagnant in the textile sector. We have argued elsewhere (Ansari and Siddiqui 2017) that a vertical export diversification strategy is most suitable for Pakistan. Vertical export diversification involves focusing on expanding exports along a supply value chain in sectors within which Pakistan already has a foothold in key global markets. This is in contrast to a horizontal export diversification[5], where focus is on opening up new markets and penetrating sectors in which the country does not at present have a significant presence.

We advocate a vertical export diversification strategy on the grounds that linking up in global value chains of selected multinationals opens up opportunities for construction of long term trade and investment partnerships with major market players. Also it is relatively easier for our leading exporting firms to efficiently upgrade production and marketing operations in commodities/areas of current specialization. We therefore consider a vertical export diversification strategy more beneficial for Pakistan than an export strategy targeting new markets or products not linked to supply chains in which Pakistan's leading export firms do not at present have significant market presence.

Table 2 presents data on the number of products with RCAs>1 in 2014 and 2018. There are 658 commodities in which Pakistan has had a comparative advantage in 2018, 31.2% of these are from the textile and 26.9% from the apparel sector, thus more than 40% of relatively specialized products are in other sectors – live animal and fish, leather products, chemicals and metal products sectors together account for 153 products

[5] Which may or may not involve product diversification of country exports.

(about 25%) of the total, with RCA values greater than unity during most of the 2014-2018 period. However, in 2018 products with RCA>1 in these sectors had decreased to 121 - just 18% of total such products.

Table 2. Number of products with RCA>1 classified by sectors for 2014-2018

HS Chapters	Sectors	Years	
		2014	2018
50-60	Textiles	202	201
61-63	Apparel	170	159
01-03	Live animal, meat and fish	40	40
25-27	Minerals petroleum	22	30
28-39	Chemicals and Pharma	35	28
72-83	Metal and products	39	28
41-43	leather and fur	23	25
06-08	Horticulture	21	19
16-22	Edible products	19	19
12-15	Oilseed and veg oil	18	18
90-99	Miscellaneous	19	16
84-85	Machineries	28	14
68-70	Stones and Glass products	11	11
04-05	Dairy and honey	11	10
44-49	Wood and products, paper book	8	9
09	Spices	10	8
10-11	Cereals and products	12	6
64-67	Footwear and Headger Umbrella	9	6
23	Meals	5	5
40	Rubber	3	4
24	Tobacco	3	1
71	Gems/Jewel	3	1
86-89	Transportation	2	0
01-99	TOTAL	712	658

Source: Author's calculation

Mineral products, food manufactures, horticulture, machinery and miscellaneous product account for an additional 12% of the total in 2018. A vertical export diversification strategy should then focus on these sectors. Sectors with a very small number of commodities with relatively high RCA values are wood and paper products, stone and glass, footwear and headgear dairy products, vegetable and edible oils jewelry and tobacco.

Table 3 shows that nearly a fourth of total products exported by Pakistan have RCA values greater than one – and this proportion has remained relatively constant during 2014-1 with a small decline in both total number of products exported and the number of exports with RCAs>1. There is thus no evidence that export structure is evolving in a manner which reflects our global comparative advantage. However, the share of products with RCA>1 has increased modestly in apparel, fish, and leather sectors. But the number of products with RCA>1 exported in the fish and leather sectors remains small. In the textile sector the number of products with RCA>1 has remained constant while in the apparel sector products with RCA>1 has decreased in 2018 as against 2014.

It is clear that we need to develop a strategy for greater product specialization within both the chemical and the machinery sectors, where total number of products exported is relatively large but number of products exported with RCA values > 1 is miniscule. It is depressing that products with RCA>1 and total number of products exported have declined during the 2014-2018 period. It is thus clear that Pakistan has lost comparative strength in global markets. The total number of exports with RCA>1 has declined during 2014-1 and the total number of products with RCA's>100 remained constant at about 1.5% during 2014-2018. For the textile sector products with RCA>100 declined from 7.6% in 2014 to 6.2% in 2018. For apparel RCA products with value greater than 100 as proportion of total products exported were 4.1% in 2014 and 4.6% in 2018.

Table 3. Share of products with RCA>1 in sectors in 2014 and 2018

Sectors	Products with RCA>1		Total products		Share of RCA>1 products in total	
	2014	2018	2014	2018	2014	2018
Fish	25	26	48	46	52.1	56.5
Food items	78	69	289	289	27.0	23.9
Chemicals	35	28	353	310	9.9	9.0
Leather	28	30	63	59	44.4	50.8
Textiles	202	201	395	370	51.1	54.3
Apparel	170	159	266	260	63.9	61.2
Machineries/Tools	43	27	668	616	6.4	4.4
TOTAL	581	540	2082	1950	27.9	27.7

Source: UNCOMTRADE through WITS, author's calculation

We now present a disaggregated analysis of export value, value growth rate, RCAs and unit value growth in the major sectors of our export portfolio. This analysis consists of four sectors, which total export value is above US$ 1 billion.

Table 4. Food items which had high export value

HS Code	Product description	RCA		Export value in $ thousand		Average annual growth rate	
		2014	2018	2014	2018	Value	Unit value
Total Fish Exports				4,600,950	4,010,982		
100630	Semi-milled/wholly milled rice, wheat	63.15	52.78	1,892,481	1,416,145	-5.83	-3.59
100640	Broken rice	74.99	193.31	157,699	490,358	45.42	-5.94
110100	Wheat/meslin flour	43.57	46.94	351,781	323,007	3.40	6.10
220710	Undenatured ethyl alcohol of an alc	16.63	29.77	161,429	231,498	42.23	-38.90
170199	Cane/beet sugar and chemically pures	0.00	14.63		230,133	47.03	-7.37
080520	Mandarins, incl. tangerines and satsu	20.97	27.20	120,896	171,720	9.42	3.37
070190	Potatoes other than seed potatoes,	19.36	32.58	102,111	122,499	29.10	5.14
080410	Dates, fresh/dried	52.14	59.38	64,082	83,200	7.38	4.33
220720	Ethyl alcohol and other spirits, dena	18.42	32.92	87,001	76,678	-0.47	-42.08
081340	Dried fruit (excl. of 08.01-08.06)	19.39	53.51	22,736	66,387	39.92	3.34

Source: UNCOMTRADE through WITS and author's calculation.

Table 4 presents data on the ten leading food sector exports ranked in terms of value, RCA and aggregate value and unit value growth. The top ten commodities in this sector accounted for 64.3% of total food sector export value in 2014 and 80.1% in 2018. Of these ten products five had negative unit value growth rate – milled rice, broken rice, un-denatured ethyl alcohol, cane and beat-sugar and denatured ethyl alcohol – together these five products accounted for about 61% of total food sector exports in 2018. Positive growth rates of the remaining five leading unit value growth food sector exports ranged from 3.37 to 6.10 (*i.e.*, quite low). Average value growth rates were high for broken rice, un-denatured ethyl alcohol and cane sugar. RCA values were high and rising for all major food sector commodities – though there was a declining trend for milled rice.

Table 5 lists commodities within the food sector, which have experienced the highest unit value growth during 2014-2018. They accounted for just 2% of total food sector export value in 2014 and also in 2018. However, vigorous growth has been experienced by several product groups in this table, cane sugar, potatoes, vegetables products and mixtures, fresh fruit and mucilages & thickeners. Their RCA however remain low and have fallen in many cases. High value and high unit value growth has been experienced by cane sugar potatoes, vegetable products, cereal straw, fresh fruit and thickeners. Clearly we are not specializing to take account of unit value growth in the food sector. This illustrates our weakness in moving up the supply chain – from raw products to food manufactures.

Table 5. Food items which had high growth rates in unit value

HS Code	Product description	RCA		Export value in US $ thousand		Average annual growth rate	
		2014	2018	2014	2018	Value	Unit value
Total Food sector Exports				4,600,950	4,010,982		
170111	Cane sugar, raw, in solid form, not	0.10	0.29	2,576	4,223	33.50	865.86
071010	Potatoes, uncooked/cooked by steami	0.35	1.52	109	273	244.14	38.98
140490	Vegetable products.(excl. of 1404.2	4.86	5.52	2,939	4,643	144.83	29.27
120799	Oil seeds and oleaginous fruits (excl	5.01	1.12	3,783	1,567	0.63	25.57
080450	Guavas, mangoes and mangosteens, fres	22.46	14.57	44,732	40,901	-0.22	25.42
071090	Mixtures of vegetables, uncooked/co	16.07	2.36	19,384	2,405	-38.84	23.83
121300	Cereal straw and husks, unprepared, w	36.92	59.45	14,474	21,309	10.63	22.79
120921	Lucerne (alfalfa) seed, of a kind u	3.77	3.32	1,371	1,616	8.89	22.35
081090	Fresh fruit, n.e.s. in Ch. 8	1.87	2.93	5,102	11,844	45.09	22.33
130239	Mucilage's and thickeners (excl. of 13	0.00	1.90	3	2,569	2589.97	20.79

Source: UNCOMTRADE through WITS, and author's calculation

Table 6. Leather items which had high export value 2014-2018

HS Code	Product description	RCA		Export value in US $ thousand		Average annual growth rate	
		2014	2018	2014	2018	Value	Unit value
Total Leather sector Exports				1,388,506	1,380,053		
420310	Articles of apparel, of leather/com	64.86	70.19	370,060	320,666	-2.99	-23.74
420329	Gloves, mittens and mitts, of leather	57.76	81.56	154,597	201,449	7.15	0.58
950662	Inflatable balls	82.28	85.18	148,496	168,832	4.19	-29.98
411310	Leather further prepared after tann	80.64	139.18	137,253	121,848	-2.08	7.97
410712	Leather further prepared after tann	7.93	20.24	46,398	120,461	29.19	-29.11
420321	Gloves, mittens and mitts, of leather	148.80	158.15	116,614	107,123	-1.87	-28.41
640399	Other footwear without outer soles	1.77	2.08	65,414	74,260	3.67	-28.55
410792	Leather further prepared after tann	13.84	15.74	53,282	60,618	5.20	-30.08
410719	Leather further prepared after tann	34.11	22.91	67,070	38,315	-11.38	-28.23
411200	Leather further prepared after tann	42.84	33.09	54,885	33,693	-10.28	-25.30

Source: UNCOMTRADE through WITS, and author's calculation

Table 6 lists leading leather exports ranked in terms of value, RCA and value unit value AAGR. They accounted for 87.5% of total sectoral export value in 2014 and 90% in 2018. Unit value growth was negative in the case of eight of the ten commodities. Positive unit value growth was experienced only by leather prepared after tanning (411310) and gloves (420329). Value AAGR was negative for five of the ten leading leather exports – this included only one commodity for which unit value growth was positive, 411310. Relatively higher value AAGR was experienced by only two commodities one of which had high negative unit value growth rate. RCA's on the other hand were high and showing an increasing trend for eight of these ten commodities. Leather gloves had high AAGR and moderate unit value growth.

Table 7. Leather items which have high growth rates of unit value 2014-2018

HS Code	Product description	RCA		Export value in US $ thousand		Average annual growth rate	
		2014	2018	2014	2018	Value	Unit Value
Total Leather sector Exports				1,388,506	1,380,053		
420340	Clothing accessories (excl. of 4203	9.46	16.79	2,749	4,363	33.26	16.91
411310	Leather further prepared after tan	80.64	139.18	137,253	121,848	-2.08	7.97
410441	Tanned/crust hides and skins of bovine	0.08	1.63	150	2,647	1699.86	2.07

HS Code	Product description	RCA		Export value in US $ thousand		Average annual growth rate	
		2014	2018	2014	2018	Value	Unit
420329	Gloves, mittens and mitts, of leather	57.76	81.56	154,597	201,449	7.15	0.58
420100	Saddlery and harness for any animal	5.52	3.94	9,167	7,736	-2.11	-2.60
420500	Articles of leather/of composition	1.87	1.09	6,304	4,772	-6.59	-7.12
640320	Footwear with outer soles of leather	19.47	14.18	15,825	12,453	30.90	-21.51
640420	Footwear with outer soles of leather	1.58	1.83	1,311	1,425	16.49	-22.01
640319	Sports footwear other than ski-boot	0.40	0.10	2,371	454	-27.02	-23.29
410419	Tanned/crust hides and skins of bovine	0.02	1.01	39	1,555	1790.16	-23.49

Source: UNCOMTRADE through WITS, and author's calculation

Table 7 presents data on the ten leather sector commodities which experienced the highest unit value growth during 2014-1. They account for 23.7% of sectoral value in 2014 about 26% in 2018. Six of these ten leading unit value products actually have negative unit value AAGR during 2014-2018. Unit value growth is positive only for clothing accessories, leather prepared after tanning, tanned hides and skin and leather gloves. RCA values have risen significantly for clothing accessories, tanned leather, gloves and footwear. RCA values are significantly higher for leading leather commodities. The share of the positive unit value growth leather sector commodities in total sectoral exports in 2018 was about 29% with leather prepared after tanning (411310) and gloves (420329) accounted for 23.5% of sectoral exports.

Table 8. Clothing/Apparels items having high Export value 2014-2015

HS Code	Product description	RCA		Export value in US $ thousand		Average annual growth rate	
		2014	2018	2014	2018	Value	Unit value
Total Clothing Exports				7,582,738	8,246,419		
630260	Toilet linen and kitchen linen, of te	78.42	93.41	746,683	820,717	2.42	-1.24
620342	Men's/boys' trousers, bib and brace o	19.28	26.80	636,311	762,104	4.84	-35.75
630231	Bed linen (excl. knitted/crocheted)	140.59	160.98	796,473	744,958	-0.11	-3.53
630210	Bed linen, knitted/crocheted	288.68	360.98	521,550	654,701	7.17	-3.11
630239	Bed linen (excl. knitted/crocheted)	470.06	472.84	573,595	588,002	1.02	-2.59
620462	Women's/girls', trousers, bib and bra	16.41	20.90	435,464	528,521	5.13	-36.36
630710	Floor-cloths, dish-cloths, dusters	123.40	131.95	358,220	396,831	2.64	-28.69
610590	Men's/boys' shirts, knitted/crochet	233.10	257.76	258,468	262,020	1.05	-2.44
610510	Men's/boys' shirts, knitted/crochet	41.00	41.94	350,389	240,342	-8.57	-33.13
610910	T-shirts, singlets and other vests, k	6.74	6.76	265,714	203,756	-6.23	-32.50

Source: UNCOMTRADE through WITS, and author's calculation

Table 8 lists ten leading clothing sector exports ranked in terms of export value, RCAs and value and unit value growth rates in 2014 and 2018 – export value growth is negative in three product group (non-knitted bed linen, men's shirts and T-shirts). The share of the top ten commodities in total clothing export value fell from 59.9% in 2014 to 54.9% in 2018. Value AAGR of these ten commodities is modest during 2014-2018, the highest earning recorded by knitted bed linen (7.2%). Unit value growth is negative in all ten leading clothing products (ranging from minus 36% to minus 1.24%). High negative unit value growth was recorded for women's/girls' trousers (-36.4%), men's/boy's trousers (-35.8%), men's/boys' knitted shirts (-33.1%), T-shirts (-32.5%) and Floor cloths (-28.7%). RCA's in most cases were very high and in most cases rising moderately.

Table 9 lists clothing sector commodities with the highest unit value growth during 2014-2018. These accounted for just 1.7% of sectoral export value in 2014 and 1.8% in 2018. Unit value growth was negative or negligible in three of the ten leading unit value growth product group. It exceeds 100% in the case of sacks and bags and 10% in the case of men's overcoats, other sacks/bags and rags. Together these four products accounted for less than one percent of total clothing sector export value in 2018. RCA values for most high unit value products are high but relatively stagnant.

Table 9. Clothing/Apparels items having high Export value 2014-2018

HS Code	Product description	RCA		Export value in US $ thousand		Average annual growth rate	
		2014	2018	2014	2018	Value	Unit Value
Total Clothing Exports				7,582,738	8,246,419		
630533	Sacks and bags, of a kind used for th	2.19	4.09	6,145	11,476	26.84	122.94
610190	Men's/boys' overcoats, car-coats, c	14.87	44.00	4,240	14,593	39.81	20.28
630539	Sacks and bags, of a kind used for th	24.33	39.87	9,642	21,008	33.15	10.52
631090	Used/new rags, scrap twine, cordage	40.93	54.72	18,231	19,337	1.84	10.41
630900	Worn clothing and other worn articles	1.33	2.04	7,543	11,388	15.25	8.95
630251	Table linen (excl. knitted/crochete	18.85	34.04	14,147	16,754	9.97	5.56
630291	Toilet linen and kitchen linen other	25.85	12.36	24,604	11,096	-6.47	2.62
630229	Bed linen (excl. knitted/crocheted)	148.24	132.13	33,145	19,781	25.45	0.03
610310	Men's/boys' suits, knitted/crochete	20.90	52.25	5,530	13,539	29.98	NA
620329	Men's/boys' ensembles (excl. knitte	8.87	38.60	7,491	12,362	21.73	-52.82

Source: UNCOMTRADE through WITS, and author's calculation

We are experiencing "immiserizing growth" with respect to our clothing exports[6]. Leading clothing exports have negative unit value growth and high and moderately rising RCAs. The commodities which have high unit value growth within this sector yield a miniscule share of total clothing sector export value. We are failing to link up to a global clothing sector value chains which can enhance the value added content of our clothing sector exports.

Table 10. Textiles items having high export value, 2014-2018

HS Code	Product description	RCA		Export value in US $ thousand		Average annual growth rate	
		2014	2018	2014	2018	Value	Unit Value
Total Textiles sector Exports				5,998,148	4,670,456		
520512	Cotton yarn, single (excl. sewing t	180.35	214.26	843,545	1,017,987	7.60	-3.39
520942	Woven fabrics of cotton, containing	75.18	125.91	348,869	447,171	7.45	-27.29
520812	Woven fabrics of cotton, unbleached	78.30	96.41	131,888	214,956	14.27	-33.68
520932	Woven fabrics of cotton, containing	88.93	130.81	151,975	168,766	3.12	-36.20
520912	Woven fabrics of cotton, containing	211.70	412.41	104,283	162,881	15.51	-5.93
520532	Cotton yarn, multiple(folded)/cable	366.10	328.49	298,642	152,229	-11.45	-10.76
551341	Woven fabrics of polyester staple f	233.63	73.19	175,822	136,102	-4.20	-30.19
521021	Woven fabrics of cotton, containing	350.12	456.91	83,351	114,907	10.68	-27.51
520100	Cotton, not carded/combed	12.28	7.19	359,348	105,092	-24.17	-11.08
520522	Cotton yarn, single (excl. sewing t	131.95	86.36	215,622	102,651	-16.05	-9.20

Source: UNCOMTRADE through WITS, and author's calculation

Table 10 lists highest export value yielding textile sector products. Together these ten leading products accounted for 45% of sectoral export value in 2014 and 57% in 2018. Value AAGR was negative in three cases and exceeded 10% in the case of unbleached woven fabrics (520812), cotton woven fabrics (520920), cotton yarn and cotton woven fabrics (521021). Unit value growth was highly negative in all of the ten cases. RCA values were high and rising in most cases. Our share of world trade was increasing but we were earning less and less per unit of export from the textile sector.

Table 11 lists highest unit value growth products from the textile sector. Export value from these accounts for 3.1% of total sectoral export value in 2014 and 4.2% in 2018. Thus while the share of thigh unit value growth textile sector products remains very low it nevertheless has doubled during the 2014-2018 period. Negative

[6] This concept formulated by Jagdesh Bhagwati in the 1950s connotes a situation in which exports are growing at the cost of declining unit values.

growth in export value has been experienced by four of the high unit value growth commodities but very high value AAGR has been experienced by woven fabrics of jute, knitted netting of twine woven fabrics of cotton (521151), cotton waste and yarn waste. Unit value average growth has been high and increasing in seven of the ten leading unit value growth rate products. This illustrate that we are more market competitive in certain segments of the textile sector than we are in the clothing sector. However, the share of products with high RCA and high growth unit value remains small and in the overwhelming majority of textile sector product group (at HS 6-digit level) we continue to experience immiserizing growth.

Table 11. Textiles items having high unit value growth 2014-2018

HS Code	Product description	RCA		Export value in US $ thousand		Average annual growth rate	
		2014	2018	2014	2018	Value	Unit value
Total Textiles sector Exports				5,998,148	4,670,456		
520821	Woven fabrics of cotton, containing	72.90	93.76	39,417	37,529	-1.09	90.45
531090	Woven fabrics of jute/other textile	54.41	37.35	3,921	1,346	84.41	21.96
520291	Garnetted stock of cotton	33.50	60.62	3,369	3,161	8.50	21.29
560819	Knotted netting of twine, cordage/r	0.02	81.11	22	93,841	90104.3	16.68
520210	Yarn waste (incl. thread waste), of	188.70	149.91	33,013	12,285	-18.08	14.09
560129	Wadding; other articles of wadding	64.19	67.80	5,554	3,749	-7.49	10.05
520299	Cotton waste other than yarn waste	40.90	76.25	29,326	29,940	5.52	10.03
590700	Textile fabrics othw. impregnated,	3.10	4.59	4,163	5,204	19.11	5.84
521225	Woven fabrics of cotton (excl. of 5	86.86	80.45	7,976	5,896	-4.99	4.93
521151	Woven fabrics of cotton, containing	26.30	60.66	1,031	3,336	141.41	4.78

Source: UNCOMTRADE through WITS, and author's calculation

Table 12. Commodities with high RCA, high value and high unit value growth 2014-18

Sector	Commodities	Value in 2018 ($ thousand)	RCA		AAGR 2014-2018	
			2014	2018	Value	Unit Value
Fish	Prawns	59,732	1.81	2.83	24.07	6.37
	Fish	14,385	3.61	1.59	23.80	14.49
Food	Cereal straw	21,309	36.92	59.45	21,309.00	10.63
	Fresh Fruits	11,844	1.87	2.93	45.09	22.35
Clothing	Sacks/bags	11,476	2.19	4.09	26.84	122.94
	Men's overcoat	14,593	14.87	44.00	39.81	20.28
	Other sacks	21,008	24.33	39.87	33.15	10.52
	Worn clothing	11,388	1.33	2.04	15.25	8.95
	Table linen	16,754	25.88	34.04	9.97	5.56
Textiles	Knitted twine	93,841	0.02	81.11	90,104.30	16.68
	Cotton waste	29,940	40.90	76.25	5.52	10.03

Source: UNCOMTRADE through WITS, and author's calculation

Table 12 lists commodities of 4 major sectors, with high RCAs, high value and unit value growth rates over 2014-2018, the export value of which exceeded $ ten million in 2018.

Of the 1950 products in 2018 exported by Pakistan only 14 meets the criteria of (yielding value in excess of $ 10 million, (b) having rising RCA values in excess of unity with the exception of fish HS-030379) and toilet articles HS-392490), (c) value AAGR in excess of 5% and (d) unit value AAGR in excess of 5% during 2014-2018. Total value yielded by these 14 products amounts to about US$ 380 million - *i.e*, about 2% of total export value realized in 2018. Products with these characteristics - substantial revenue yields, rising RCAs relatively high value and unit value AAGR during 2014-2018 - represent 0% of total export revenue in the leather and machinery sectors, about 22% of sectoral value in the fish sector, less than 1% of food sectoral value 12% of chemical sector export value, less than 1% of clothing sector revenue and less than 3% in the textile sector aggregate value in 2018. Overall it is clear that the technological content of our export portfolio is very low. It

cannot be compared with even a relatively small member of the BRICS group - South Africa. As Mzumara (2016) has shown of the 657 products with RCA>1 that South Africa currently exports. 300 products are in the chemical, metal, machinery and transportation equipment sectors.

Spearman's rank correlation coefficient was estimated for 6-digit HS level sectors, ranked by RCA values on the one hand and unit value growth values on the other. Table 13 reports our results Spearman's rank correlation was negative for 9 out of 16 sectors - alarmingly including the clothing sector. Spearman's rank correlation was below 0.1 for as many as 5. Positive and significant rank correlation was estimated for spices and oil seeds. Exports of these commodities accounted for only 1.3% of total exports revenue in 2018.

Table 13. Correlation between RCA and unit value average growth rate

Sectors	Rank Correlation
Meat and Fish products	-0.09
Dairy and Honey	-0.26
Horticulture	-0.08
Spices	0.45
Cereals	0.01
Oil seed and Vegetable oils	0.16
Food items	0.07
Minerals and Petroleum	-0.01
Chemicals and Pharmaceuticals	0.07
Leather	-0.02
Textiles	0.02
Clothing/Apparels	-0.29
Stones/Glass and products	-0.10
Metals & products	-0.02
Machineries	-0.03
Miscellaneous	0.03

Conclusion

This article compares Pakistan's RCA with export value growth and unit value growth for the period 2014-1 and found immiserizing export growth. Our analysis provides sufficient evidence that our trade structure is out of sync with world trade patterns. RCA, value and unit value growth is significant as about 12% RCA values are high and rising in the rice, leather, textiles and clothing sector, but the share of products with relatively high RCA values in total export value has remained constant and has fallen in the clothing sector. Major exports have negative unit value growth – this is especially true for the textile and clothing sectors.

Products with high unit value growth have a miniscule share of total sectoral value in all sectors with the exception of minor sectors such as pharmaceuticals and fish products. There is a positive association between high value growth and high unit value growth also in the food sectors. Association between aggregate value growth and unit value growth is particularly low in the major sectors *i.e.*, leather and apparel sectors. Textile sector performance is also weak however the share of high unit value growth products in aggregate sectoral value has doubled during 2014-2018 (from approx. 2% to 4%). It is clear that we are slightly more competitive in some segments of the textile as against the clothing sector.

Spearman's rank correlation coefficient shows a depressing fact that we have not succeeded in moving up the value chain in the product groups in which we specialize - clothing, textiles, leather, and chemicals. Our trade strategy is focused on opening up new markets - through FTAs, PTAs etc. What is required is pursuit of vertical export diversification in markets in which we already have a foothold through building up firm to firm supply chain linkages.

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Drivers of the Farmers' Protest Movement in Late Nineteenth Century: Revisiting Douglass North's Thesis

Ahmad BORAZAN
Economics Department, Craig School of Business
California State University-Fresno[1], *United State of America*
aaborazan@csufresno.edu

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Abstract:

This paper reexamines Douglass C. North's claim that the Farmers' Populist Movement in the late nineteenth century was not because of rural distress. North used wholesale prices for farm and other products, in addition to farmland prices, to conclude that farm products' terms of trade were improving. By constructing a rural consumer price index using Thurston M. Adams' detailed study on Vermont farmers, we find that wholesale farm prices declined more than the consumer prices, with no correlation between the increase in farmland prices and farmers' income. The findings reinforce the economic hardship thesis as an explanation of the farmers' protest movement.

Keywords: US economic history; price level index; American farmers' unrest.

JEL Classification: N31; N11; N51; E31.

Introduction

The farming sector was an important economic sector for the US economy in the late nineteenth century in terms of both its output and share of labor force (Table 1 and Table 2). Farmers belonged mainly to the middle class. Although farm wage labor was an established class by 1900, it constituted less than 13% of total farmers, except in the Western US, where production was highly mechanized and done on a large scale (Wright 1988). US history in the late nineteenth century was marked by farmers' discontent, which manifested itself in social and political movements during the period of prolonged price deflation (1873–1896) (Jäger 2020).

The reasons behind the protest movement during this time are still debated among economic historians and historians in general (McMath *et al*. 2008, Whaples 1995). The widely accepted explanation for the Populist Movement used to be based on John D. Hicks's thesis in his 1931 book *The Populist Revolt*; he sought to explain the protests in terms of the economic hardship of farmers owing to declining crop prices, burdensome borrowing conditions, and debt appreciation from deflation.

In this era, the greatest decline in the price level occurred between 1873 and 1896. Farmers blamed this decline on the gold standard and advocated the use of abundantly available silver to increase money supply and the price level. Farmers also complained about railroad companies' freight fares and the rent they enjoyed, along with the middlemen, by taking over the processing, transportation, and distribution of crops to the final users. Farmers also called for a bigger role for government in the stabilization of market prices, as well as the regulation of the railroad industry (Hicks 1931).

Table 1. Percent distribution of the share of the agricultural sector of gainful workers, ten years old and over for the United States: 1870 to 1900

Occupation	1900	1890	1880	1870
Agriculture Sector Share of Labor Force	37.5	42.6	49.4	53.0

Note: Data from United States Census Bureau (1975)

Economic historians unanimously accepted Hicks's view until the rise of the cliometricians, led by Douglass North. North (1966) questioned the farmers' grievances regarding their economic conditions during that period, and argued that the available data did not back their claim. North looked for mainly sociological or psychological causes, such as uncertainty, risk, and change in farmers' status.

[1] 5245 N Backer Ave M/S PB20, United State of America

Table 2. Farm sector share of output in millions of US dollars

Year	Farm Sector output*	Gross National Product^	Farm sector share of output
1870	2,774	8,410	33.00%
1880	3,263	1,106	29.50%
1890	4,298	1,344	25.27%
1900	5,780	1,858	18.51%

Note: Farm gross output data from Bruce L. Gardner (2006), Gross national product from Balke and Gordon (1989)

These causes appear to be justified, given the structural changes in the US economy, the declining importance of the agriculture sector, and the sector's integration with the world agriculture market. However, I argue that they were secondary in importance to the deterioration in farmers' income and economic conditions. The fact that the farmers' protest movement came to an end in 1896 only after an increase in crop prices and farm incomes (Eichengreen *et al.* 2019) lends support to my view. The importance of crop prices in determining farmers' economic condition becomes evident when we consider the stagnation in productivity per acre (Table 3) during the period studied in this paper. This stagnation caused the dependency of farmers' income on prices and meant lower crop income, during the deflation period and higher income post-1896.

Table 3. Decade average yield of selected crops

Decade	Wheat	Corn	Barley	Cotton	Tobacco
	Bushels per acre	Bushels per acre	Bushels per acre	Pounds per acre	Pounds per acre
1871–1880	12.57	26.36	21.08	172.5	739.7
1881–1890	13.03	25.41	23.28	172.7	714.7
1891–1900	13.72	26.46	23.92	192.1	756.5

Note: Data from Julian Alston and Philip Pardey (2006)

1. Literature Review

Bowman and Keehn (1974) used state-level data on the prices that farmers received for their products to examine farmers' terms of trade between 1870 and 1900, and found no secular decline in terms of trade or the purchasing power of farmers, but there was a significant fluctuation in their purchasing power, which supports the timing of farmers' protest movements. However, the authors used Ethel D. Hoover's *urban* price index for 1870–1900 to estimate the purchasing power of farmers' income. This is not a realistic assumption because farmers did not live in the cities but in rural areas. They traded primary commodities for manufactured goods.

Other researchers, such as Mayhew (1972), followed North's revisionist stand, and speculated that the greater commercialization brought to an end the self-sufficiency of farmers by the late nineteenth century and subjected them to market prices. McGuire (1981) attempted to reinforce North's argument of social instability as a source of protest, rather than the deteriorating economic conditions; he did so by showing that the variance in income and prices in data on 14 states was significantly correlated to the intensity of the protests.

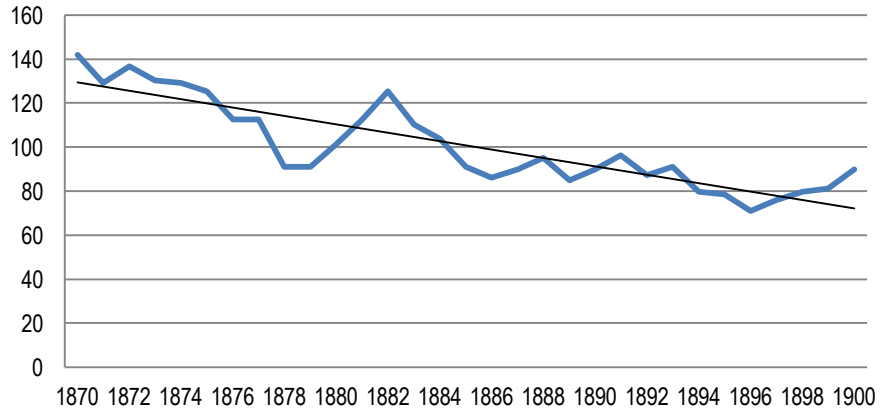
Stock (1984) used state-level data on North Dakota to attribute farmers' discontent in that era to the fear of foreclosure on farm mortgages. Although Stock blamed economic distress as one of the reasons for the protest movement, he accepted North's thesis of improvement in farm income and economic conditions.

Persson and Sharp (2013) investigated wheat prices and claimed that the basis of farmers' discontent was the transportation cost - perceived to be large - that was deducted from the market prices of their products, especially grain.

2. Douglass North's Explanation

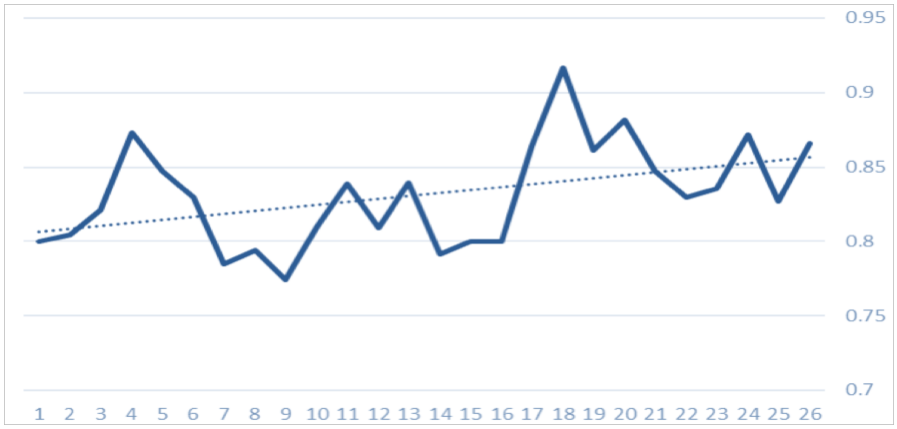
According to North, there was a decline in prices during the late nineteenth century (Figure 1), however, the Warren–Pearson index of wholesale prices shows that agricultural terms of trade untill 1890 were trending upward. Hence, farm prices did not decline as much as other commodities. This meant that farmers were "really getting more for their money" as the prices of other manufacturing goods were declining more than farm product prices, (Figure 2).

Figure 1. Wholesale price index for farm products



Note: Wholesale price index data from Michael R. Haines (2006).

Figure 2. Agricultural terms of trade; 1865–1890 ratio of wholesale farm prices to all wholesale prices



Note: Wholesale price index data from Haines (2006).

Second, North used the increase in the value of land during the period as an indicator of higher farm income. Then, to further debunk the farmers' claims of economic distress, he referred to the fall in prices of railroad fares and the insignificant appreciation in the real cost of debt.

Contesting North's thesis, I maintain that measuring farmers' real relative income by comparing wholesale prices of farm products to non-farm product wholesale prices ignores the fact that farmers are themselves consumers, and consumer price trends and levels do not necessarily coincide with those for wholesale prices. Adams' (1944) detailed study of Vermont farmers' prices and incomes from 1870 to 1940 shows a considerable spread, both between retail and wholesale prices, and in the price trends of a group of consumption items. Furthermore, when I calculate the deflation for Adams' basket of consumption goods for the entire deflationary period (1873–1896), I find that while the price of the wholesale basket showed a decline of 76%, that of the retail basket declined by only 55%. Thus, the wholesale price trend was dissimilar to that of retail prices for the rural consumption basket. The steeper decline in wholesale prices affected farmers far more than urban consumers. Further, I claim the same trends apply to farmers' income and prices at the national level.

Adam attributes the spread between wholesale and consumer price indices to the wage bill of employees in the distribution chain to final consumers, as well as the degree of monopoly in the distribution chains. This idea is reinforced by the narrative offered in Chandler (1977) regarding the rise of mass retailers in the post-Civil War era. My calculations show a correlation of 0.46 between the differences in the change of the wholesale price, the farm consumer price index, and the change in the wages of all annual nonfarm employees. This suggests a moderately positive relationship (Table 4).

To examine the effects of price deflation on farmers' economic status, I construct a consumer price index for farmers. I find that the decline in farm product prices was much higher than that in consumer product prices. Hence, the farmers did not get more for their money, as North argued. Second, I argue against North's use of the increase in farmland price as an indication of the improvement in the income and economic conditions of farmers.

Table 4. Nonfarm workers' wages versus the farmers' wholesale and retail prices spread

Year	Wholesale Price Index Change	Farmers Consumer Price Index Change	1st Column - 2nd Column	Annual Non-Farm Employees Annual Earnings Growth
1873	-2.15686	-1.25517	-0.90169	-4.11523
1874	-5.27722	-3.16091	-2.11632	-5.79399
1875	-5.50071	-5.96935	0.468642	-3.64465
1876	-6.71642	-3.54859	-3.16783	-4.72813
1877	-3.76	-1.66259	-2.09741	-3.47395
1878	-14.8795	-7.49545	-7.38402	-2.57069
1879	-1.46484	-1.33713	-0.12771	-1.58311
1880	11.19921	1.568162	9.631045	3.485255
1891	1.464435	-1.26667	2.731107	1.052632
1892	-6.59794	0.424809	-7.02275	0.416667
1893	2.538631	-1.15059	3.689224	-4.97925
1894	-10.8719	-2.9442	-7.92771	-8.29694
1895	-1.08696	-1.88713	0.800169	4.285714
1896	-4.884	-0.88082	-4.00319	0.228311

Note: Earnings data from Margo (2006a).

3. Constructing the Farmers' Consumption Price Index

In constructing the farmers' price index, we used the 1885 weights for items consumed by a farming family, as reported in Adams' (1944) study of the prices and income of Vermont farmers (Table 5). The main sources of Adams' data were sales records of stores, farm account books, diaries, and US Department of Agriculture records. The series covers the prices and wages paid and received by Vermont farmers from 1780 to 1940. Adams assigned weights to groups of consumption items over 20-year intervals. For the price data series of consumed products, I used Hoover's (1960) consumer price indices for 1873–1880 collected from the *Weeks Report*, in which prices were gathered from 40 cities in 16 states between 1850 and 1880.

As retail price data are not available for 1881–1889, this period is excluded from this section study. For price indices for the remaining part of the deflationary period (1890–1896), we relied on Rees' (1961) price data series, which was collected from Douglas's (1930) food index, main retail stores catalogues, newspapers, and data from the Bureau of Labor statistics. If we compare the weights attached to the consumption items, we see a similarity between Rees' and Hoover's weights. This is because they both represent the consumption habits of urban dwellers (Kitov and Kitov 2008), whereas Adams weights are different as they represent rural farmers' consumption habits. A close look at the three biggest items in Adams and Rees' indices shows that, while the weights for food were similar, those for the other two items (clothing and rent) showed considerable divergence (Table 6, Table 7, and Table 8).

Table 5. Adams' farmers consumption pool

Farm Family Living	1865	1885	1905
Building Materials	10	10	10
Clothing	28	32	27
Fire Insurance	3	1	1
Food	43	43	44
Medical Care	8	5	6
Taxes	3	4	5
Transportation	2	2	4
Others	3	3	3
Total	100	100	100

Note: Numbers from Adams (1944).

Table 6. Food, clothing, and rent weights in the three series

	Food	Clothing	Rent
Hoover 1875	57%	15.2%	17.7%
Rees 1901	44.1%	17%	22.3%
Adams 1885	43%	32%	10%*

Note: Adams (1944) used building materials to depict the cost of accommodation; according to Lindert (1988) building materials are correlated to the rental spending of farmers.

Table 7. Hoover weights from 1960

Group	Value	% of Total
All commodities and services	726.70	100.0
Food	417.36	57.4
All items other than food	309.34	42.6
Clothing	110.40	15.2
Rent	128.47	17.7
Fuel and light	51.34	7.0
Others	19.13	2.7

Table 8. Rees weights for the cost of living index in 1901

Consumption Basket Weights	Food	Clothing	Home Furnishing	Rent	Fuel and Light	Liquor and Tobacco
	44.1	17.9	4.5	22.3	7.2	4.0

Hoover (1960) collected urban price indices for the following items: food, clothing, rent, fuel, and light, and "other"; the last item included medical care, newspapers, soap, and starch. The price index constructed in this paper includes food, clothing, and rent from Hoover's series. Further, to account for the difference between rents in urban and rural areas, we replaced the rent price in Hoover's series with the wholesale price of construction materials, as calculated in the Warren–Pearson wholesale price index. We justified the replacement by Lindert (1988), who maintained that rental income in farms correlated to the wholesale price of construction materials. For medical care, it is used Adams' series, which was also used by Hoover. Owing to the lack of other consistent price series, 10% of rural farmers' consumption basket is not accounted for; to include the residual 10%, I multiplied the basket items with 1.1111.

Hence, the farmers' consumption price index is:

$$CPIfarmers = \sum 1.111 * (0.43 * cpifood + 0.32 * cpicloth + 0.1 * cpiconstruction + 0.05\ cpimedical\ care) \quad (1)$$

If we compare the price deflation between the urban and rural areas, we find that the decline in consumer prices index during 1873–1880 was more in the rural areas. For 1890–1896, we find that the decline in rural and urban areas was almost equal.

However, in contesting North's thesis, we are concerned with how farm product prices fared in comparison to farmers' consumption basket prices. Upon calculating the decline in prices, I find that while farm wholesale prices declined by 26.7% and 15% during 1873–1880 and 1891–1896, respectively. The consumer price index for rural farmers declined by 22.9% and 7.7% during 1873–1880 and 1891–1896, respectively. This indicates that the decline in consumer product prices was less than the decline in farm product prices (Table 9, Table 10, Table 11, and Table 12).

Table 9. Comparison of consumer price changes

Time Period	Urban Consumer prices Change (Hoover Series)	Urban Consumer prices Change (Rees Series)	Farmers Consumer Price Change (1885 weights)
1873–1880	-20.1%	-	-22.9%
1890–1896	-	-7.9%	-7.7%

Table 10. Rural consumer price index (1873–1880)

Year	Rural Consumer Price Index 1873–1880 (base year 1860)	Rural Price Index Annual Change
1873	135.6144	-1.25517
1874	131.3278	-3.16091
1875	123.4883	-5.96935
1876	119.1062	-3.54859
1877	117.1260	-1.66259
1878	108.3469	-7.49545
1879	106.8981	-1.33713
1880	108.5745	1.568162

Table 11. Rural consumer price index (1890–1896)

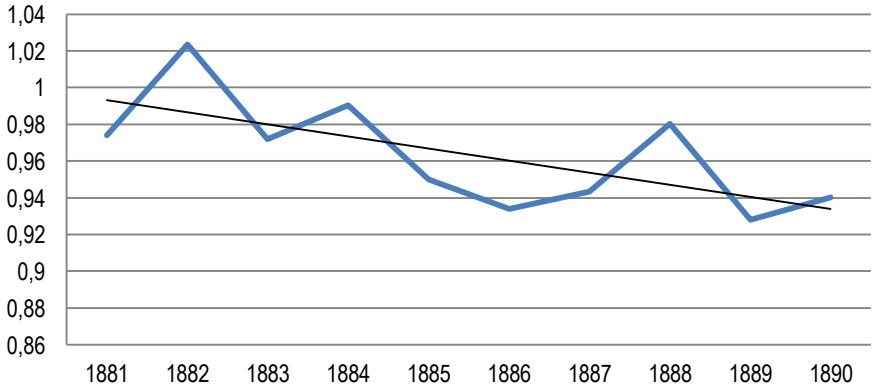
Year	Rural Consumer Price Index 1890–1896 (base year 1914)	Rural Consumer Price Index Annual Change
1890	132.4554	-
1891	130.7776	-1.26667%
1892	131.3332	0.424809%
1893	129.8221	-1.15059%
1894	125.9999	-2.9442%
1895	123.6221	-1.88713%
1896	122.5332	-0.88082%

Table 12. Total price changes

Time Period	All Products Wholesale Price Change	Farm Product Wholesale Price Change	Farmers Consumer Price Change (1885 weights)
1873–1880	-28.6%	-26.7%	-22.9%
1891–1896	-15%	-21.6%	-7.7%

Even for the years between 1881 and 1889, for which retail price data is missing, we find a downward trend in the terms of trade for farm products (Figure 3).

Figure 3. Wholesale farm prices/wholesale all prices, 1881–1889



Note: Wholesale price index data from Haines (2006)

4. The Farmland Prices Discussion

North (1966), contesting the previous consensus on the deterioration in farmers' income and economic conditions being an explanation of the Populist Movement, maintained that the increase in the value of land in this era reflects the higher income derived by farmers from their land.

However, the increase in farmland prices should be, first, attributed to the expansion of agriculture to lower-quality land; this drove up the prices of the higher-quality land (Lindert 1988). Second, the public land policy that followed the Civil War encouraged settlement in the Western US in order to accompany the expansion of railroads to the western frontier (Hicks 1931). Public land policies, such as the 1862 Homestead Act, the Preemption Act of 1841, and the 1873 Timber Culture Act, led to a threefold and sevenfold expansion in farmland in the North Central and West, respectively, between 1860 and the end of the decade (Table 13). They also provided farmers with land tracts either for free or at very low prices. There was nowhere for land prices to go but up. Furthermore, a part of the increase in the prices could have been because of the activities of the speculators, who took advantage of the expansion of railroads. In any case, the increase was not driven by higher farm income. Finally, land prices at the national level declined after the Civil War - the South being the biggest farmland area through the entire period. It is not surprising that values plummeted during the war and began to rise in the postwar years.

Table 13. Land in farms by region and state in thousand acres: 1860–1900

Year	United States	Northeast	North Central	South	West
1860	407213	61082	107900	225514	12718
1870	407735	62744	139215	189556	16219
1880	536082	67986	206982	234920	26194
1890	623219	62744	256587	256606	47282
1900	841202	65409	317349	362036	96407

Note: Data from Olmstead and Rhode (2006)

Conclusion

This article underlines economic conditions in the farming sector as a response to North's thesis, which denies the role of economic conditions as a cause of the political struggle of the farmers, who were 30%–40% of the total labour force during the period studied. I argue that it is not sufficient to look at the relative wholesale farm product prices to deduce the conditions of farmers because they were consumers too. While some researchers have taken retail prices into consideration (Hoover 1960, Bowman and Keehn 1974), they applied the weights attached to the urban consumers' items to those of rural farmers. I correct this misapplication by using farmers' consumption weights, as reported by Adams (1944). This allows me to more accurately explore the effects of price changes on farmers' economic well-being. I also extended the analysis to 1890–1896, which overlaps with the duration of the Populist Movement, a facet not covered by North's analysis.

After looking at retail and farm prices, consumption patterns, and changes in the land market, I find that farmers' protests during the deflationary period had a legitimate economic basis, especially when we factor in the importance of farm credit and loan tenure of 4–5 years (Eichengreen 1984).

Future research should be directed to obtain micro-level insights into the economic conditions of the protesting farmers in the US in the late nineteenth century by building on this analysis. In particular, it can look at state-level price series for both farm products and items of consumption in rural areas of individual states in the US.

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Democracy Level and Its Impact on Economic Development

Zahin Mahmood CHOWDHURY
Department of Banking and Finance, Chulalongkorn Business School
Chulalongkorn University, Thailand
czahin@gmail.com, 6081872926@student.chula.ac.th

Pornpitchaya KUWALAIRAT
Department of Banking and Finance, Chulalongkorn Business School
Chulalongkorn University, Thailand
pornpitchaya@cbs.chula.ac.th

Narapong SRIVISAL
Department of Banking and Finance, Chulalongkorn Business School
Chulalongkorn University, Thailand
narapong@cbs.chula.ac.th

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Abstract:

While there are benefits of democracy, not all democracies are the same. Consistent with previous findings, we find democracy positively affects economic development in general. However, after we classify democracy into different levels, we find a high democracy level positively affects economic development more than the low and mid democracy level. We find both high and low democracy levels have further enhanced the positive effect of higher political rating (lower political risk) on economic development.

Consistent with previous findings, we find high population growth negatively affects economic development overall. A high democracy level, however, helps mitigate the negative effect of higher population growth on economic development while low democracy level enhances the negative effect further. We find the democratic level does matter more for the economic development of developing economies compared to developed economies. We find the democratic level helps contribute to the positive relationship between lower political risk and economic development of developing economies. However, if the democratic level of the developing economies is low, higher population growth will further enhance the negative effect of high population growth on economic development. Therefore, the democratic level does matter for economic development and channels through which democracy level affects economic development, especially for the developing economies.

Keywords: democracy; democracy level; economic development; political risk; population growth.

JEL Classification: E00; I15; P16; P48.

Introduction

According to Freedom in the World 2019 by Freedom House, democracy has been in a steady decline for the last 13 years, worldwide. While it is easy to harp on the benefits of democracy from a theoretical point, it is also obvious that not all countries can ensure the inherent economic and personal freedoms promised by democracy. Previous studies (Acemoglu *et al.* 2019, Heo and Hahm 2015) have found that the key difference is the maturity of the democratic institutions that make the difference.

Several research papers have studied the impact of democracy on economic development. Researches conducted by Acemoglu *et al.* (2019) and Carden and James Jr. (2013) have proven that democracy has led to higher overall growth in the long term. Acemoglu *et al.* (2019) find that if a country has been able to sustain a democratic system over the long term, GDP would increase by 20-25% in the first 25 years after democratization. In other words, the longer a country is democratic, the more impact democracy can have on its long-term economic prospects. The democratic system by not being leader-centric allows for a group process in policymaking which leads to better quality policies (Gerring *et al.* 2005). A democratic system also allows for a more independent judicial system, which is one of the most important underlying factors of property rights (Gerring *et al.* 2005). Stronger property rights lead to productive economic activities and steers away from rent-seeking activities (Acemoglu 1995,

Feng 1997) and thus help to enhance economic development. Acemoglu et al. (2019) argue that democracy may result in economic reform and reduction in social unrest and therefore results in higher economic growth.

Perssonand Tabellini (2006) believe that not all democracies are the same. Gerring *et al.* (2005) find the degree and duration of democracy affect economic growth. The level of democratic maturity is very different across countries (Knack and Keefer 1995). A high democracy level is likely to positively impact economic development more than a low democracy level. This is due to, in contrast to high democracy level countries, political leaders in younger/low or less developed democracies tend to over-promise and set lofty expectations especially in poor countries (Gerring et al. 2005). Thus, looking at how different level of democracy affects a country's economic development is interesting.

To understand more how a country's democracy level impacts economic development, we investigate the channels through which democracy level affects economic development. In other words, we investigate how the democracy level helps contribute to the factors previously found to affect economic development. Among many factors that found to affect economic development, we are particularly interested in political risk and population growth. Uddin *et al.* (2017) find political risk has negative effects on economic growth while they find political stability is crucial for the economic growth of developing countries. Henisz (2000) also finds political stability positively affect economic growth as a reduction in political risk by one standard deviation enhances economic growth by roughly 1.3%. The evidence of the contribution of population growth on economic development has been mixed. Heo and Ham (2015) find population growth provides input in the form of labor, which in turn helps enhances economic output. Becker *et al.* (1999) argue that population growth in low-income, agricultural societies tend to slow growth in per capita income due to diminishing returns while the growing population in high income, urban economies tend to give rise to greater income growth as a result of increasing returns from greater specialization and more rapid accumulation of new knowledge. Peterson (2017) argues that rapid population growth is likely to be detrimental to low-income countries' economic growth in the short-run and medium run as it leads to a large number of dependent children. Therefore, if the country's democracy level does matter for economic development, it is interesting to investigate how the democracy level affects the relationship between political risk and economic development as well as population growth and economic development.

To the best of our knowledge, we help contribute to the existing literature by focusing on how democracy level affects economic development. In other words, rather than just focusing how "*democracy*" affects economic development like previous literature, we focus on "*democracy level*" instead, as we firmly believe different democracy level contributes to economic development differently. We believe that a country that has been democratic for 10 years is vastly different from a country that has just started practicing democracy. As Heo and Hahm (2015) find more mature democracies have better economies, we believe high-level and maturity of democracy is a key reason that helps to enhance economic development and that somehow set high democracy level apart from low democracy level. Our study also contributes to the existing literature by investigating channels through which democracy level affects economic development by focusing on how it affects the relationship between political risk and economic development as well as population growth and economic development. Also, we help contribute to the existing literature further by studying whether the *"democratic level"* matters more to the economic development of developed economies compared to less developed economies.

Using annual data of 125 developed and developing countries from 1990 to 2016, we find democracy does positively impact economic development in overall although we also find autocracy also positively affects economic development. To identify what sets high-level democracies apart from mid and low-level democracies in terms of its impact on economic development, we shift our focus to democratic countries only which brings the total countries in our sample to 105. We then categorize democracies into three levels: high, mid, and low based on the Freedom House Index criteria. We find high-level democracies has a higher positive significant impact on economic development more than low and mid democracy level. This result is consistent with the study of Lehkonen and Heimonen (2015) who find younger democratic institutions have a lower impact as opposed to more mature democratic institutions.

When investigating further how democracy level affects the relationship between political risk and economic development by using political rating as a proxy for political risk. A high political rating implies lower political risk and vice versa. As low political risk creates a favorable condition for the economy to thrive, the low political risk associated with high-level democracy should result in better economic development compared to a low democracy level where leaders tend to over-promise and set lofty expectations (Gerring *et al.* 2005). Besides, Doucouliagos and Ulubaşoğlu (2008) find democracy has significant and positive indirect effects through lower political instability and higher economic freedom. Therefore, we expect a high democracy level associated with lower political risk would help enhance a nation's economic growth more compared to the low democracy level.

Our results show high political rating (lower political risk) has a positive and significant impact on economic development in general. When we investigate how democracy level affects the relationship between economic development and political risk, we find both high and low democracy levels help to enhance the positive effect of lower political risk on economic development. Upon investigating further whether the results would be different if focusing on developed countries and less developed countries only. In the case of a developed country, we find high and low democracy levels do not help enhance the positive effect of lower political risk on economic development. On the other hand, in the case of a developing country, we find both high and low democracy levels help enhance the positive effect of lower political risk on economic development. Thus, the democracy level seems to matter more for the economic development of developing countries compared to developed countries.

For population growth, consistent with previous findings, we find population growth is negatively related to economic development in general. As Easterlin (1967) argues high population growth puts pressure on limited resources and may result in the reduction of private and public capital formation and therefore results in lower economic development. We, however, find that a high democracy level helps mitigate the negative effect of population growth on economic development. Low democracy levels, on the other hand, further enhances the negative effect of population growth on economic development. As per previous studies, population growth in a country where individual and national resources are already stretched, an increasing population may strain their limited resources especially for poorer nations where the democracy level is usually low. A high democracy level may help enhance the human capital accumulation and efficient allocation of limited resources and therefore helps mitigate the negative effect of population growth on economic development, especially for less-developed nations. When we separate the sample into developed and less developed nations, we find these effects are more pronounced in developing economies compared to less developed economies. Therefore, the democracy level does matter for economic development, especially for developing nations.

1. Previous Related Literature

Acemoglu *et al.* (2019) explore the relationship between democracy and economic development measured by GDP. Based on the Freedom House Index and the Polity IV, they created a list of 175 democratic countries. They found that a country's, if it has been able to sustain a democratic system long-term, GDP increases by 20-25% in the first 25 years after democratization. Therefore, the longer a country is democratic, the more impact democracy can have on its long-term economic prospects. They also found there is a high probability a country will shift to democracy or non-democracy if the same shift is happening in other neighboring countries. They have explored the channels through which democracy impacts economic development. Their findings suggest that "democracy contributes to growth by increasing investment, encouraging economic reforms, improving the provision of schooling and health care, and reducing social unrest"(Acemoglu *et al.* 2019, 51).

Heo and Hahm (2015) studied the feedback relationship between economic development and the maturation of democracy. They test how the maturity of democracy or democracy stock affects economic development and find that the two have positive effects on each other. They focused on the importance of institutional maturity on the relationship between democracy and economic development measuring by the log of GDP per capita. They used the variable *democracy stock* developed by Gerring *et al.* (2005). Democracy stock includes the transition, survival, and maturity of democracy by adding up democracy scores for 50 years (The Polity score). In the first model, they used Democracy Stock as the output variable, which is positively affected by Economic Development, Education, Economic Openness, Years of Independence, English Legal Origin, and negatively impacted by Social Conflict (Heo and Hahm 2015, 1046). The second model, they used Economic Development as the main output variable, which is positively affected by Democracy Stock, Population Growth, Education, Economic Openness, Life Expectancy, Government Expenditures, while being negatively impacted by Inflation and Social Conflict (Heo and Hahm 2015, 1046). The results indicated that both have a significant positive impact on each other. As for the other variables, life expectancy, economic openness, population growth, and education have a significant effect on economic development. While English legal origin and years of independence have a positive significant impact on democracy stock. Like Acemoglu *et al.* (2019) this implies that the longer a country has been democratic, the more time it had for its democratic institutions to grow and mature and that this growth has been aided by economic development.

Gerring *et al.* (2005) tested the relationship between democracy and economic growth by treating it as another variable or as they put it '*stock*' (a country's 50-year summation of Polity Score, which indicates the transition, maturity, and development of its democracy). First, they tested the effect of '*democracy level*' on economic growth; for which they found no statistical significance. In subsequent models, they use democracy as a '*stock*' and investigate other variables' effects on it. Those variables are GDP, trade openness, investment, inflation,

investment, life expectancy, regime durability *et al.* In these instances, democracy stock is strongly affected by these variables. They went further and tested democracy stock with a length of time. They concluded that the '*degree*' and '*duration*' of democracy affect economic growth. This conclusion is supported by Acemoglu *et al.* (2019) and Heo and Hahm (2015), about institutional maturity and its role in democracy.

Persson and Tabellini (2006) took a more detailed look at the impact of democracy on the economy measured by the log of per capita income. They felt that the evidence linking democratization and economic growth was weak as not all democratic regimes have the same characteristics. Moreover, different political regimes other than democracies have overseen economic growth. They found democratization after economic liberalization led to a 3.5% growth when the two are put together. On the other hand, economic liberalization after democratization is "barely positive and statistically insignificant" (Persson and Tabellini 2006, 321). They interpret that immediately after democratization, but without economic liberalization, leaders are more occupied with populist policies and resource redistribution which leads to growth is negative. It is only after economic liberalization, which lags by a few years, do they see positive economic growth. As mentioned before, economic liberalization with stronger property rights (a result of democratization) eventually leads to high growth. Singularly the two reforms have a small impact, but together they have a large impact. When comparing parliamentary and presidential democracies, they find that presidential democracies grow by 1.5% more than parliamentary democracies. They argued that parliamentary democracies increase government spending more, which in turn leads to higher taxes. They also looked at regime change in a democratic manner and a transition to democracy from an autocratic regime. Within a democracy, if the transition occurs constitutionally there is a 1% growth. A change from an autocratic regime is normally preceded by violence, which has an initial negative impact on growth.

Lipset (1959) investigated the conditions of a functioning and stable democracy. He tested two conditions that he thought were most important: economic development and legitimacy. Lipset posits that the wealthier a country is, the likelier it will be able to sustain democracy. Lipset divides economic development into four sub-categories: wealth, industrialization, urbanization, and education. His observations were based on English speaking and European countries and Latin American countries. He further divided democracies into four categories: stable democracies in English speaking and European countries, unstable democracies and dictatorships in English speaking and European countries, democracies and unstable dictatorships in Latin American countries, and stable dictatorships in Latin American countries. He averaged each nation's scores within a group. The result led him to conclude that economic development aids democracy because the countries with the highest scores were the most democratic.

La Porta, Lopez-de-Silanes, Shleifer, and Vishny (LLSV) made a series of research papers in the late 1990s examining the relationship between law and economic growth (Xu 2011). Xu (2011) does a literature review of those papers. He concludes that legal institutions play a major role in modern economies. La Porta, Lopez-de-Silanes, Pop-Eleches, and Shleifer (2004) test two types of judicial checks and balances: judicial independence and constitutional review and they have found that it has the most impact on economic freedom.

Therefore, to investigate how democracy level affects economic development, we set our hypotheses as follows:

H1: Democracy leads to economic development.

Heo and Hahm (2015), Acemoglu *et al.* (2019), Feng (1997), and Vega-Gordillo and Alvarez-Arce (2003) studied the impact of democracy on economic development. Acemoglu *et al.* (2019) and Carden and James Jr. (2013) find that democracy has led to higher overall growth in the long term. Vega-Gordillo and Alvarez-Arce (2003) find that political and economic freedom positively impact economic growth. They find economic freedom impacts economic growth more, and at the same time, there is a strong positive correlation between economic freedom and political freedom. Feng (1997) finds that democracy impacts growth indirectly by encouraging regular government change, which has a direct positive impact on economic growth. Feng (1997) also makes a clear distinction between regime change and government change. Government change under democracy happens constitutionally, which is another indication of stability. Regime change is always predicated on political turbulence (*e.g.* military coup) which harms the economy. Thus, if democracy leads to political stability, it would, therefore, lead to higher economic development.

H2: Higher democracy level impacts economic development more than a lower democracy level.

The level of democratic maturity is very different across countries (Knack and Keefer 1995). A high democracy level is likely to positively impact economic development more than a low democracy level. Acemoglu *et al.* (2019) find that the longer a country is democratic, the more impact democracy can have on its long-term

economic prospects. Gerring *et al.* (2005) find the degree and duration of democracy affect economic growth. Gerring *et al.* (2005) point out that decision making processes in democratic countries and authoritarian countries are vastly different. Authoritarian regimes' decision-making process is leader-centric while democratic regimes' is a group process. This, in turn, will lead to more quality decisions.

Following this line of reasoning, we can assume developed democracies will have more quality group inspired policies in contrast to less developed democracies given their level of maturity. Gerring *et al.* (2005) argue that political leaders in younger/less developed democracies tend to over-promise and set lofty expectations on what self-determination can provide in a limited timeframe. They argue that if the country in question is poor or ethnically divided, it is easy for citizens to become disillusioned. This is because it takes time for democracy to materialize. Krieckhaus (2006) believes democracy can constrain or facilitate growth. According to Krieckhaus (2006), democratic countries where leaders focus on redistributive policies or not focus on economic growth, democracy will constrain growth. On the other hand, if citizens can remove leaders based on poor performance, democracy will facilitate growth. With democracy, minorities (lower classes, ethnic, religious, or racial) find a larger voice and are no more held back through fear in voicing their demands.

Based on these reasons, we believe it is worthwhile to investigate the economic growth difference between developed and less developed democracies[1]. As Heo and Hahm (2015) and Acemoglu *et al.* (2019) have shown that democracies get stronger with time; therefore, in mature/high-level democracies these factors should have a larger impact. The longer the duration and maturity of democracy, the more positive effect it will have on economic development.

H3: Higher political rating (lower political risk) positively impacts the Economic Development of high-level democracies more and Population Growth negatively impacts the Economic Development more in low-level democracies.

H3.1: Positive contribution of Political Rating on Economic Development should be higher for high-level democracies.

Political rating is used to measure political risk in which higher political rating means lower political risk. Political risk is a factor that affects how businesses (local and foreign) and entrepreneurs make business decisions. The lower a country's political risk, the better environment it provides for investment. Low political risk also implies high political stability. Economic growth flourishes most in an environment of political stability (Feng 1997). Henisz (2000) finds that as the political risk decreases by one standard deviation, economic growth increases by roughly 1.3%. Abu and Karim (2015) find that political instability causes lower economic development, high corruption, and more reliance on aid. Thus, they argue that political stability would help enhance economic development. Jensen (2008) posits that risk reduction is the link between political institutions and their positive impact on economic performance. Busse and Hefeker (2007) also look at the impact of political risk on foreign direct investment (FDI). They find multinational companies' decision to invest in a country is heavily influenced by its political risk. Therefore, more FDI to the country results in higher economic development.

Democracy has a heavy role in reducing the political risk of a country (Feng 1997, Henisz 2000). Jensen (2008) has found that high-level democracy and high political risk have a negative relationship. Lehkonen and Heimonen (2015) find that there is a J-shaped relationship between political risk and type of government. In a J-shaped curve, strong democratic countries have low political risk and are on one end. While 'semi-democracies' have high political risk and fall on the bend of the curve. The reason being that strong democratic countries have different methods and strong institutions to deal with protests and anti-government activities. A look at their sample countries has shown that countries fall in the curve or 'semi-democracies' are countries that have been categorized as mid and low-level countries in this paper. They underline that as a country "pass[es] a threshold level, the higher levels of democracy decrease political risk." (Lehkonen and Heimonen 2015, 78). Also, they argue that low-level democracies don't yet have a strong institutional environment therefore their political stability is weak. Hence, low-level democracies have higher political risk, and only with time will their political risk decrease as their democracies mature. This is consistent with Heo and Hahm (2015) and Acemoglu *et al.* (2019) stating that democracies need time to let their institutions develop and mature. Also, Rock (2009), supported by Mohtadi and Roe (2003) finds that democracy and corruption have an inverted U-shaped curve. This mirrors Lehkonen and Heimonen (2015), where

[1] Gerring *et al.* (2005) tested something similar. While testing their hypothesis with all free countries, the authors did separate tests by excluding countries based on regions and test the effectiveness of democracy stock on economic development on the rest. They had 5 regions: Middle East, Africa, Asia, Latin America/Caribbean and OECD. They have found that the connection between democratization and economic growth are the same and regional effects are a non-issue.

younger democracies have higher corruption than more mature democracies. Rock (2009) also looks at bureaucratic quality and rule of law. They have a J-shaped pattern exactly like Lehkonen and Heimonen (2015) with initial democratic years having low bureaucratic quality and rule of law ratings and then the ratings rise with more mature democratic countries. Rock (2009) concludes that time is needed for "new democracies to build those transparent and accountable institutions (rule of law and a high-quality public-sector bureaucracy) necessary to control corruption" (Rock 2009, 70). Reynal-Querol (2002) looks at the impact of political regimes and the level of democracy's impact on ethnic and religious conflict. She finds that low to mid-level democracies has a higher chance of conflict. While high-level democracies have low chances of conflict arising from ethnic and religious issues.

Therefore, based on previous literature, lower political risk is conducive to economic growth and that higher democracy level countries are more conducive to lower political risk. As Jensen (2008) has found that democracy leads to political stability which in turn has a positive impact on the economy, we believe that higher political rating (lower political risk) should positively contribute more to economic development in high-level democratic countries compared to low-level democratic countries. In other words, we believe a high democracy level will enhance the positive effect of lower political risk on economic development more thana low democracy level.

H3.2: Negative contribution of Population Growth on Economic Development should be higher for low-level democracies.

The majority of low-level democracies also happen to be low-income countries in which real GDP per capita is already low. This implies these economies have lower financial and natural resources available per person. Therefore population growth will likely harm their real GDP per capita. Simply put as their population increases, the amount invested per person will decrease or slow down their growth. According to Becker *et al.* (1990), the modern economy relies on skilled and trained labor, in other words, higher human capital. Therefore, countries with large human capital and rapid accumulation of new knowledge will have better economies. For human capital to be large, there has to be a relevant investment in its population. But low-income countries inherently have less to invest in their population. This leads to a scarcity of human capital and lower economic development. On the other hand, richer countries have larger human capital, and more to invest in per person, maintaining their economic development.

Therefore, low-level democracies should see population growth negatively impacting their economic development as it leaves fewer resources per person. According to Becker *et al.* (1999), higher population growth seems to benefit urbanized and high-income economies while bringing harm to low-income economies as it results in diminishing returns of intensive usage of limited resources. Peterson (2017) argues that rapid population growth is likely to be detrimental to low-income countries' economic growth in the short-run and medium run as it leads to a large number of dependent children. Easterlin (1967) also argues that high population growth in less-developed economies increases pressures on limited natural resources and diverts those resources away from using them to increase capital stock per worker and therefore resulting in lower economic development.

Doucouliagos and Ulubaşoğlu (2008) argue that democracy has a significant positive indirect effect on economic growth through human capital accumulation. Thus, the higher the democracy level, the more positive effect on human capital accumulation, and the more rapid accumulation of knowledge in contrast to low democracy level. For these reasons, we believe higher population growth should benefit economic development more for high democracy level countries while negatively affect economic development further for low democracy level countries.

In our study, we follow papers done by Persson and Tabellini (2006), Heo and Hahm (2015) and Acemoglu *et al.* (2019) and put the concentration on how 'democracy level' contributes to economic development and affects the relationship between political risk and population growth with economic development. We use government spending and trade as control variables. We also extend our study by investigating whether the democracy level matters more for the economic development of developed nations compared to less developing nations and channels through which democracy level affects the economic development of those nations.

2. Data

We employ a panel dataset of 105 countries in yearly frequency, covering the period from 1990 to 2016. The chosen period of study is due to the economic indicators being available from 1990 onward, but ICRG's political risk rating using as a proxy of political risk is available only until 2016. More importantly, the year 1990 is the beginning of the dissolution of the Soviet Union. Between 1990 and 1992, sixteen countries became independent democratic nations. Since then, there had not been a major wave of regime shifts towards democracy. Hence, starting from 1990 allows us to expand our data set with more variation of democratic levels across countries that could provide

a higher statistical power of our study. Our first sample to test *hypothesis 1* is composed of 125 countries including both authoritarian and democratic countries. Then, we reduce our sample to 105 countries that include only democratic countries to test the subsequent hypotheses as our study mainly focuses on the impact of democracy level on economic development. Our dataset contains countries which were democratic for most of the time except for a few years of backsliding, for instance, Thailand and Bangladesh, but those years of the countries are excluded when we test *hypothesis 2 and 3*. However, given that our democracy variable is time-varying, the number of countries we use to test *hypothesis 1* is the same due to the democracy level for some countries varies over time, with some countries moving in and out of the different levels. In other words, there are some years that some democratic countries in the sample are authoritarian and we exclude those years.

To investigate the impact on economic development, we follow mainstream literature to use the log of real GDP per capita as the result in the models. This, for comparable results, is also in line with several previous notable studies such as Acemoglu *et al.* (2019), Heo and Hahm (2015), Mauro (1995), and Chong and Calderon (2000). We also use control variables similar to prior studies, including population growth, government spending as a percentage of GDP, and total trade as a percentage of GDP. Population growth is used to capture the effect of labor input as argued in (Heo and Hahm 2015) and, implicitly, human capital followed Krieckhaus's (2006) argument based on fertility growth theory. Government spending is to control for a government's general roles and policies toward macroeconomic conditions as in Ram's (1986) argument. Lastly, trade is controlled for as it has now become a more important contributor to many economies in the age of globalization. All these variables were retrieved from the World Development Indicators by the World Bank Group.

Apart from the variables mentioned above, we need to measure democracy levels and political risks of the countries in our sample which may be different across the years. The impact of democracy level on economic development is our main interest. Besides, as political risk and population growth can also contribute to economic development, we also interest how the democracy level affects the relationship between political risk and economic development as well as the relationship between population growth and economic development.

Democracy and Democracy Level

To classify whether a country is democratic and to determine levels of democracy of each country in each year, we rely on the Freedom House Index or Gastil Index by Freedom House[2], which has been widely adopted in many social science research publications. The Freedom House Index is constructed based on an average of the two criteria: political rights (PR) and civil liberties (CL), both of which have a scale of one to seven, with one being the highest level of freedom and seven being the lowest. Freedom House then uses the resulting index score to designate a country in each year into three groups: Free (F), Partly Free (PF), and Not Free (NF). However, the ranges of the index scores used to define each group were modified slightly in 2003[3], as illustrated in Table 1 that the criterion for "Not Free" has been eased to just above 5.0 instead of 5.5 since the year 2003.

Table 1. Freedom house index rating

Before 2003		2003 and After	
Rating	Classification	Rating	Classification
1.0 – 2.5	Free	1.0 – 2.5	Free
3.0 – 5.5	Partly Free	3.0 – 5.0	Partly Free
5.5 – 7.0	Not Free	5.0 – 7.0	Not Free

Source: Freedom in the World 2019

Our study herein, firstly focusing on impacts of democracy on economic development. In other words, we define a country in a given year as democratic if it did not fall into Freedom House's Not Free category in that year. We redefine whether the country in a sample is democratic or authoritarian (not free) for each year.

Furthermore, to investigate possibly heterogeneous impacts of democracy levels on economic development, we divide the democratic countries into three groups by their level of democracy: high, mid, and low. This is because the effect of democracy on economic development may not be monotone in democracy levels, in which case using a raw index score may fail to capture significant effect. Those with a stable democratic system should be able to enjoy good aspects of democracy, as evidenced in Acemoglu *et al.* (2019), while the borderline countries between

[2] Freedom House is a US government funded non-governmental organization. They publish an annual report called Freedom in the World that looks at the state of democracy around the world. The Freedom House Index's methodology was created by Dr. Raymond Gastil and first used in 1972.

[3] See Table 1 for the summary

democratic and authoritarian systems may still struggle to manage democracy, making it unclear whether the benefits from democracy could outweigh management costs. Hence, classifying roughly into just two groups of Free and Not Free may not be adequate to capture the heterogeneity in effects as well. Our criteria for this further classification are shown in Table 2.

Table 2. Democracy level

Before 2003		2003 and After	
Range	Democracy Level	Range	Democracy Level
1.0 – 2.0	High-Level Democracy	1.0 – 2.0	High-Level Democracy
2.5 – 4.0	Mid-Level Democracy	2.5 – 3.5	Mid-Level Democracy
4.5 – 5.5	Low-Level Democracy	4.0 – 5.0	Low-Level Democracy

Source: Freedom in the World 2019

Therefore, for the last two hypotheses which we include only 105 democratic countries, we group the countries into three democratic levels. We created our classification but based on Freedom House's basic categorization. We have taken only countries that fall into the category of Free and Partly Free or countries falling in the range of 1.0 to 5.5 for years before 2003 and 1.0 to 5.0 for years after 2003. The democratic countries are then divided into three categories: high, mid, and low level. Each level is comprised of three 0.5 increments. As the countries are all rated on increments of 0.5, we can further sub-categorize them into 3 different levels, with each group having 3 increments. Our 'Democracy level' classification can be found in Table 2 above. Our democracy level variable is time-varying as we reclassify the democracy level variable for each country every year according to criteria stated in Table 2. As mentioned earlier, the democracy level for some countries varies over time, with some countries moving in and out of the different levels.

Political Rating

We use political rating from the International Country Risk Guide (ICRG)'s political risk index as a proxy for political risk. The higher ICRG's political risk (higher political rating) means lower political risk and vice versa. The ICRG rates three main categories of a country: Political Risk, Economic Risk, and Financial Risk. For this paper, we only focus on the Political Risk rating. Keefer and Knack (1997) use ICRG's political risk rating when studying the slow growth of poorer nations to more developed economies. Similar to this paper, Henisz (2000) uses the ICRG index when looking at the impact of the political and its institution's environment on economic growth. Therefore, we use ICRG's political risk rating to measure political risk in this paper.

As mentioned earlier, political risk has a massive impact on a country's economy. Local and foreign companies base their long-term and short-term decisions based on political risk. Political and social instability (social conflict: religious, ethnic, or otherwise) often hurting economic growth (Acemoglu *et al.* 2019, Heo and Hahm 2015). Acemoglu *et al.* (2016) and Heo and Hahm (2015) both use conflict or social unrest events as a variable with negative effects on the economy. We then further investigate how the democracy level affects the contribution of political risk on economic development.

Population Growth

Previous literature finds population growth could benefit as well as harm economic development. In terms of benefits, population growth increases labor inputs, which in turn increases economic input. The population is an important factor in economic development in this manner (Heo and Hahm 2015). Population growth, however, can harm economic development, especially for less-developed nations. Krieckhaus (2006) using the fertility growth theory, posits that as family size increases, the parents' average investment per child decreases. This in turn reduces the quality of human capital and therefore lower economic development. Regardless of the two opposing views, population growth impacts economic development. Then we further investigate how democracy level affects the contribution of population growth on economic development.

Government Spending

Governments have a huge impact on the economy through their economic and financial policies. Based on Ram's (1986) economic growth model, government expenditure as a percentage of GDP is used as a proxy for the government's role in the economy.

Trade

In the age of globalization, trade is an important contributor to the economy. The larger an economy is, the larger their trade tends to be, which in turn leads to greater economic performance. Trade as a percentage of GDP has been used by Heo and Hahm (2015), Reuveny and Li (2003), and Acemoglu *et al.* (2019).

Therefore, in our study, we initial use population growth, government spending, trade, and political rating as control variables to investigate the relationship between democracy level and economic development. Then, we focus on how the democracy level affects the impact of political rating (high political rating implies lower political risk) and population growth on economic development to further understand channels through which democracy level affects economic development.

3. Methodology

Following Lehkonen and Heimonen (2015) and Busse and Hefeker (2007), We apply the system GMM estimation by using the Arellano-Bond estimator to test the first hypothesis.

H1: Democracy leads to economic development

$$y_{i,t} = \gamma + \alpha_i + \beta_1 y_{i,t-1} + \beta_2 x_{i,t} + \beta_3 D_{i,t} + \beta_4 A_{i,t} + \varepsilon_{i,t} \quad (1)$$

The log of GDP per capita is denoted by $y_{i,t}$ which is a proxy for economic development for a given country *I* at a given year *t*. The lag of log GDP per capita is represented by $y_{i,t-1}$. $D_{i,t}$ is the dummy variable for democracy in which 1 indicates democracy in that given year and 0 if on a year the country is undemocratic. The variable $A_{i,t}$ indicates autocratic countries. These samples have been autocratic for the whole or majority of the sample period. The $x_{i,t}$ variable represents the matrix of control variables which are the factors that have an impact on a country's economic development. Those variables are population growth, trade, government spending, and political risk (proxy by political rating). The country fixed effect is denoted by α_i. The γ represents the constant. In this hypothesis, we include both democratic and non-democratic countries in our sample. We expect democracy would lead to higher economic development.

H2: Higher democracy level impacts economic development more than a lower democracy level.

$$y_{i,t} = \gamma + \alpha_i + \beta_1 y_{i,t-1} + \beta_2 x_{i,t} + \beta_3 D_{H,i,t} + \beta_4 D_{L,i,t} + \varepsilon_{i,t} \quad (2)$$

We now include only democratic countries in our sample and separate democracy into levels. Since we are interested in investigating whether democracy level affects a country's economic development, we add two new dummy variables that represent high-level and low-level democracies. If a country is deemed to be a high-level democracy, the dummy variable D_H is equal to one and zero otherwise and if it is a low-level democracy, the dummy D_L is equal to one and zero otherwise. Like the previous hypothesis, the high and low democracy dummy is time-variant and we reclassify the democracy level of each country each year. We expect a high democracy level impacts country's economic development more than a low democracy level.

H3: Higher political rating (lower political risk) positively impacts the Economic Development of high-level democracies more and Population Growth negatively impacts the Economic Development more in low-level democracies.

We now investigate how democracy level impacts the relationship between political rating (a proxy for political risk) and economic development and the relationship between population growth and economic development. We include interaction variables in our model which is the democracy level multiplied with the variable being tested (political risk or population growth). The new variables included in the model to test the subsequent hypotheses are summarized in Table 4. We expect higher political rating (lower political risk) in high democracy level countries would positively contribute to economic development more than low democracy level countries. Also, we expect high population growth in low democracy level countries would negatively contribute to economic development more than high democracy level countries.

Table 4. Variable names

Name	Variable name
Political Rating (a proxy for Political risk)	Polrat
Population Growth	Popgrow
Trade	Trade
Government Spending	Govsp

H3.1: Positive contribution of high Political Rating (low political risk) on Economic Development should be higher for high-level democracies.

$$y_{i,t} = \gamma + \alpha_i + \beta_1 y_{i,t-1} + \beta_2 polrat_{i,t} + \beta_3 popgrow_{i,t} + \beta_4 trade_{i,t} + \beta_5 govsp_{i,t} + \beta_6 (polrat_{i,t} * D_{H,i,t}) + \beta_7 (polrat_{i,t} * D_{L,i,t}) + \varepsilon_{i,t} \quad (3)$$

H3.2: Negative contribution of Population Growth on Economic Development should be higher for low-level democracies.

$$y_{i,t} = \gamma + \alpha_i + \beta_1 y_{i,t-1} + \beta_2 polrat_{i,t} + \beta_3 popgrow_{i,t-1} + \beta_4 trade_{i,t} + \beta_5 govsp_{i,t} + \beta_6 (popgrow_{i,t-1} * D_{H,i,t}) + \beta_7 (popgrow_{i,t-1} * D_{L,i,t}) + \varepsilon_{i,t} \quad (4)$$

Overall, we test hypothesis III (H3) again as follows:

$$y_{i,t} = \gamma + \alpha_i + \beta_1 y_{i,t-1} + \beta_2 polrat_{i,t} + \beta_3 popgrow_{i,t-1} + \beta_4 trade_{i,t} + \beta_5 govsp_{i,t} + \beta_6 (polrat_{i,t} * D_{H,i,t}) + \beta_7 (polrat_{i,t} * D_{L,i,t}) + \beta_8 (popgrow_{i,t-1} * D_{H,i,t}) + \beta_9 (popgrow_{i,t-1} * D_{L,i,t}) + \varepsilon_{i,t} \quad (5)$$

In total, 144 observations are dropped due to missing data. Some of the missing data are overlapping. After testing Hypothesis 1, we focus only on democratic countries. Thus in testing Hypothesis 2 and 3, for certain countries that were categorized as autocracy for specific years, those years were dropped. Overall, we have a total of 2,411 observations to test hypotheses 2 and 3.

Following the Arellano-Bond Estimator and the variables used for testing the hypotheses, it requires the variables to be separated into two groups: endogenous and exogenous. The endogenous variables are lag of log GDP per capita and log of trade. As per the rules of the Arellano-Bond method, the lag of log GDP per capita is used to consider the accelerator affects. Being the lag of log GDP per capita, it is naturally an endogenous variable. According to Acemoglu *et al.* (2019) trade is also an endogenous variable. GDP per capita and trade tend to have a circular relationship. In an open economy, trade is a sizable chunk of the GDP. Trading activities (export and import) raises income which in turn increases GDP. The GDP growth, in turn, encourages more trading activities (Reuveny and Li 2013). Barro (1990) has found that government spending has a negative relationship with economic development. The economic outlook also influences government spending. Generally, if the economic outlook is negative, governments will increase spending to stimulate the economy. Therefore, government spending is another endogenous variable in our model.

All other variables are exogenous variables. The variable Population Growth (*popgrow*) is already a logged variable as per World Bank Data. The impact of population growth on labor output is lagged since those born need to grow up before they can start contributing to the economy (Peterson 2017). Generally, the lag of population growth is used when it is a variable. Acemoglu *et al.* (2019) use four lags and Huang and Xie (2013) used one lag. In this paper, a lag of one year is used. Political rating (*polrat*) is comprised of social, legal, and political components. As such it has been treated as an exogenous variable by previous literature used in this paper (Henisz 2000, Lehkonen and Heimonen 2015). Likewise, the interaction variables used in H3.1, H3.2, and overall H3 are categorized as exogenous. The democracy variables (high and low included) are considered as exogenous.

Given the sample size is larger than thirty, the use of z-statistics is preferred to t-statistics. The Arellano-Bond is a GMM estimation. The system GMM was applied to estimate the models as it corrects endogeneity by introducing more instruments to improve efficiency.

4. Results

Table 5. Descriptive Statistics – Democracy and Autocracy

Variable	Obs	Mean	Std. Dev.	Min	Max
Log of GDP per Capita	2,685	9.198	1.219	5.870	11.491
Log of Trade	2,685	68.122	13.113	0.000	96.080
Political Rating	2,575	1.394	1.243	-2.851	7.061
Lag of Population Growth	2,685	4.257	0.536	2.621	6.090
Government Spending	2,685	15.593	5.135	0.911	43.479
Democracy	2,685	0.947	0.223	0.000	1.000
Autocracy	2,685	0.053	0.223	0.000	1.000

Table 6. Data Correlations – Democracy and Autocracy [Hypothesis 1]

Variable	Log of GDP per Capita	Log of Trade	Political Rating	Lag of Population Growth	Government Spending	Democracy	Autocracy
Log of GDP per Capita	1						
Log of Trade	0.759	1					
Political Rating	-0.4936	-0.3978	1				
Lag of Population Growth	0.2707	0.3078	-0.1228	1			
Government Spending	0.4155	0.4616	-0.2922	0.2196	1		
Democracy	0.1719	0.2124	-0.1546	0.0396	0.1491	1	
Autocracy	-0.1719	-0.2124	0.1546	-0.0396	-0.1491	-1	1

Table 7. Descriptive Statistics – Democracy Levels [Hypothesis 2 and 3]

Variable	Obs	Mean	Std. Dev.	Min	Max
Log of GDP per Capita	2,684	9.197	1.219	5.870	11.491
Log of Trade	2,684	68.122	13.115	0.000	96.080
Political Rating	2,574	1.394	1.242	-2.851	7.061
Lag of Population Growth	2,684	4.257	0.537	2.621	6.090
Government Spending	2,684	15.590	5.134	0.911	43.479
Democracy High	2,684	0.455	0.498	0.000	1.000
Democracy Mid	2,684	0.304	0.460	0.000	1.000
Democracy Low	2,684	0.189	0.391	0.000	1.000
Political Rating*Democracy High	2,684	35.556	39.327	0.000	96.083
Political Rating*Democracy Mid	2,684	18.517	28.480	0.000	80.875
Political Rating*Democracy Low	2,684	11.063	23.466	0.000	89.125
Lag of Population Growth*Democracy High	2,684	0.338	0.703	-2.258	6.017
Lag of Population Growth*Democracy Mid	2,684	0.512	0.996	-2.851	5.564
Lag of Population Growth*Democracy Low	2,684	0.424	1.036	-1.475	7.061

From Table 6, democracy is positively correlated with economic development while autocracy is negatively correlated with economic development. Thus, democracy seems to positively contribute to economic development. When looking at the democracy levels in Table 7, the mean of high-level democracies is higher than the other two levels. This implies there are more countries in the higher end of the democratic level and for a longer time in our sample. In other words, when a country reaches or is already a high democracy level country, they are likely to stay that way for more years. As opposed to mid-level and low-level countries that tend to phase in and out their respective categories, sometimes even becoming autocratic.

When looking at the raw correlation matrix in Table 8, high democracy level has a positive correlation with economic development (log of GDP per capita) while mid-level and low-level democracies have a negative correlation. At a glance, this reflects that different democracy level contributes to economic development differently. When looking into the relationship between political rating and economic development, when the democracy level of the country is high, the higher political rating (lower political risk) seems to positively correlated with economic development. This might imply that a high democracy level positively correlated with lower political risk and a stable political environment. On the other hand, higher political rating (thus lower political risk) seems to negatively contribute to economic development in lower democracy level countries. This might be due to lower democracy level countries having low-quality democratic institutions while higher democracy level countries have strong democratic foundations. This pattern is in conjunction with the J-curved relationship posited by Lehkonen and Heimonen (2015) where younger democratic countries have a poor quality rule of law and bureaucracy; where the quality only improves as the countries mature over time.

Table 8. Data Correlations – Democracy Levels

	Log of GDP per Capita	Log of Trade	Political Rating	Lag of Pop Growth	Government Spending	Demo High	Demo Mid	Demo Low	Political Rating * Demo High	Political Rating * Demo Mid	Political Rating * Demo Low	Lag of Pop Growth * Demo High	Lag of Pop Growth * Demo Mid	Lag of Pop Growth * Demo Low
Log of GDP per Capita	1.000													
Log of Trade	0.759	1.000												
Political Rating	-0.494	-0.398	1.000											
Lag of Pop Growth	0.271	0.308	-0.123	1.000										
Government Spending	0.416	0.462	-0.292	0.220	1.000									
Democracy High	0.667	0.709	-0.481	0.157	0.483	1.000								
Democracy Mid	-0.424	-0.369	0.168	-0.141	-0.267	-0.605	1.000							
Democracy Low	-0.254	-0.350	0.329	-0.012	-0.217	-0.440	-0.317	1.000						
Political Rating * Demo High	0.697	0.762	-0.484	0.170	0.495	0.990	-0.599	-0.436	1.000					
Political Rating * Demo Mid	-0.395	-0.304	0.154	-0.128	-0.255	-0.597	0.987	-0.312	-0.591	1.000				
Political Rating * Demo Low	-0.195	-0.269	0.325	0.054	-0.195	-0.431	-0.310	0.980	-0.427	-0.306	1.000			
Lag of Pop Growth * Demo High	0.291	0.340	0.139	0.061	0.156	0.526	-0.318	-0.232	0.510	-0.314	-0.227	1.000		
Lag of Pop Growth * Demo Mid	-0.467	-0.324	0.440	-0.161	-0.226	-0.472	0.780	-0.247	-0.467	0.753	-0.242	-0.248	1.000	
Lag of Pop Growth * Demo Low	-0.230	-0.294	0.490	-0.013	-0.160	-0.375	-0.269	0.851	-0.371	-0.266	0.836	-0.197	-0.210	1.000

For population growth, when the democratic level of countries is low, higher population growth seems to negatively affect economic development while when the democratic level of countries is high, higher population growth seems to positively affect economic development. As mentioned earlier, there are conflicting theories on how population growth impacts economic growth. One is that population growth leads to more labor which in turn increases economic output (Heo and Hahm 2015, Peterson 2017). Another theory says that as the number of people increases in a household, the amount invested per person is reduced (Easterlin 1967, Krieckhaus 2006). We further investigate the effect of democracy level on economic development by using the system GMM estimation.

Before looking at how democracy level affects economic development, our results in Table 9 show that higher government spending significantly negatively contributes to economic development in all models. At first glance, government spending is expected to help enhance GDP growth. However, as the government increases its budget, it may lead to an increase in the marginal tax to finance an increase in government spending. Higher tax leads to less consumption and lower savings rate (Barro 1990). Also, if the government needs to borrow money to finance its budget, it may lead to higher interest rates. Higher interest rates then negatively impact investment. Landau (1983) and Barro (1990) conclude government spending has a negative and significant impact on growth. Nevertheless, government spending is still important especially for public goods (*i.e*. public transportation, education, and health care) (Barro 1990). However, spending policies should be balanced and well thought out to positively contribute to economic growth.

Table 9. Results of GMM Arellano Bond Estimation

VARIABLES	H1	H2	H3.1	H3.2	H3
	Log of GDP per Capita	Log of GDP per Capita	Log of GDP per Capita	Log of GDP per Capita	Log of GDP per Capita
Lag of Log GDP per Capita	0.993000***	0.989000***	0.989000***	0.989000***	0.989000***
	(0.001270)	(0.001200)	(0.001210)	(0.001220)	(0.001230)
Political Rating	0.000632***	0.000475***	0.000420***	0.000502***	0.000384***
	(0.000102)	(0.000100)	(0.000102)	(0.000096)	(0.000104)
Lag of Population Growth	-0.006870***	-0.008300***	-0.008340***	-0.009370***	-0.008090***
	(0.000520)	(0.000643)	(0.000647)	(0.000875)	(0.000958)
Log of Trade	0.014900***	0.020500***	0.019800***	0.021800***	0.020000***
	(0.001920)	(0.002050)	(0.002060)	(0.002070)	(0.002050)
Government Spending	-0.002290***	-0.002440***	-0.002400***	-0.002400***	-0.002310***
	(0.000250)	(0.000217)		(0.000212)	(0.000219)
Democracy High		0.010100***			
		(0.002230)			
Democracy Low		0.006050***			
		(0.001990)			
Political Rating * Democracy High			0.000130***		0.000106***
			(0.000032)		(0.000037)
Political Rating * Democracy Low			0.000082**		0.000172***
			(0.000033)		(0.000045)
Democracy	0.024200**				
	(0.009460)				
Lag of Population Growth * Democracy High				0.003770***	0.002450*
				(0.001190)	(0.001380)
Lag of Population Growth * Democracy Low				-0.000262	-0.00320***
				(0.000851)	(0.001150)
Autocracy	0.030800***				
	(0.010000)				
Constant		0.048100***	0.054500***	0.041400***	0.053900***
		(0.010400)	(0.010800)	(0.010600)	(0.010900)
Observations	3,029	2,411	2,411	2,411	2,411
Number of Countries	125	105	105	105	105

Note: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1; Sargan's test of over-identification (p-value) = 0.000000.

The log of trade, on the other hand, has a significant positive contribution to economic development. GDP is highly influenced by trade and is an indicator of a country's economic liberalization policy (Acemoglu *et al.* 2019, Heo and Hahm 2015). Now we look at the impact of democracy level on economic development as follows.

H1: Democracy leads to economic development

We find that democracy does lead to economic development although we find autocracy also leads to economic development. As previous literature has found (Acemoglu *et al.* 2019, Heo and Hahm 2015, Gerring *et al.* 2005, Lipset 1959) democracy does indeed positively impact economic development. Krieckhaus (2006) argues that the most important aspect of democracy is that if a leader's performance is not satisfactory, the people can change the leader without economic turbulence. Referring to Feng (1997) and Persson and Tabellini (2006), democracy has government change and not regime change. Government change is a result of the constitution and leads to economic growth by 1% (Persson and Tabellini 2006). While regime change is always preceded by strife and violence (Feng 1997). Decision making is based on the voices of the many as opposed to the few which in turn leads to clearer and well-tuned policies (Gerring *et al.* 2015). The transition to democracy is generally followed by economic liberalization. The positive impact of economic liberalization is reflected through variable trade which is positive and significant at 1% throughout the findings. Therefore our result confirms that democracy leads to economic development.

H2: Higher democracy level impacts economic development more than a lower democracy level

We find a high democracy level has a significantly positive impact on economic development with low and mid democracy levels also having a positive impact albeit with a lower impact. In other words, we find a high democracy level positively affects economic development more than the low and mid democracy level. According to Persson and Tabellini (2006), not all democratic countries are the same. Geography and political history have a huge impact on current governments (Acemoglu *et al.* 2019). For example, British democracy was centuries in the making, with the signing of the Magna Carta (1215) limiting the King's authority and followed by the first representative parliament in 1265. Whereas, the United States of America was able to start with a clean slate as a democratic country in 1776. The high-level democracies are mostly comprised of western liberal democracies. Thus, certain countries have been democratic for a long time.

As per Acemoglu *et al.* (2019) the amount of time a country has been democratic plays a major role in its economic development. As such the results here have shown that high-level democracies or the more mature democracies have a positive impact and are significant at 1%. Low and mid-level democracies, while statistically significant at 1%, positively affects economic development at a lower level. Delving further into the fundamental differences between high-level and low-level democracies, there is a great gap in the democratic and bureaucratic institutions. Implementing policies effectively has always been an issue for low-level democracies (Keefer and Knack 1997, Henisz 2000). Another major issue is corruption and accountability (Mauro 1995). The issue with corruption leads to the state of the judicial system. A strong and fair judicial system is an important foundation for economic development (Heo and Hahm 2015). A strong marker for the judicial system is property rights (Feng 1997, Leblang 1997).

Strong property rights encourage citizens to invest in economic activities as opposed to becoming rent-seekers. Without strong property rights, people are afraid of losing their property. Therefore, rent-seeking activities are a way of safeguarding the property and increasing income without engaging in risky business activities. In low-level democracies leaders often over-promise and under-deliver (Gerring *et al.* 2005). It could be the fault of an unrealistic timeframe or poor execution by the bureaucracy. Therefore, a high democracy level positively impacts economic development more compared to the lower level of democracy.

H3: Higher political rating (lower political risk) positively impacts the Economic Development of high-level democracies more and Population Growth negatively impacts the Economic Development more in low-level democracies

H3.1: Positive contribution of Political Rating on Economic Development should be higher for high-level democracies.

We find that higher political rating (lower political risk) significantly and positively affects economic development overall. The results are similar to the conclusion reached by Feng (1997) and Henisz (2000). High political rating is an indicator of political stability which in turn increases economic growth (Henisz 2000).

We find both high and low democracy level further contributes to the positive relationship between lower political risk and economic development. Jensen (2008) has found there is a clear link between high-quality democratic institutions and low political risk. Thus, the democracy level, regardless of high and low, helps enhance the positive effect of lower political risk and economic development. This may be one channel that the democracy level leads to economic development through the effect of political stability regardless of the level of democracy.

To investigate further whether the results are true for all economies, we investigate further by separate our sample into developed and less developed economies. The results in Table 9 show that the effect of democracy level on the relationship between political risk and economic development is stronger for developing economies compared to developed economies. We find both high and low democracy levels significantly help enhance the positive effect of lower political risk on economic development of developing economies while low democracy level weakly enhances the positive effect of lower political risk on economic development of developed economies. The high democracy level in a developed nation does not significantly contribute to the positive relationship between lower political risk and economic development. Thus, the channel through which democracy level affects economic development through lower political risk seems to be stronger in developing economies compared to developed economies. Therefore, the democracy level seems to matter more for developing economies compared to developed economies given the results. In our sample, the developed nations are high-level democracies and most developing nations in our sample are either mid or low-level democracies.

H3.2: Negative contribution of Population Growth on Economic Development should be higher for low-level democracies.

We find that, overall, high population growth negatively contributes to economic development significantly. In other words, higher population growth results in lower economic development. To investigate how democracy level impacts the relationship between population growth and economic development, we find that a high democracy level helps mitigate the negative effect of higher population growth and economic development. On the other hand, we find that a low democracy level further enhances the negative effect of population growth and economic development. As high-level democracies in our sample are mostly more developed economies, these countries might benefit from higher population growth through increasing returns and rapid accumulation of knowledge and human capital as argued by Becker *et al.* (1999).

While low-level democracies in our sample are mostly less developed economies and households in less developed countries are generally financially stretched. An increase in the number of people in a household will reduce the amount of money invested per head (Krieckhaus 2006) and lowers the rate of the income level of output per head (Easterlin 1967). Poor households might be better off with a small number of people per household. This will help to remove the financial burden from the main breadwinner and leave some money on the table for emergencies, saving, or future consumption. A high population also puts a strain on the federal government as it may imply there is a large portion of the population who are below the working age. Therefore, high population growth in low democracy level countries that usually lower-income economies results in lower economic development further. Thus, the democracy level does matter for the relationship between population growth and economic development.

To confirm whether the democracy level matters more for developed or less developed economies in terms of the effect of population growth on economic development, we further investigate by separating our sample into developed and developing economies. The result in Table 9 shows that a high democracy level weakly mitigates the negative effect of high population growth and economic development of developed economies. On the other hand, a low democracy level significantly enhances the negative effect of high population growth on economic development in developing economies. Therefore, the democracy level seems to matter more for developing economies. Over the long-term, poorer countries are better off focusing on controlling their population growth so investment per person in a household does not decrease as well as strengthen the democracy level of the countries to help enhance the countries' economic development.

Table 10. Robustness – Developed and Developing Countries

VARIABLES	Developed Countries		Developing Countries	
	H2	H3	H2	H3
	Log of GDP per Capita	Log of GDP per Capita	Log of GDP per Capita	Log of GDP per Capita
Lag of Log GDP per Capita	0.971000***	0.970000***	0.991000***	0.991000***
	(0.002590)	(0.002580)	(0.001520)	(0.001540)
Political Rating	0.000849***	0.000902***	0.000452***	0.000341**
	(0.000138)	(0.000178)	(0.000134)	(0.000134)
Lag of Population Growth	-0.003950***	-0.009580*	-0.008730***	-0.008100***
	(0.001000)	(0.005040)	(0.001010)	(0.001220)
Log of Trade	0.010700***	0.010600***	0.0081600***	0.007850***
	(0.001460)	(0.001470)	(0.002440)	(0.002450)
Government Spending	-0.001450***	-0.001350***	-0.001600***	-0.001600***
	(0.000201)	(0.000206)	(0.000234)	(0.000235)
Democracy High	-0.009240		0.011000***	
	(0.008170)		(0.002930)	
Democracy Low	0.004020		0.008020***	
	(0.009380)		(0.002350)	
Political Rating*Democracy High		-0.000154		0.000125**
		(0.000118)		(0.000053)
Political Rating*Democracy Low		0.000254*		0.000201***
		(0.000144)		(0.000054)
Lag of Population Growth*Democracy High		0.008470*		0.002380
		(0.005140)		(0.002110)
Lag of Population Growth*Democracy Low		0.000167		-0.003310**
		(0.005130)		(0.001400)
Constant	0.247000***	0.247000***	0.074400***	0.082100***
	(0.021100)	(0.021100)	(0.016600)	(0.016900)
Observations	899	899	1,388	1,388
Number of Countries	37	37	62	62

Note: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1; Sargan's test of over-identification (p-value) = 0.000000.

Conclusion

Democracy can provide economic and political stability and more. The results here have shown that democracy has a positive impact on the economy. Applying the GMM estimation by Arellano-Bond estimator, we find democracy has increased economic development measuring by the log of real GDP per capita. Democracy has embraced the inevitable change which is an inherent process safeguarded by the constitution (Feng 1997). It is argued that a democratic process if strong will not only lead to economic and political stability but ethnic and civil stability also. Even though we find democracy leads to higher economic development in general, we believe not all democracies are the same.

By separating low-level democracies from high-level democracies, we find a different level of democracy affects economic development differently. We find a high democracy level positively impacts economic development more than mid and low-level democracies. This may imply that democratic institutions in lower level democracies have room for further improvements.

We believe the country's democracy level does matter for the relationship between political risk and economic development as well as the relationship between population growth and economic development. Previous literature suggests that political rating plays a significant role in economic development and democratic institutions but does not concentrate on investigating how democracy level impacts the relationship between them. We find democracy level, regardless of high and low, further enhances the positive contribution of higher political rating (lower political risk) on economic development. Therefore, in general, the democracy level regardless of high and low helps enhance the positive effect of lower political risk on economic development. We find this result is stronger when looking at developing

economies. Thus, this confirms the channel through which democracy helps enhance economic development via political stability.

We also find high population growth negatively contributes to economic development in overall and find low democracy level further enhances the negative effects of high population growth on economic development. The result is stronger when looking at developing economies. Thus, to enhance economic growth, developing economies should focus on controlling the population growth and strengthen the democratic level of the country. Overall, we find democracy level does matter for economic development.

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Appendix

Appendix 1. List of countries divided by development status

Developed Nations			Developing Nations		
Democracy Level			*Democracy Level*		
High	Mid	Low	High	Mid	Low
Australia	Estonia (1991-94)	Kuwait	Argentina	Albania	Armenia
Austria	Hungary (2006)	Singapore	Botswana	Bolivia	Bangladesh
Belgium	Korea, South (1990-92)		Bulgaria	Brazil	Burkina Faso
Canada	Latvia (1991-94)		Costa Rica	Colombia	Congo (DR)
Chile	Lithuania (1991-92)		Croatia	Ecuador	Cote d'Ivoire
Czech Republic	Singapore (1990-91)		Dominican Republic	El Salvador	Gabon
Denmark	Slovakia (1993-97)		Mongolia	Ghana	Guatemala
Estonia	Slovenia (1991)		Panama	Guyana	Guinea-Bissau
Finland			South Africa	Honduras	Indonesia
France				India	Kazakhstan
Germany				Jamaica	Kenya
Greece				Madagascar	Lebanon
Hungary				Malawi	Liberia
Iceland				Mali	Malaysia
Ireland				Mexico	Morocco
Israel				Moldova	Mozambique
Italy				Namibia	Niger
Japan				Nicaragua	Nigeria
Korea, South				Papua New Guinea	Pakistan
Latvia				Paraguay	Russia
Lithuania				Peru	Sierra Leone
Luxembourg				Philippines	Sri Lanka
Netherlands				Romania	Tanzania
New Zealand				Senegal	Thailand
Norway				Turkey	Tunisia
Poland				Ukraine	Uganda
Portugal					Venezuela
Slovakia					
Slovenia					
Spain					
Sweden					
Switzerland					
United Kingdom					
United States					
Uruguay					
Total 35	*8*	2	9	26	27

Source: World Population Review. This table provides a snapshot of democracy level of developed and developing countries in our sample. Please note that the democracy level of the country is time-varying and we carefully define democracy level based on the actual democracy level of the country each year when we run the models.

Appendix 2. Developed Countries – Arellano Bond Estimates

VARIABLES	H2	H3.1	H3.2	H3
	Log of GDP per Capita	Log of GDP per Capita	Log of GDP per Capita	Log of GDP per Capita
Lag of Log GDP per Capita	0.971000***	0.971000***	0.972000***	0.970000***
	(0.002590)	(0.002580)	(0.002500)	(0.002580)
Political Rating	0.000849***	0.000941***	0.000707***	0.000902***
	(0.000138)	(0.000173)	(0.000138)	(0.000178)
Lag of Population Growth	-0.003950***	-0.003730***	-0.005430	-0.009580*
	(0.001000)	(0.000991)	(0.004560)	(0.005040)
Log of Trade	0.010700***	0.010800***	0.012700***	0.010600***
	(0.001460)	(0.001470)	(0.001410)	(0.001470)
Government Spending	-0.001450***	-0.001450***	-0.001640***	-0.001350***
	(0.000201)	(0.000203)	(0.000195)	(0.000206)
Democracy High	-0.009240			
	(0.008170)			
Democracy Low	0.004020			
	(0.009380)			
Political Rating * Democracy High		-0.000111		-0.000154
		(0.000108)		(0.000118)
Political Rating * Democracy Low		0.000037		0.000254*
		(0.000122)		(0.000144)
Lag of Population Growth * Democracy High			0.003720	0.008470*
			(0.004690)	(0.005140)
Lag of Population Growth * Democracy Low			0.001910	0.000167
			(0.004640)	(0.005130)
Constant	0.247000***	0.237000***	0.228000***	0.247000***
	(0.021100)	(0.021000)	(0.020300)	(0.021100)
Observations	899	899	899	899
Number of Countries	37	37	37	37
Standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				
Sargan's test of over-identification (p-value)	0.000000	0.000000	0.000000	0.000000

Appendix 3. Developing Countries – Arellano-Bond Estimates

VARIABLES	H2	H3.1	H3.2	H3
	Log of GDP per Capita	Log of GDP per Capita	Log of GDP per Capita	Log of GDP per Capita
Lag of Log GDP per Capita	0.991000***	0.991000***	0.991000***	0.991000***
	(0.001520)	(0.001520)	(0.001530)	(0.001540)
Political Rating	0.000452***	0.000396***	0.000399***	0.000341**
	(0.000134)	(0.000132)	(0.000132)	(0.000134)
Lag of Population Growth	-0.008730***	-0.008700***	-0.009120***	-0.008100***
	(0.001010)	(0.001020)	(0.001180)	(0.001220)
Log of Trade	0.008160***	0.007990***	0.008620***	0.007850***
	(0.002440)	(0.002450)	(0.002440)	(0.002450)
Government Spending	-0.001600***	-0.001610***	-0.001570***	-0.001600***
	(0.000234)	(0.000234)	(0.000233)	(0.000235)
Democracy High	0.011000***			
	(0.002930)			
Democracy Low	0.008020***			
	(0.002350)			
Political Rating * Democracy High		0.000161***		0.000125**
		(0.000043)		(0.000053)
Political Rating * Democracy Low		0.000120***		0.000201***
		(0.000040)		(0.000054)
Lag of Population Growth * Democracy High			0.004440***	0.002380
			(0.001700)	(0.002110)
Lag of Population Growth * Democracy Low			-0.000135	-0.003310**
			(0.001050)	(0.001400)
Constant	0.074400***	0.078900***	0.076100***	0.082100***
	(0.016600)	(0.016700)	(0.016700)	(0.016900)
Observations	1,388	1,388	1,388	1,388
Number of Countries	62	62	62	62
Standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				
Sargan's test of over-identification (p-value)	0.000000	0.000000	0.000000	0.000000

Structural Shocks and Macroeconomic Conditions in Indonesia

Diny GHUZINI
Department of Economics, Faculty of Economics and Business
Universitas Gadjah Mada[1], Yogyakarta 55281, Indonesia
dinyghuzini@ugm.ac.id and diny.ghuzini@gmail.com

Josephine WURI
Sanata Dharma University, Yogyakarta, Indonesia
Department of Economics, Faculty of Economics and Business
Universitas Gadjah Mada, Yogyakarta, Indonesia
josephine@usd.ac.id and josephinewuri24@gmail.com

Kuntari DASIH
Department of Economics, Faculty of Economics and Business
Universitas Gadjah Mada, Yogyakarta, Indonesia
kuntari.dasih@mail.ugm.ac.id and kuntaridasih@gmail.com

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Abstract:

The objective of this paper is to examine the impacts of structural shocks that lead to macroeconomic weakening in Indonesia during the recovery phase after the global financial crisis. We use real business cycle (RBC) and New Keynesian approach to identify the structural shocks and utilize the Structural Vector Autoregression (SVAR) model to build a macro-econometric model and to analyze the relationships between the shocks and macroeconomic variables. The sample that are used are quarterly data from the Census and Economic Information Center (CEIC) database and Statistik Ekonomi dan Keuangan Indonesia (SEKI) Bank Indonesia from 2007–2019. The results show that production shocks lead to an increase in unemployment and exchange rate shocks lead to depreciation of rupiah against dollar. Aggregate supply shocks, however, only have a relatively small impact on inflation. The effects of aggregate demand shocks on output vary, depending on the source of the shocks. Monetary policy shocks lead to an increase in the central bank interest rate.

Keywords: structural shocks; SVAR; real business cycle (RBC); new Keynesian; unemployment; inflation; exchange rate.

JEL Classification: E12; E31; E32; F31; F62; F68.

Introduction

Major international economic events bring about external disturbances to a small open economy. As a small open economy, Indonesia must meet the disturbances that may results in structural shocks as they are originated from demand and supply. In the aftermath of global financial crisis, the Indonesia's economy showed a promising recovery up to 2012. However, this positive trend started to decline by of 2013. This paper analyses factors that influence the declining of macroeconomic condition in Indonesia following the recovery phase from the global economic crisis. The 2007 global financial crisis sourced from the United States as the epicenter of the crisis and lately compounded by the occurrence of a trade war between the US and China has consequences for macroeconomic fluctuations in various countries, including Indonesia (Blanchard *et al*. 2013, Kim 2019).

The crisis began to impact Indonesia in the fourth quarter of 2008 in which lessened export performance. Economic growth showed a slowdown from the previous figure and inflation rate almost doubled in the same time period. From the external side, the pressure of the crisis, market sentiment, and as a result of the current account deficit and the tight liquidity, rupiah has depreciated. The economic condition in Indonesia after the 2008 global crisis has been slowly restored and has shown improvement until 2012. By 2008, the economy grew at steady rate around 6.2%, with a reasonably low inflation rate of 4.3%. Not only that, the government's initial target of restoring post-crisis macroeconomic stability has shifted to boost sustainable economic growth. In terms of exchange rate fundamentals, even if rupiah was still depreciated against US dollar, the foreign exchange reserves until the end of

[1] Yogyakarta 55281, Indonesia

2012 had achieved more than double from the crisis period. Nonetheless, by 2013 the macroeconomic condition experienced a decline which reflected in growth, inflation, and trade volumes.

1. Research Background and Literature Review

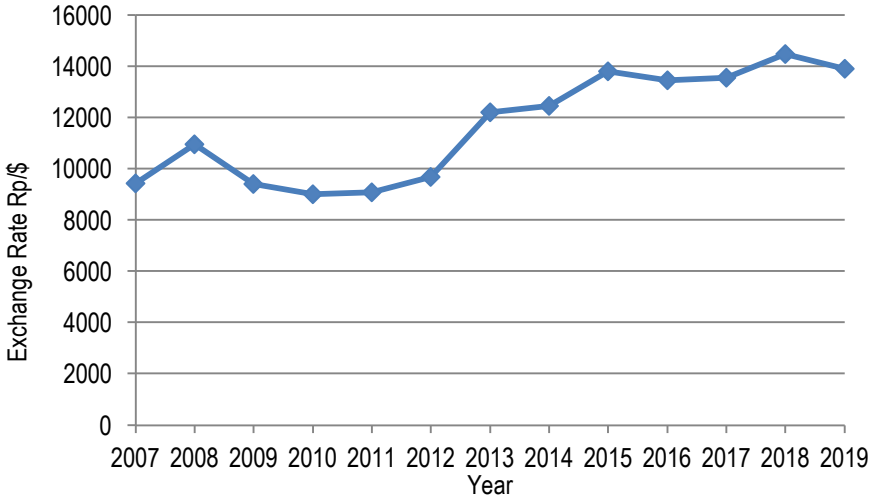
1.1. Research Background

Improvement in economic conditions before 2013 occurred because there are two global trends, namely terms of trade and capital inflow. First, Indonesia experienced terms of trade improvement that was driven by the rising export prices originating from demand for primary commodities in emerging market countries such as India and China. Second, the existence of policies from developed countries that carry out monetary stimulus causes capital inflows to Indonesia. This happens because there is an excess of liquidity at the global level, which then flows to countries that provide attractive returns, including Indonesia (Gruber and Kamin 2007, Liu *et al*. 2019). The ease in capital mobility is not without risk, besides giving benefits to Indonesia by encouraging domestic demand this capital inflow can also be a threat when all of a sudden, the funds that have been invested are withdrawn to their home countries.

In 2013, the fundamental condition of macroeconomic experiences a declined. This can be seen from the value of economic growth which dropped sharply to 5.58% from the previous period which reached 6.23% (year-on-year) in 2012 and 6.5% in 2011, and rising inflation exceeded the target that was expected in 2012 and several other declining macroeconomic variables. The weakening trend that occurs is at least triggered by changes in factors that were previously favorable. The economic slowdown that occurred in India and China also affected the performance of Indonesia's trade and export whose impact can be seen from the decline of trade due to the end of the previous era of high commodity prices. This results in production shocks in the supply side. While from the monetary side, the improvement in the United States' economy has led to a reduction in monetary stimulus where the Fed then raised the Fed's interest rate which ultimately resulted in reduced global liquidity and capital outflow from funds that were originally allocated in developing countries, including Indonesia. This condition then led to the widening of the current account deficit and the depreciation of rupiah against the US dollar which can result in external imbalances (Gruber and Kamin 2007).

Another indicator is that the inflation rate has increased. In the third quarter of 2013, the inflation reached 7.66%. This inflation level was far higher than in 2012, which was only 3.66%. Inflation in 2014 was still high at 8.36% but began to decline in 2015 to 3.35% and 2.72% by 2019. Furthermore, the decline in macroeconomic conditions can be seen from the depreciation of the rupiah exchange rate (Figure 1). This considerable depreciation is a result of the capital outflow due to differences in interest rates with the Fed, which have increased several times in a year. This frequent exchange rate fluctuation is a consequence of the exchange rate system that is used, namely the flexible exchange rate, where the increase and decrease of the exchange rate is determined by the demand and supply of foreign exchange in the financial market (Hubbard *et al.* 2012, Krugman *et al*. 2015, Liu *et al*. 2019). The depreciation of rupiah against dollar has reached a figure of Rp 15,200 per dollar in October 2018, which was the biggest decline in the past few decades.

Figure 1. Exchange rate fluctuation 2007-2019



Source: Bank Indonesia, 2019

The government's foreign exchange reserves also began to decline from around 130 billion US dollars at the beginning of 2018 to 120.65 billion US dollars in a few months. This is due to the stabilization of the exchange rate policy. Other indicators such as the unemployment rate in February 2013 of 5.88% had risen to 6.18% in 2015, and then fell again to around 5.34% in 2018.

Furthermore, the high level of uncertainty in the global economy has affected the condition of Indonesia's external balance. In terms of the ratio of the current account deficit to GDP, it increased compared to the previous period due to a decrease in the performance of the trade balance. Foreign debt towards GDP is seen to have increased from 34.8% in 2017 to 35.8% in 2018. While the ratio of the accumulation of exports and imports of goods and services to GDP (the degree of openness of the Indonesian economy) has seen a decline. However, several other indicators of external sustainability show improvement so that it supports the resilience of the external sector. The ratio of foreign debt to foreign exchange reserves has decreased in line with the increase in foreign exchange reserves at the end of 2018.

Table 1 External sustainability indicators 2015-2018

Indicator (%)	2015	2016	2017	2018
Ratio of current account to GDP	-2.03	-1.82	-1.60	-2.98
Ratio of foreign debt to GDP	36.1	34.3	34.8	35.8
Ratio of export and import of goods and services to GDP	0.60	0.90	1.1	-0.7
Ratio of total foreign debt to reserve assets	293.3	275.0	271.2	309.0

Source: Bank Indonesia, 2018.

1.2. Literature Review

This study uses the approach of the Real Business Cycle (RBC) and the New Keynesian. They are currently the leading theories on business cycle. The RBC theory explains that economic conditions that experience periodic expansion or recession are natural events. Weakening economic conditions resulted in fluctuations output and employment is the result of the various shocks that have hit the real economy and markets make adjustments quickly to maintain the balance (Vašková and Vašková 2010, Shirota 2019). From policymakers' as well as academic's point of view, examining structural shocks is one of the important areas as it helps to formulate decisions regarding the variable of interest. The Real Business Cycle approach emphasizes the importance of including shock from the supply side. RBC theory explains that supply shocks cause the macroeconomic fluctuations (Chugh 2015). To complete the analysis, we considered the shocks from the demand side by using the New Keynesian approach. It states that the demand shocks, such as changes in government policy that lead to fluctuation in macroeconomic conditions, trigger business cycles (Chugh 2015). Another important factor is market failure, it causes inefficient business cycle fluctuations by lowering output produced than the potential GDP. The market failure arises because of price and wage rigidity in the labor market while the company maintained its profit maximizing mark-up. In this case, the government plays a role in overcoming economic problems (Chugh 2015, Scarth 2014, Romer 2012).

Economists define shocks differently. Shock can be defined as the gap of actual and potentials of a variable and the gap is called the disequilibrium (Hubbard *et al.* 2012, Insukindro 1998). In general, the magnitude of a business cycle is measured using this definition. When an economic policy is implemented to address the disequilibrium, it creates additional source of shocks (Conway 1987). Chugh (2015) defines a shock as a change that cannot be explained. In the supply and demand perspective, the change is represented by the shift of the demand and supply. Shocks originating from the demand and supply sides are known as structural shocks (Jiang *et al.* 2020). Therefore, an unexpected occurrence that have a wide structural impact on large scale economy can be called a macroeconomic shock, for instance economic crisis (Hubbard *et al*. 2012).

A strand of literature has been focusing on the impact of shocks to macroeconomic variables. Ireland (2004) uses the New Keynesian Model to look at the impacts of the cost-push, monetary policy shocks, and RBC model's technology shocks on the output aggregate and employment. Heidarpour, *et al.* (2015) examines the effect of government investment shocks on consumption, employment, output, and inflation. Goodhart (2007) states that shocks towards money stock will affect the economy through the credit supply system, which will affect the interest rate and real economy through the IS curve. In five European Union member countries, a positive shock in interest rate affects output negatively (Ďurčová 2012). Leeper *et al*. (2003) states that short-term interest rates cannot be used to identify the quantitative monetary policy because the interest rates can fluctuate due to unobservable shocks towards money demand. In the case of Indonesia, economic fluctuations and exchange rate shock or the twin shocks are found to positively influence deposit interest rates (Insukindro 2020).

In addition to the macroeconomic variables described above, the government also concerns on the efforts to anticipate the weakening of the rupiah exchange rate. Fluctuations in foreign exchange rates are determined by demand and supply aggregate dynamics. In particular, the exchange rate is determined by three markets *i.e*. output market, money market, and foreign exchange market. The three equilibrium in this market determines the level of output and foreign exchange balance (Cover and Mallick 2012, Krugman *et al*. 2015). A study on exchange rate fluctuations were conducted by Peersman (2011) found that exchange rates were the source of the independent shocks for the British Economy. Whereas Cover and Mallick (2012) found that shocks to the exchange rate had little influence on the unemployment and output levels in the UK, indicating that flexible exchange rates for most of the British economy had been isolated from shocks. Batini *et al*. (2005) found that real import prices and the aggregate supply shocks caused inflation in the UK. The economic shocks due to the presence of news also lead to exchange rate volatility (Tah 2013). Garratt *et al*. (2003) analyzed the structural innovation in the Nominal Effective Exchange Rate (NEER) in a small open economy. They found that monetary contraction causes an appreciation of exchange rates, however when uncovered interest parity (UIRP) condition is considered it leads to depreciation.

2. Data and Methodology

2.1. Data

The data in this study consist of quarterly data from 2007-2019 and are drawn from the Census and Economic Information Center (CEIC) database and Statistik Ekonomi dan Keuangan Indonesia (SEKI) Bank Indonesia. The 2007 period was chosen as the year of study, as the slowdown in economic performance was seen after the global economic crisis. This period is used as a critical point. The variables that are included are unemployment, output gap, output, inflation, domestic interest rates, exchange rate, expected exchange rate depreciation, interest rate differentials, and BIRate. Unemployment is measured by open unemployment rate. Output gap is calculated by taking the difference between real output and potential output, while output is represented by GDP constant price 2010. Inflation is calculated from consumer price indices. Domestic interest rate (INDIR) is 3-months deposits interest rate (rupiah). Interest Rate Differential (DIR) is the difference between domestic dan foreign interest rate. BIRate is the central bank interest rate. Exchange rate is the exchange rate of rupiah against US dollar or Rp/US Dollar, and expected change of exchange rate is expected change of Rp/US Dollar.

2.2. Methodology

The paper uses the RBC and New Keynesian approach, that has covered shock both in terms of demand and supply to analyze the link between variables used in this research model. The model consists of three main components:

- investment and saving (IS) curve that reflects the balance in the goods and services market;
- monetary policy (MP) curve that illustrates the monetary policy of the Central Bank;
- Phillips Curve (PC) that represents the Phillip Curve.

In this paper we use modified New Keynesian Phillips curve that describes the short-term relationship between the output gap, the difference between actual GDP and potential GDP, and inflation (Cover and Mallick 2012, Giese and Wagner 2007). If the output gap is positive, it means that there is an expansion in the economy, the unemployment rate will decline, and the inflation will likely rise.

According to the Purchasing Power Parity (PPP) approach, the increase in inflation in a country more than the foreign inflation will result in domestic currency exchange rates depreciation. The difference in the rate of return of assets between countries can also lead to appreciation or depreciation of currencies. In this condition, Uncovered Interest Parity (UIRP) does not hold. UIRP condition is a condition in which the foreign exchange market is in equilibrium condition where the foreign interest rate is the same as the domestic interest rate with the assumption that there are no transaction costs and obstacles in trading. Therefore, in this condition, the differential interest rate is zero so that the arbitrage does not occur. If there is an appreciation in one of the currency exchange rates, it will immediately be offset by the depreciation of other currency, or pair currency, so that it will return to equilibrium (Krugman *et al*. 2015).

Based on the approach, therefore, to analyze the effect of structural shocks on Indonesia's macroeconomic conditions, a model consisting of productivity equations, IS equations, Phillips Curve equations, monetary policy rule equations and exchange rate equations is used (Cover and Mallick 2012, Krugman *et al*. 2015). The approach states that output and employment fluctuations are caused by various structural shocks that hit the economy, which

include productivity shock, IS shock, AS shock, monetary policy shock, and exchange rate shock. The shocks are represented in the errors in each equation.

$$\mu_t = \mu_{t-1} - \alpha_1(y_{t-1} - y^n_{t-1}) + \varepsilon^p_t \quad \text{Productivity (1)}$$

$$y_t = \beta_1\mu_t + \beta_2 p_{t-1} + \beta_3 i_{t-1} + \varepsilon^{IS}_t \quad \text{IS (2)}$$

$$p_t = \mu_1\mu_{t-1} + \mu_2(y_{t-1} - y^n_{t-1}) + \mu_3 q_{t-1} + \varepsilon^{AS}_t \quad \text{Phillips curve (3)}$$

$$BIRate_t = \lambda BIRate_{t-1} + (1-\lambda)[\gamma_1 p_t + \gamma_1(y_{t-1} - y^n_{t-1})] + \varepsilon^{MP}_t \quad \text{Monetary Policy Rule (4)}$$

$$q_t = \kappa_1 q^e_t + \kappa_2(i_t - i^f_t) + \varepsilon^q_t \quad \text{UIRP Exchange Rate Equation (5)}$$

Equation 1 states that the unemployment rate depends on the value of the output gap and production shocks. The basic idea is that unemployment (μ_t) responds to lag in unemployment rate (μ_{t-1}), output gap $(y_{t-1} - y^n_{t-1})$, and productivity shock (ε^p_t). Equation 2 shows the IS equation, the output level is influenced by the unemployment rate, lag of inflation (p_{t-1}), nominal interest rate (i_{t-1}), and IS shock (ε^{IS}_t). Equation 3 is the Phillips curve equation which shows the relationship between inflation and unemployment and its shock (ε^{AS}_t). Equation 4 shows the effect of monetary policy (BI Rate) and its shock (ε^{MP}_t). It is assumed that the bank rate gradually adjusts to the desired level, the bank rate depends on inflation (p_t), the output gap $(y_{t-1} - y^n_{t-1})$, and MP shocks (ε^{MP}_t). Equation 5 shows the exchange rate (q_t) equation that is influenced by the expected of exchange rate (q^e_t), interest rate differential $(i_t - i^f_t)$, and exchange rate shocks (ε^q_t).

The model used in this study is the Structural Vector Autoregression (SVAR) model, which is a development of the VAR model. Sims (1980) proposed the new model that does not specify exogenous and endogenous variables. The SVAR model was developed to test theories and predict policies. Since the model is over-parameterized, the t-test is not reliable. Therefore, this model does not estimate the parameters but examines the interrelationship between variables. The SVAR model is used when (1) there is a suspected reverse causality between variables and (2) the error term is assumed to be a composite error that is an error containing shocks from an X variable and shocks from a Y variable (Equation 6) (Sims 1980, Enders 2015).

$$A(L)y_t = A_0\left(I_n - A_1L - A_2L^2 \dots \dots A_pL^p\right)y_t = A_0e_t = B\varepsilon_t \quad (6)$$

where: A_0 = *n* x *n* matrix of contemporaneous effects between variables; A(L) = matrix of polynomials lag of variables of interest; y_t = n x 1 vector containing each of n variables included in the VAR; B = matrix of restrictions; ε_t = *n* x *n* column vector of structural shocks; e_t = n-column vector of reduced form shocks.

Structural VAR emphasizes on restrictions on responses from variables and predicts the impact of interventions. Several assumptions are applied to build a complete SVAR model as well as to develop the restrictions, they are based on economic theory and literature review (Cover and Mallick 2012, Krugman *et al*. 2015, Hubbard *et al.* 2012, Arestis and Sawyer 2008, Saliu *et al.* 2020). In this paper, the restrictions that are imposed in the system are as follows.

- The unemployment rate (Unemp) is affected by output gap shocks and is not directly affected by inflation and exchange rate shocks. This is known as Okun's Law, which shows the relationship between cyclical unemployment and the output gap. Based on RBC theory, cyclical unemployment occurs due to the business cycle recession. If the current unemployment is greater than the natural unemployment, then the output gap has decreased;
- Output is affected by unemployment, inflation, and domestic interest rates (INDIR) shock. Negative demand shocks have a negative effect on output;
- The inflation rate is influenced by unemployment, exchange rate (ER), and output gap shocks. If Okun's Law relationship is substituted into the Phillips curve, we will obtain inflation equation that is influenced by aggregate supply and demand shocks;
- The BI Rate is influenced by inflation and output gap shocks. Unanticipated shocks can lead to high inflation and the negative output gap. This leads the central bank issues its monetary policy through the interest rate channel;
- The exchange rate (ER) is affected by interest rate differential (DIR) and expected exchange rate depreciation (Exper) shocks. If there is a difference between domestic and foreign interest rate, it will result in capital flows that affect the fluctuation of exchange rate and at the same time UIRP does not hold;

- The domestic interest (INDIR) rate is affected by expected exchange rate depreciation (Exper) shocks. As domestic interest rate may reflect the returns on investment in the domestic country, the returns will be affected by the expected rate depreciation shocks, which can be a negative signal of the domestic economy;
- Interest differential is determined by expected exchange rate depreciation (Exper) shocks. Consistent with the previous point, shocks in expected rate depreciation affect domestic interest rates. Therefore, they also affect interest rate differential, as interest differential is defined as the difference between domestic and foreign interest rates.

Based on the restrictions, the SVAR matrix can be written as follows. Some elements in the second matrix or the B matrix are null, for example $a_{13} = 0$, it means that the long-term response of the unemployment variable towards the inflation variable shocks is zero.

Table 2. SVAR restriction matrix

$$\begin{bmatrix} Unemp \\ Output \\ Inflation \\ BIRate \\ ER \\ INDIR \\ DIR \\ OutputGap \\ Exper \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & 0 & 0 & 0 & 0 & a_{18} & 0 \\ b_{21} & 1 & b_{23} & 0 & 0 & b_{26} & 0 & 0 & 0 \\ c_{31} & 0 & 1 & 0 & c_{35} & 0 & 0 & c_{38} & 0 \\ 0 & 0 & d_{43} & 1 & 0 & 0 & 0 & d_{48} & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 & e_{57} & 0 & e_{59} \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & f_{69} \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 & g_{79} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} \varepsilon_{Unemp} \\ \varepsilon_{Output} \\ \varepsilon_{Inflation} \\ \varepsilon_{BIRate} \\ \varepsilon_{ER} \\ \varepsilon_{INDIR} \\ \varepsilon_{DIR} \\ \varepsilon_{outputGap} \\ \varepsilon_{Exper} \end{bmatrix}$$

Source: Authors' formulation.

3. Results and Discussion

This section describes the results of the study. Before proceeding into estimating the SVAR model, all variables should be stationary. ADF test is used to test whether the variables are stationary at the level. The results of the unit root test are presented in Table 3. All variables are stationary at the level as indicated by the significant ADF test statistics.

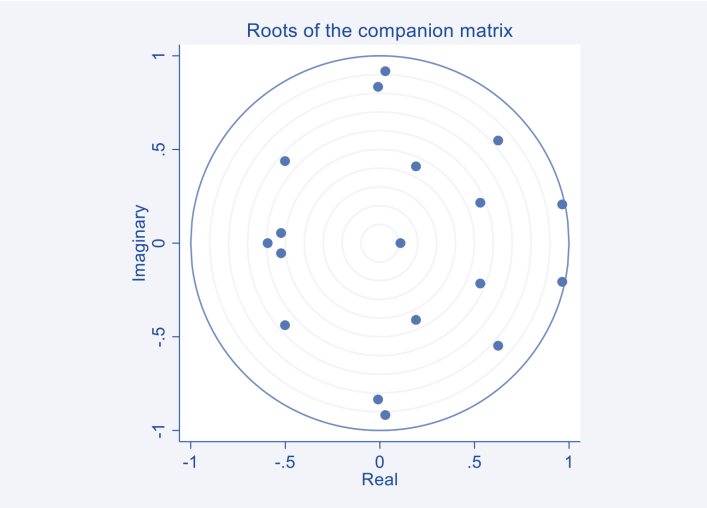
Table 3. Unit Root Test Results

No	Variables	ADF Test
1	Output	-17.963***
2	Inflation	-4.050***
3	BIRate	-4.036***
4	Unemployment	-7.064***
5	ER	-5.627***
6	INDIR	-4.736***
7	DIR	-3.425**
8	OutputGap	-17.152***
9	Exper	-6.570***

Note: ***) indicates that the variable is stationary at a critical value of 1%; **) indicates that the variable is stationary at a critical value of 5%;
Source: Unit root test results.

The next step is to determine the number lag for VAR estimation. Akaike's Information Criterion (AIC), Schwarz's Bayesian Information Criterion (SBIC), and the Hannan and Quinn Information Criterion (HQIC) are used to determine the lag variable used in the VAR model. Based on the test, the results suggest that lag of three should be used. The model also passed several diagnostic tests *i.e.*, the stability test, normality test, and autocorrelation. The stability test indicates that the system is stable with eigenvalue <1 and the roots are within the unit circle.

Figure 2. Stability Test-Unit Circle



Source: Test results.

3.1. Impulse Response Function

Impulse Response Function (IRF) analysis is used to examine the composite shock effect in the equation system towards the variables of interest (Insukindro and Pritadrajati 2019). The SVAR approach applies restrictions on the contemporaneous structural parameters, which are expected to be able to explain the dynamic changes in the Indonesian economy caused by structural shocks.

The Impulse Response Function is derived from the equation system as follows. From Equation 7, we can analyze the effect of one unit of change in the e_{Xt} shocks on Y_t in which others are assumed to be constant.

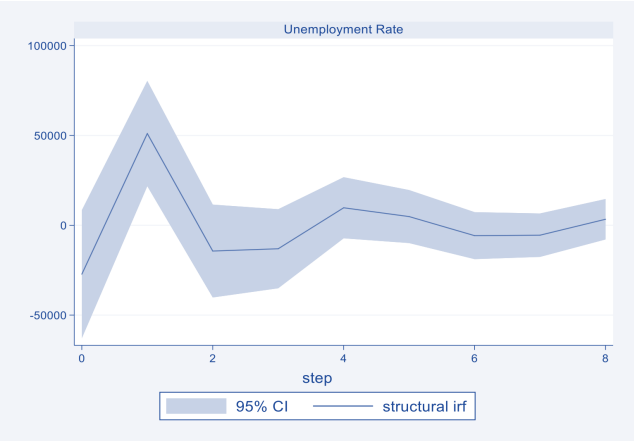
$$\begin{bmatrix} Y_t \\ X_t \end{bmatrix} = \begin{bmatrix} \bar{Y} \\ \bar{X} \end{bmatrix} + \sum_{i=0}^{\infty} \begin{bmatrix} \emptyset_{11}(i) & \emptyset_{12}(i) \\ \emptyset_{21}(i) & \emptyset_{22}(i) \end{bmatrix}^{i} \begin{bmatrix} e_{Yt-i} \\ e_{Xt-i} \end{bmatrix} \quad (7)$$

The four Φ_{jk} elements in Equation 7 are impact multipliers or impulse response functions. For example, Φ_{12} (0) is the effect of one unit of change in the e_{Xt} shocks on Y_t in which others are assumed to be constant. The model requires a stable equation system (or eigenvalue <1), which is located in a unit circle or is stationary. Sims (1980), however do not require differencing to be stationary because it will remove a lot of information.

Figure 3 shows unemployment response to the production shocks. In the first period, the production shocks originating from the output gap leads to an increase of 51,066 unemployed people. The effect levels out in the fifth period onward. This is consistent with empirical research which states that the business cycle that results in the production shocks affecting the unemployment rate (Constant and Zimmermann 2014). The increase in the output gap shows that the potential output is more significant than the real output resulting in a decrease in economic conditions, which can lead to increased cyclical unemployment (Okun's law). The high production cost results in demands for wage increases. If the company cannot fulfil the demand, the cyclical unemployment increases, and the subsequent impact exacerbates the output gap. Therefore, the model captures production shocks from the supply side in the economy (Chugh 2015, Cover and Mallick 2012, Romer 2012, Hubbard *et al.* 2012).

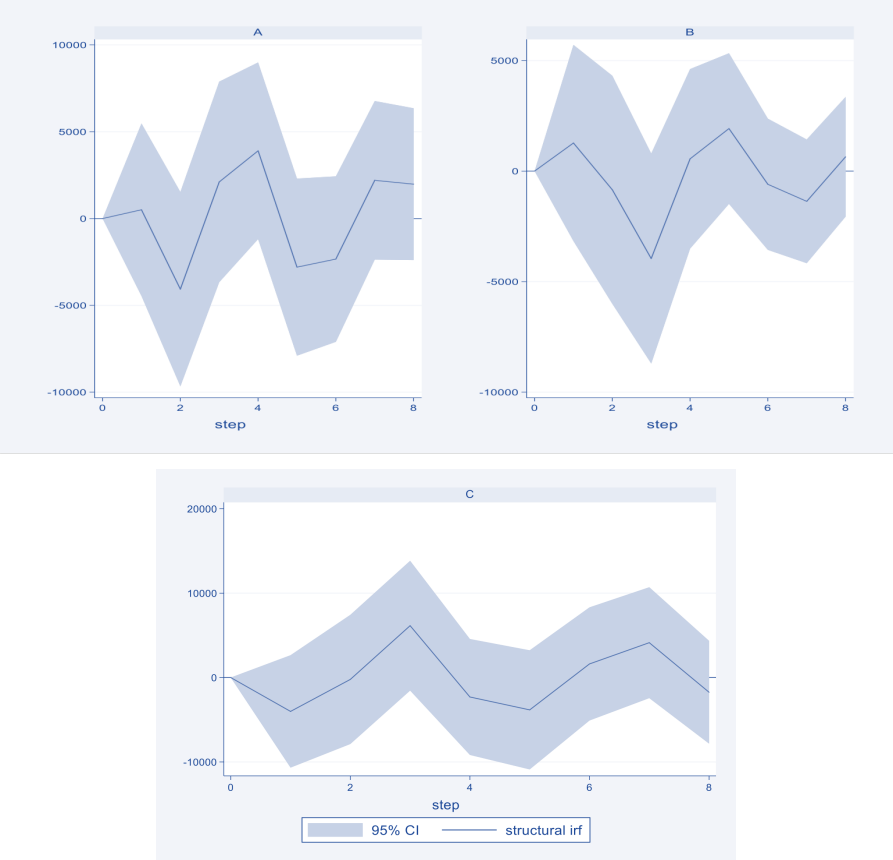
Figure 4a, 4b, and 4c show that IS shocks affect the level of output in Indonesia. The figures indicate that output oscillates around zero as a response to IS shocks originating from the unemployment, inflation, and domestic interest rates. The unemployment shocks resulted in an increase in output of 506.158 billion rupiah in the first period, but it decreases output in the second period (Figure 4a). Similar to the output response to unemployment shocks, the inflation shocks resulted in a temporary increase in output at the beginning of the period and then declined again in the third period. In the first period, the inflation shocks will cause real money demand to fall, domestic interest rates to rise, investment to fall, which leads to the fall of the output (Figure 4b). The domestic interest rate shocks affect output in the same pattern, but initial effect is negative (Figure 4c). This result is in line with the study of (Ďurčová 2012).

Figure 3. Unemployment Response to Production Shocks



Source: Impulse response results

Figure 4. Output response to IS shocks

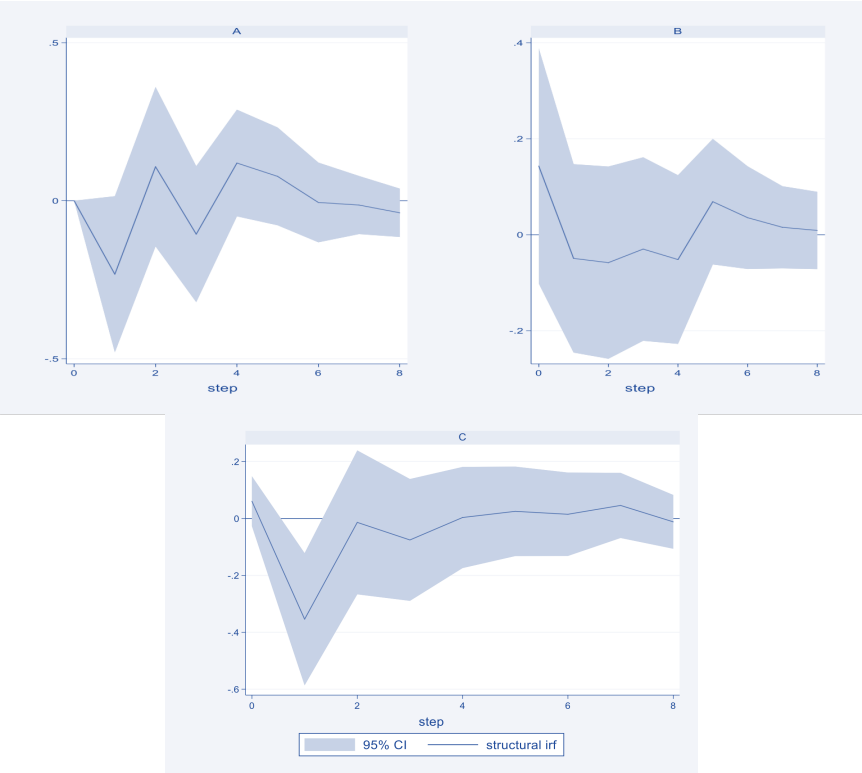


Source: Impulse response results.

Figure 5 shows the effect of AS shocks on the inflation rate in Indonesia. The figures indicate that inflation response differently to the three shocks, the AS shock originating from unemployment, output gap, and exchange rate. Overall the response of inflation to these shocks is relatively small. The unemployment shocks result in a decrease in inflation by 0.232% in the first period. This result is in line with the theory stating that if the unemployment shocks exist, then the demand aggregate will fall and further, resulting in the fall of the output because there is unemployment at the beginning of the period (Figure 5a). On the other hand, the output gap shocks increase in inflation by 0.143% at the beginning of the period. The increase in the output gap shows that the potential output is larger than the real output that lead to the rise of inflation (Figure 5b). Furthermore, the exchange rate shocks increase inflation instantly. The exchange rate shocks result in depreciation, an increase in exports, an increase in foreign exchange from the export results, increase in income, an increase in purchasing

power, an increase in consumption, which then leads to inflation that comes from the demand-pull inflation by 0.06% (Figure 5c). However, in the subsequent period inflation drops to -0.35%. This result is in line with the study of Batini *et al.* (2005) and Osabuohien *et al.* (2018).

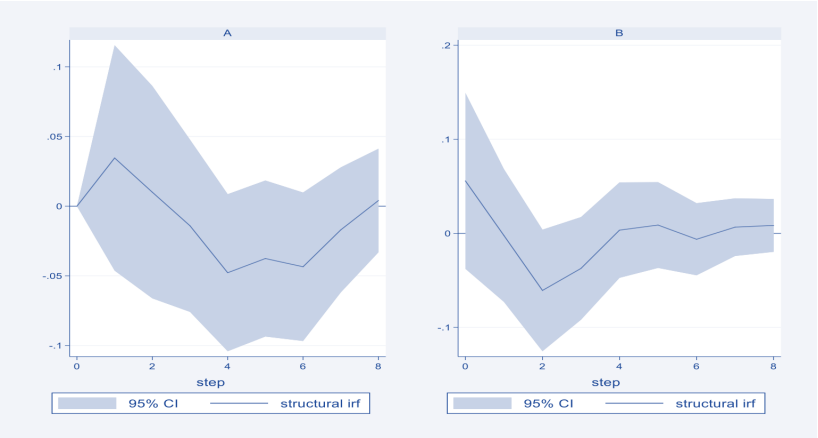
Figure 5. Inflation Response to Aggregate Supply (AS) Shocks



Source: Impulse response results.

Figure 6 shows the increase in the BI Rate due to monetary policy shocks originating from inflation and the output gap of one standard deviation. The inflation shocks resulted in an increase in the BI Rate by 0.03%. In this case, the central bank has to raise the BI Rate interest rates to control the inflation rates (Figure 6a). The output gap shocks resulted in an increase in the BI Rate by 0.06% immediately but it decreases BI Rate after ward (Figure 6b). The decline in economic conditions has prompted the central bank to raise the BI Rate. The change in the BI Rate gives an upward pressure to the domestic interest rate and in turns attract capital inflows that can drive the economy. The results of this study show that Bank Indonesia responded quickly to the structural shocks. According to the Keynesian, in disequilibrium condition, interest rates have a direct relationship with prices or inflation (Insukindro 2020). The results of this study show that Bank Indonesia responded quickly to structural shocks.

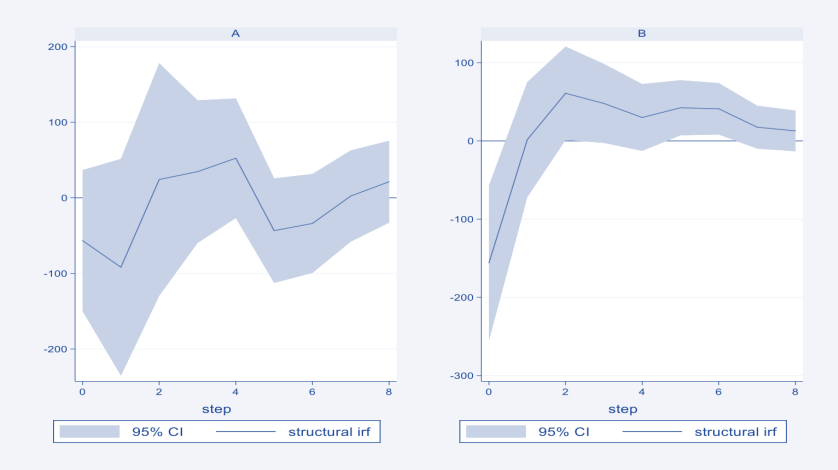
Figure 6. BI Rate response to monetary policy shocks



Source: Impulse response results.

Figure 7 show the response of exchange rate due to exchange rate shocks. The shocks are originating from interest rate differential and expected exchange rate depreciation. Both shocks lead to depreciation of rupiah. The exchange rate differential shocks result in an exchange rate depreciation of Rp56.67 per Dollar (Figure 7a). The difference in interest rate encourages arbitrage between countries, which leads to the capital flight and then the exchange rate depreciation. The expected exchange rate depreciation shocks result in the exchange rate depreciation of Rp155.91 per dollar (Figure 7b).

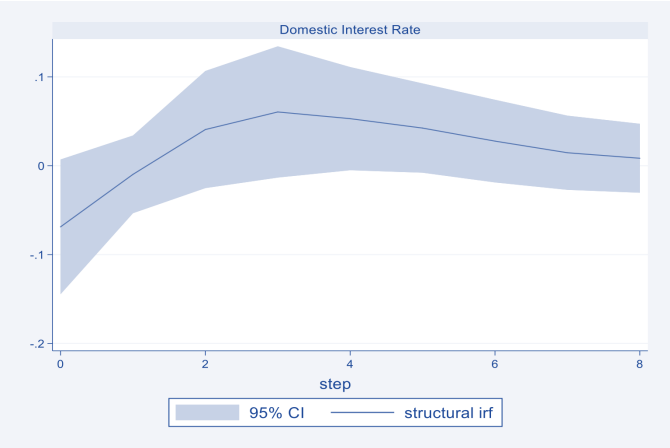
Figure 7. Exchange rate response to exchange rate shocks



Source: Impulse response results.

Figure 8 presents the effect of expected exchange rate depreciation shocks (Exper) to the domestic interest rates (INDIR) in Indonesia. The shocks resulted in a decrease in the domestic interest rate of 0.07%. If there is an expected exchange rate depreciation shocks, the rate of return of the domestic interest rate will be less attractive to the market players. Based on the monetary economic theory, in which the market is efficient, changes in interest rates can predict changes in exchange rates. In the short term, the change in exchange rate can be predicted using random walk method while in the long term it can be predicted using the fundamental factors. The results of the study showed that the UIRP condition was not reached. Therefore, structural shocks affect the weakening of economic conditions, in which the unemployment rate increases, the output falls, the inflation is high, and the depreciation of the exchange rate. This is following the theory of Real Business Cycle (RBC) and New Keynesian, which state that a decrease in aggregate demand results in a recession caused by various shocks that hit the economy (Chugh 2015, Scarth 2014).

Figure 8. Domestic interest rate response to expected exchange rate depreciation



Source: Impulse response results.

To check the robustness of the findings from the Impulse Response Functions, Granger Causality test is used to find the short-run dynamic and causality relationship between variables. The test can be used to identify whether structural shocks granger caused macroeconomic variables. The results of the analysis using the test show that at 5% significance level, all structural shocks affect macroeconomic variables, except only one variable

that is the unemployment. The results conform with the previous IRF analysis in which structural shocks affect macroeconomic indicators.

Conclusion

The global financial crisis and unexpected events generate structural shocks to the Indonesia's economy. While the Indonesian economy are improving up to 2012, by 2013 it began to decline. This study identified the shocks that lead to the weakening of macroeconomic conditions in Indonesia by using a Real Business Cycle (RBC) and New Keynesian approach. The approaches are used as they incorporate both shocks from the demand and the supply side and thus are better in representing the reality. The sample that are used are quarterly data from the Census and Economic Information Center (CEIC) database and Statistik Ekonomi dan Keuangan Indonesia (SEKI) Bank Indonesia from 2007-2019. This study uses the Structural Vector Autoregression (SVAR) model to build a macro-econometric model to analyze the relationship among the macroeconomic variables. The effects of structural shocks towards Indonesia's economy are analyzed using the impulse response function.

The results showed that in general the relationship of various shocks and the macroeconomic variables are consistent with the economic theory. The production shocks affect the unemployment rate by increasing it. Exchange rate depreciates as a response of exchange rate shocks from either interest differentials or expectation of depreciation. Thus, the shocks contribute to the declining of Indonesia's economy. The responses of inflation and output vary depending on the types of shocks. Demand shocks particularly from inflation and domestic interest rates leads a decrease in output. Inflation responses due to aggregate supply are found to be relatively small. In term of monetary policy, the monetary policy shocks originating from inflation and output gap immediately increase BI Rate. The central bank reaction is driven by the motivation to stabilize the economy.

Based on the results of the study, three suggestions are proposed for policy makers and further research agenda. First, since a particular shock have impacts on several macroeconomic variables, the government is expected to create a stable economic condition to minimize the macroeconomic volatility. Second, this study includes only inflation and output gap as the determinants of BI Rate. There are, however, other factors that influence the central bank interest rate, for instance exchange rate shocks. Therefore, we recommend imposing a restriction in the SVAR model on the exchange rate shocks so that it has a direct effect towards the BI Rate. Third, effectiveness of an economic policy on stabilizing the economy can be evaluated using counterfactual simulation. Thus, to shed light on the topic, research in this area is encouraged.

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APPENDIX

Table 4. Definition of variables and source

Notation	Variable	Definition	Unit	Source
u_t	Unemp	Open unemployment rate	People	CEIC Database
$y_t - y_t^n$	OutputGap	Difference between real output and potential output	Percentage	CEIC Database
y_t	Output	The amount of GDP measured from the expenditure side with at constant price 2010	Billion Rupiah	CEIC Database
p_t	Inflation	Price increases in general and continuously	Percentage	SEKI, BI
i_t	INDIR (*domestic interest rate*)	3 months deposits interest rate (Rupiah)	Percentage	SEKI, BI
i_t^f	US-IR *(foreign interest rate*)	3 months deposits interest rate (Dollar)	Percentage	SEKI, BI
q_t	*ER*	Exchange Rate Rp/US Dollar	Rp/US	CEIC Database
q_t^e	*Exper*	*Expected Exchange Rate* D*epreciation* Rp/ US Dollar	Rp/US	CEIC Database
DIR	*DIR (Interest Rate Differential)*	Difference between *domestic* dan *foreign interest rate*	Percentage	SEKI, BI
BI Rate	BI Rate	Central Bank Interest Rate that reflect monetary policy *stance*	Percentage	SEKI, BI

Table 5. Impulse response function

Step	(1)	(1)	(1)
	sirf	Lower	Upper
0	-27,197.50	-62,806.80	8,411.75
1	51,066.70	21,778.30	80,355.00
2	-14,346.00	-40,186.30	11,494.40
3	-13,072.40	-35,065.30	8,920.59
4	9,747.19	-7,251.97	26,746.30
5	4,842.56	-9,903.11	19,588.20
6	-5,776.74	-18,852.70	7,299.19
7	-5,515.11	-17,593.30	6,563.09
8	3,354.52	-7,887.77	14,596.80

Note: 95% lower and upper bounds reported; (1) Impulse = D_OutputGap and Response = D_Unemp
Source: impulse response results

(1) Impulse = D_Unemp and Response = D_Output
(2) Impulse = D_Inflation and Response = D_Output
(3) Impulse = D_INDIR and Response = D_Output

Step	(1)	(1)	(1)	(2)	(2)	(2)	(3)	(3)	(3)
	Sirf	Lower	Upper	sirf	Lower	Upper	sirf	Lower	Upper
0	0	0	0	0	0	0	0	0	0
1	506.158	-4,462.26	5,474.57	1,270.34	-3,165.91	5,706.59	-4,013.23	-10,672.80	2,646.38
2	-4,065.99	-9,662.14	1,530.16	-845.952	-6,003.56	4,311.66	-220.457	-7,873.45	7,432.53
3	2,109.22	-3,665.89	7,884.32	-3,956.28	-8,704.32	791.753	6,147.24	-1,539.14	13,833.60
4	3,902.79	-1,184.65	8,990.22	553.991	-3,506.04	4,614.02	-2,300.42	-9,167.99	4,567.15
5	-2,799.4	-7,898.60	2,299.81	1,923.14	-1,483.81	5,330.09	-3,828.89	-10,884.20	3,226.40
6	-2,334.71	-7,099.88	2,430.46	-596.341	-3,563.75	2,371.07	1,613.46	-5,088.92	8,315.84
7	2,202.35	-2,363.02	6,767.72	-1,368.54	-4,165.75	1,428.67	4,134.05	-2,436.82	10,704.90
8	1,980.06	-2,391.79	6,351.91	646.163	-2,061.16	3,353.48	-1,738.62	-7,828.22	4,350.97

Note: 95% lower and upper bounds reported
Source: Impulse response results

(1) Impulse = D_Unemp and Response = D_Inflation
(2) Impulse = D_OutputGap and Response = D_Inflation
(3) Impulse = D_ER and Response = D_Inflation

Step	(1)	(1)	(1)	(2)	(2)	(2)	(3)	(3)	(3)
	sirf	Lower	Upper	sirf	Lower	Upper	sirf	Lower	Upper
0	0	0	0	0.1431	-0.1019	0.3881	0.0605	-0.0272	0.1482
1	-0.2325	-0.4794	0.0144	-0.0493	-0.2456	0.1470	-0.3540	-0.5862	-0.1218
2	0.1077	-0.1445	0.3599	-0.0583	-0.2585	0.1420	-0.0137	-0.2666	0.2391
3	-0.1057	-0.3209	0.1094	-0.0299	-0.2210	0.1613	-0.0754	-0.2895	0.1386
4	0.1195	-0.0492	0.2882	-0.0518	-0.2275	0.1240	0.0034	-0.1742	0.1811
5	0.0773	-0.0776	0.2319	0.0689	-0.0619	0.1997	0.0251	-0.1321	0.1822
6	-0.0053	-0.1314	0.1209	0.0355	-0.0714	0.1425	0.0148	-0.1317	0.1613
7	-0.0135	-0.1054	0.0783	0.0155	-0.0701	0.1011	0.0459	-0.0685	0.1603
8	-0.0380	-0.1145	0.0385	0.0089	-0.0716	0.0894	-0.0118	-0.1063	0.0827

Note: 95% lower and upper bounds reported
Source: Impulse response results

(1) Impulse = D_Inflation and Response = D_BIRate; (2) Impulse = D_OutputGap and Response = D_BIRate

Step	(1)	(1)	(1)	(2)	(2)	(2)
	sirf	Lower	Upper	sirf	Lower	Upper
0	0	0	0	0.0558	-0.0377	0.1493
1	0.0346	-0.0463	0.1155	-0.0023	-0.0729	0.0683
2	0.0100	-0.0662	0.0863	-0.0608	-0.1254	0.0039
3	-0.0141	-0.0759	0.0477	-0.0373	-0.0919	0.0172
4	-0.0478	-0.1041	0.0086	0.0034	-0.0473	0.0542
5	-0.0376	-0.0936	0.0184	0.0088	-0.0368	0.0544
6	-0.0435	-0.0968	0.0098	-0.0063	-0.0446	0.0320
7	-0.0171	-0.0619	0.0278	0.0066	-0.0241	0.0372
8	0.0040	-0.0331	0.0412	0.0084	-0.0197	0.0365

Note: 95% lower and upper bounds reported
Source: Impulse response results

(1) Impulse = D_DIR and Response = D_ER; (2) Impulse = D_Exper and Response = D_ER

Step	(1)	(1)	(1)	(2)	(2)	(2)
	sirf	Lower	Upper	sirf	Lower	Upper
0	-56.5702	-149.889	36.7482	-155.905	-254.831	-56.9776
1	-91.8284	-235.108	51.4516	1.55043	-71.9350	75.0358
2	24.2636	-129.467	177.994	60.9139	1.28323	120.545
3	34.6163	-59.7011	128.934	47.9559	-2.53152	98.4433
4	52.3996	-26.6763	131.475	29.9822	-12.6932	72.6575
5	-43.4362	-112.571	25.6982	42.3600	7.16848	77.5514
6	-33.8932	-99.2702	31.4837	41.0404	8.18643	73.8944
7	2.38779	-57.9005	62.6761	17.5745	-9.84612	44.9952
8	21.2889	-32.8486	75.4264	12.8069	-13.1824	38.7961

Note: 95% lower and upper bounds reported
Source: Impulse response results

(1) Impulse = D_Exper and Response = D_INDIR

Step	(1)	(1)	(1)
	Sirf	Lower	Upper
0	-0.0688	-0.1445	0.0070
1	-0.0097	-0.0534	0.0340
2	0.0408	-0.0251	0.1066
3	0.0605	-0.0133	0.1344
4	0.0530	-0.0050	0.1110
5	0.0424	-0.0078	0.0926
6	0.0277	-0.0188	0.0742
7	0.0147	-0.0271	0.0564
8	0.0084	-0.0304	0.0472

Note: 95% lower and upper bounds reported
Source: Impulse response results

Table 6. Granger Causality Wald Tests

Equation	Excluded	chi2	Df	Prob > chi2
D_Output	D_Inflation	1.8431	2	0.398
D_Output	D_BIRate	1.8947	2	0.388
D_Output	D_Unemp	6.1954	2	0.045
D_Output	D_ER	4.7063	2	0.095
D_Output	D_INDIR	1.2462	2	0.536
D_Output	D_DIR	1.3201	2	0.517
D_Output	D_OutputGap	18.789	2	0.000
D_Output	D_Exper	1.2793	2	0.527
D_Output	ALL	47.002	16	0.000
D_inflation	D_Output	1.2493	2	0.535
D_inflation	D_BIRate	4.4346	2	0.109
D_inflation	D_Unemp	3.598	2	0.165
D_inflation	D_ER	12.095	2	0.002
D_inflation	D_INDIR	2.8111	2	0.245
D_inflation	D_DIR	2.6511	2	0.266
D_inflation	D_OutputGap	1.7734	2	0.412
D_inflation	D_Exper	5.8338	2	0.054
D_inflation	ALL	65.987	16	0.000
D_BIRate	D_Output	2.8707	2	0.238
D_BIRate	D_Inflation	0.9173	2	0.632
D_BIRate	D_Unemp	0.0795	2	0.961
D_BIRate	D_ER	0.2457	2	0.884
D_BIRate	D_INDIR	6.6586	2	0.036
D_BIRate	D_DIR	1.6198	2	0.445
D_BIRate	D_OutputGap	3.0943	2	0.213
D_BIRate	D_Exper	6.7012	2	0.035
D_BIRate	ALL	31.808	16	0.011
D_Unemp	D_Output	10.331	2	0.006
D_Unemp	D_Inflation	0.7630	2	0.683
D_Unemp	D_BIRate	0.2698	2	0.874
D_Unemp	D_ER	0.4055	2	0.816
D_Unemp	D_INDIR	2.8387	2	0.242
D_Unemp	D_DIR	4.9312	2	0.085
D_Unemp	D_OutputGap	13.953	2	0.001
D_Unemp	D_Exper	0.1375	2	0.934
D_Unemp	ALL	22.425	16	0.130
D_ER	D_Output	3.0929	2	0.213
D_ER	D_Inflation	3.9729	2	0.137
D_ER	D_BIRate	3.4627	2	0.177
D_ER	D_Unemp	0.5464	2	0.761
D_ER	D_INDIR	8.3171	2	0.016
D_ER	D_DIR	2.0807	2	0.353
D_ER	D_OutputGap	2.2218	2	0.329
D_ER	D_Exper	7.5629	2	0.023
D_ER	ALL	46.311	16	0.000
D_INDIR	D_Output	2.8278	2	0.243
D_INDIR	D_Inflation	14.478	2	0.001
D_INDIR	D_BIRate	13.746	2	0.001
D_INDIR	D_Unemp	3.1056	2	0.212
D_INDIR	D_ER	2.1868	2	0.335
D_INDIR	D_DIR	1.2017	2	0.548
D_INDIR	D_OutputGap	4.0325	2	0.133
D_INDIR	D_Exper	5.0128	2	0.082
D_INDIR	ALL	96.921	16	0.000
D_DIR	D_Output	0.1124	2	0.945

Equation	Excluded	chi2	Df	Prob > chi2
D_DIR	D_Inflation	20.079	2	0.000
D_DIR	D_BIRate	5.1238	2	0.077
D_DIR	D_Unemp	0.0808	2	0.960
D_DIR	D_ER	0.1485	2	0.928
D_DIR	D_INDIR	5.3830	2	0.068
D_DIR	D_OutputGap	0.2366	2	0.888
D_DIR	D_Exper	4.1242	2	0.127
D_DIR	ALL	68.481	16	0.000
D_OutputGap	D_Output	14.467	2	0.001
D_OutputGap	D_Inflation	1.2286	2	0.541
D_OutputGap	D_BIRate	0.7922	2	0.673
D_OutputGap	D_Unemp	6.6396	2	0.036
D_OutputGap	D_ER	1.8865	2	0.389
D_OutputGap	D_INDIR	3.9383	2	0.140
D_OutputGap	D_DIR	2.8092	2	0.245
D_OutputGap	D_Exper	1.2722	2	0.529
D_OutputGap	ALL	38.596	16	0.001
D_Exper	D_Output	2.4007	2	0.301
D_Exper	D_Inflation	0.6499	2	0.723
D_Exper	D_BIRate	1.9375	2	0.380
D_Exper	D_Unemp	0.3306	2	0.848
D_Exper	D_ER	30.390	2	0.000
D_Exper	D_INDIR	4.9641	2	0.084
D_Exper	D_DIR	1.3630	2	0.506
D_Exper	D_OutputGap	2.7134	2	0.258
D_Exper	ALL	88.678	16	0.000

Source: Granger causality test results.

Employment Intensity of Growth in Nigeria: Implication for Development

Rasaki Stephen DAUDA
Department of Economics, Faculty of Social Sciences
Redeemer's University, Nigeria
daudas@run.edu.ng daudastephen@gmail.com adeldauda@yahoo.com

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Abstract:

Nigeria in the recent past recorded high growth performance, averaging 6.5% between 2000 and 2017. The growth feat placed her among the fastest growing economies globally and the largest in Africa. This growth achievement presupposed that the volume of economic activities in the nation was large and thus should have contributed positively to employment generation. However, the reverse appeared to be the case as the level of unemployment remained high and increasing; moving from 18.8% in 2017 to 23.1% 2018 while combined unemployment and underemployment rates rose from 40.0% in 2017 to 43.3% in 2018. This jobless growth situation shows the low labor absorptive capacity of the economy.

This study therefore investigated the employment intensity of growth (EIG) in Nigeria between 1991 and 2018. It is based on the Okun's law and employed quantitative technique of analysis, using elasticity procedure. Secondary data were adopted for the analysis and they were collected from the World Development Indicators and the Central Bank of Nigeria Statistical Bulletin. Five growth measures were used in addition to employment variable while the analysis was disaggregated into different periods and regimes. The findings revealed overwhelming negative EIG in the overall economy, which ranged between -0.001 and -1.64. During the military rule (1991-1998), EIG hovered between -0.002 and -0.15 while the civilian regime (1999-2018) had EIG ranged from -0.01 to -1.68. The implication of the findings is that growth has not engendered employment generation in Nigeria. One major reason for this is the dominance of the nation's economy by oil, which employs an infinitesimal proportion of the labor force. Therefore, for growth to generate employment, it is important that the economy is diversified away from oil. In addition, entrepreneurship and skill development programmes should be encouraged while economic environment should be investor friendly to attract local and foreign investors.

Keywords: unemployment; employment intensity; economic growth; elasticity; Nigeria.

JEL Classification: B22; E24; J21.

Introduction

One of the critical areas of measuring macroeconomic performance of a nation is the labor market performance. This relates to how the economy has been able to reduce the level of unemployment, raise the ratio of population employed, improve the labor force participation rate, increase the level of employment created, enhance labor productivity rate, and how growth has translated into employment generation (Kapsos 2006, Rani and Zaman 2018, Sachs and Schleer 2019, and Tvrdon 2019). To this end, studies across literature have examined different aspects of these labor market issues and reported mixed outcomes. Prominent among them is how economic growth and job creation relate, which is studied from two perspectives. While some examine how unemployment or employment affects economic growth, others focus on the impact of economic growth on employment. The latter is the focus of the present study.

This issue, often referred to as employment intensity of growth (EIG) or employment elasticity of growth (EEG), attempts to assess how economic growth has generated employment. In doing this, it tries to measure numerically the relationship between output growth and employment generation. This provides useful information on labor markets in the area of how output and employment growths evolve over time, and how employment varies among different population groups (Kapsos 2006).

Employment generation is key to social and economic development of every society, and economic growth has significant role to play in this. Economic growth can translate into poverty alleviation, reduce inequality gap and engender development through employment generation (Bell and Newitt 2010, Manh, Ngoc and Dao 2014, Bezler and Borbasova 2018). This explains why the eight goal of sustainable development is tagged "decent work and economic growth."

The growth performance of Nigeria's economy in the recent past averaged 6.5% between 2000 and 2017. Nevertheless, unemployment in the country rose from 18.8% in 2017 to 23.1% 2018 while combined unemployment and underemployment rates increased from 40.0% in 2017 to 43.3% in 2018 (National Bureau of Statistics 2018). This situation normally referred to as jobless growth shows the low labor absorptive capacity of Nigeria's economy.

The issue of employment impact on growth, which falls within the context of EIG has been grossly understudied until recently, when literature begins to emerge in this area, showing countries translating economic growth to job creation (Kapsos 2006, Slimane 2015 also Soylu, Cakmak and Okur 2018). However, literature along this area is not conclusive due to the mixed findings and its dearth in some developing countries like Nigeria where high rates of unemployment and economic growth coexist. In fact, studies examining output growth effect on employment in Nigeria appear scarce. Those that are plethora focus on employment/unemployment impact on growth. A good number of them regress unemployment on growth with mixed outcomes, influenced majorly by their methodologies (Omitogun and Longe 2017 also Seth, John and Dalhatu 2018). Others studied how unemployment, poverty and economic growth relate (Adelowokan, Maku, Babasanya and Adesoye 2019); the relationship between growth and employment (Oloni 2013, Ajakaiye *et al.* 2016); as well as output shock and unemployment (Abraham 2014, Akeju and Olanipekun 2015).

The current paper examines EIG in Nigeria, using elasticity procedure. The paper is distinct from others in several respects. For instance, it studies EIG across the entire economy on annual basis, per period basis, and across different regimes over the period 1991-2018. Furthermore, the work employed the methodology that rightly captures these different areas of focus as opposed to the ordinary regression used by some of the other studies. The rest of the paper covers section one, which reviews literature, section two focuses on methodology employed, section three presents results of the analysis conducted in the study while section four concludes the study.

1. Literature review

The work of Okun (1962) proposes linear relationship between unemployment and growth of gross domestic product (GDP). Since then, several empirical studies have been conducted to examine how growth and employment relate. Okun's law postulates that a 3% output growth is required for a 1% reduction in unemployment rate. Thus, implying the existence of a positive relationship between a country's output growth and employment generation. However, empirical findings across literature on this relationship appeared mixed, with some being consistent with the stance of the law while others diverge.

A recent work by An, Prieto, Loungani and Mishra (2016, 5) shows that this law holds for the overall United States and most States in the country over several periods of years, especially in States with strong industrial structure while the relationship was "weaker in States where agriculture or oil production are dominant". This finding is consistent with some previous ones that found positive employment elasticity's of growth across countries.

For example, Seyfried (2005) reported a 0.47 EEG for the overall US economy while the estimate for various States ranged from 0.31 to 0.61.

Other earlier studies include: Padalino and Vivarelli (1997) which estimated EIG for the G-7 countries (United States, UK, Canada, France, Germany, Italy and Japan) and reported a positive 0.5 employment-growth elasticity for the UK and US while the results for the remaining five countries approached zero. Boltho and Glyn (1995) also reported between 0.5 and 0.6 EEG for some OECD countries.

Moreover, the study of Herman (2011) over the period 2000-2010 shows some countries in the Eastern and Central EU recording low and negative EEG while others had positive and high EEG. Countries such as Romania and Estonia had -0.39 and -0.04 elasticity coefficients respectively. On the other hand, the coefficient ranged from 0.96 in Luxemburg to 1.45 in Italy. The author attributed the variations in employment growth elasticity performance in the EU to factors such as the small capacity of some of the countries to generate employment during economic growth process.

The work of Slimane (2015) used unbalanced panel of 90 developing countries over a period of 1991-2011, and employed a two-step estimation technique to investigate what determines "cross-country variations in employment elasticity." It was reported among others that positive EEG exists in most of the countries. However, the elasticity was higher and more pronounced "in more advanced and closed countries."

The above suggest that Okun's law appears to hold in developed economies where better systems are in place than in developing economies as shown in most of the available literatures.

In advanced countries, where negative or near zero EIG has been reported (Padalino and Vivarelli 1997, Herman 2011) one key explanation has been the use of new technologies by firms, which raise productivity level rather than employment. Other explanation presupposes that when an economy is recovering from recession, the tendency is that not all sectors recover at the same time, and thus sectors that are growing rather increase labor utilization instead of job creation. Flaig and Rottman (2009) also identified institutions, which are specific to the labor market as well as labor flexibility as factors that will normally determine the influence of economic growth process on employment.

In most developing countries, studies reported declining EEG, suggesting that the law of Okun appears not to hold in such countries. For instance, Leshoro (2014) found that in spite of the sustained growth in the economy of Botswana for decades, unemployment level still remained high. This result was due to the greater proportion of the country's growth from diamonds.

In Nigeria, works which attempt to examine the effect of growth on employment/unemployment are not many. Literature search produced just four, which are Oloni (2013), Abraham (2014), Akeju and Olanipekun (2015), and Ajakaiye *et al.* (2016). While Oloni (2013) and Ajakaiye *et al.* (2016) focus on how economic growth affects employment, Abraham (2014) considers the impact of output shock on unemployment and Akeju and Olanipekun (2015) examined how growth affects unemployment in the country.

The findings were mixed. For example, while Ajakaiye *et al* (2016) reported inverse relationship between economic growth and employment in Nigeria, Oloni (2013) and Abraham (2014) found no significant effect of growth on employment and unemployment respectively. However, Akeju and Olanipekun (2015) found a positive relationship between unemployment and growth. These findings notwithstanding, the methodologies employed by some of the authors could have accounted for their findings. For instance, Oloni (2013) claimed to have used the Johansen Vector- Error Correction Model (VECM); however, this does not reflect in the study because only unit root and cointegration tests were conducted, after which a static regression, using the OLS estimating technique was carried out and the results reported. Similarly, Akeju and Olanipekun (2015) reported direct relationship; however, the findings were mixed. Some of the lagged unemployment variables were negative while others were positive. Moreover, the unit root result also showed different order of integration yet the authors went ahead to run ECM, which cast some doubts on the findings, conclusion and recommendation. Another observation was that authors like Oloni (2013) and Abraham (2014) provided recommendations from insignificant findings, which is not supported in the literature because an insignificant finding is not important and no recommendation can emerge from this

2. Methodology

2.1. Analytical framework

There are two prominent approaches to determining EIG in the empirical literature. The ratio of a change in employment to a change in output approach otherwise referred to as the elasticity procedure. The second is the multivariate log-linear regression approach (Kapsos 2006, Slimane 2015).

In this study, the first approach is adopted. The justification for this is that it allows per period determination of EIG as against the once for all approach of using multivariate log-linear regression. With the first approach, EIG can be determined within a year, and different periods over a long period of time. This enables policies that affect the result per period to be pinpointed.

The first approach, which is the elasticity procedure, defines EIG as the percentage change in employment to a percentage change in output level. Symbolically, it is given as:

$$\varepsilon = \frac{\%\Delta E}{\%\Delta Y} \tag{1}$$

where: ε stands for EIG, Δ is a change operator, E signifies employment generation, and Y implies output level for measuring economic growth. A positive ε signifies increased employment as output level rises while a negative ε means that employment level declines as output increases.

Equation (1) can be re-written as:

$$\varepsilon = \frac{\dfrac{E_t - E_{t-1}}{E_{t-1}}}{\dfrac{Y_t - Y_{t-1}}{Y_{t-1}}} = \left(\frac{\left(E_t - E_{t-1}\right)/E_{t-1}}{\left(Y_t - Y_{t-1}\right)/Y_{t-1}}\right) = \left(\frac{E_t - E_{t-1}}{Y_t - Y_{t-1}}\right)\left(\frac{Y_{t-1}}{E_{t-1}}\right) \tag{2}$$

Where all other variables remain as earlier defined. However, t indicates period, usually a year while $_{t-1}$ on a variable is the lag of that variable. Therefore, E_{t-1} and Y_{t-1} are lags of employment and output respectively.

Equation (2) implies:

$$\varepsilon = \frac{\partial E}{\partial Y}.\frac{Y}{E} \tag{3}$$

2.2. Data Description and Sources

The study employed secondary data from two major sources as shown in Table 1 below.

Table 1. Data requirement, definition and source

Variable	Definition	Source
GNIK	GNI, PPP (constant 2011 international $)	World Bank (2020)
GDPK	GDP, PPP (constant 2011 international $)	World Bank (2020)
GDPC	GDP, PPP (current international $)	World Bank (2020)
GDPn	GDP (Gross Domestic Product at Current Basic Prices - Annual (₦' Billion))	Central Bank of Nigeria (2018)
GDPr	GDP (Gross Domestic Product at 2010 Constant Basic Prices - Annual (₦' Billion))	Central Bank of Nigeria (2018
EMP	Employment to population ratio, 15+, total (%)	

Source: Author's Compilation (2020).

3. Empirical Findings/Results

The empirical results presented in this section cover per annum computation of EIG from 1991 to 2018. Thereafter, different periods, ranging from five years interval to ten years interval were estimated. Moreover, EIG was examined between 1991 and 2018. Finally, the analyses also cover the military era (1991-1998); overall civilian regime (1999-2018), different civilian periods of 1999-2007; 2007-2010; 2010-2015; and 2015-2018. These are shown in Tables 2 to 4.

3.1. Employment Intensity of Growth in Nigeria, per period estimation, 1991-2018

The EIG reveals the impact of economic growth on employment generation. It deals with how employment responds to output growth in a particular economy. The results presented in this section show EIG in Nigeria computed every year over the period 1991-2018. This is contained in Table 2 below.

Table 2. Per annual employment intensity of growth in Nigeria, 1991-2018

Year	GNIKeig	GDPKeig	GDPCeig	GDPneig	GDPreig
1991 - 1992	-0.04	-0.03	-0.02	-0.003	-0.06
1992 - 1993	0.13	0.23	-1.64	-0.01	-0.30
1993 - 1994	1.12	0.21	-1.35	-0.01	-1.49
1994 - 1995	-0.08	1.21	-0.04	-0.001	-0.05
1995 - 1996	-0.04	-0.05	-0.03	-0.01	-0.05
1996 - 1997	-0.05	-0.06	-0.04	-0.02	-0.06
1997 - 1998	-0.08	-0.06	-0.04	-0.01	-0.07
1998 - 1999	-0.04	-0.16	-0.04	-0.01	-0.17
1999 - 2000	0.08	-0.02	-0.01	-0.003	-0.02
2000 - 2001	-0.01	-0.02	-0.01	-0.01	-0.01
2001 - 2002	-0.01	-0.01	-0.004	-0.002	-0.01
2002 - 2003	-0.01	-0.01	-0.01	-0.003	-0.01
2003 - 2004	-0.05	-0.05	-0.04	-0.02	-0.04
2004 - 2005	0.02	0.02	0.01	0.01	0.02
2005 - 2006	0.02	0.04	0.03	0.01	0.04
2006 - 2007	0.08	0.05	0.03	0.02	0.04

Year	GNIKeig	GDPKeig	GDPCeig	GDPneig	GDPreig
2007 - 2008	0.02	0.015	0.01	0.01	0.01
2008 - 2009	-0.03	-0.03	-0.03	-0.02	-0.03
2009 - 2010	0.01	0.01	0.01	0.003	0.01
2010 - 2011	0.03	0.03	0.02	0.01	0.03
2011 - 2012	0.02	0.02	0.01	0.01	0.02
2012 - 2013	0.01	0.01	0.01	0.01	0.01
2013 - 2014	-0.09	-0.12	-0.09	-0.07	-0.12
2014 - 2015	-0.24	-0.32	-0.23	-0.15	-0.31
2015 - 2016	0.77	0.53	1.59	-0.11	0.54
2016 - 2017	3.67	0.36	0.11	0.02	0.35
2017 - 2018	-0.03	-0.02	-0.01	-0.004	-0.02

Note: GNIKeig = EIG with respect to GNI, PPP (constant 2011 international $, GNIK); GDPKeig = EIG with respect to GDP, PPP (constant 2011 international $, GDPK); GDPCeig = EIG with respect to GDP, PPP (current international $, GDPC); GDPneig = EIG with respect to nominal GDP (Gross Domestic Product at Current Basic Prices - Annual (₦' Billion)); and GDPreig = EIG with respect to real GDP (GDP at 2010 Constant Basic Prices - Annual (₦' Billion)).
Source: Author's computation (2020).

Table 2 shows the annual EIG for Nigeria over the period 1991-2018, using five variants of growth data. From the findings, EIG remain negative for most of the periods. For instance, 80 out of the 135 coefficients were negative as apparent in the table. The negative EIG was highly pronounced from 1991 to 2004 (with the coefficient ranging between -0.001 and -1.49) and then 2013 to 2018. Even where positive coefficients were recorded, it was due to simultaneous declines in both growth and employment. So, the growth recorded by Nigeria during the period 1991-2018 did not translate into substantial employment generation. This is a situation referred to as jobless growth.

3.2. Employment Intensity of Growth in Nigeria, per period analysis, 1991-2018

The findings presented in this sub-section are based on per period analysis of EIG in Nigeria over 1991-2018 as shown in Table 3.

Table 3. Employment intensity of growth for Nigeria, per period analysis, 1991-2018

Year	GNIKeig	GDPKeig	GDPCeig	GDPneig	GDPreig	Period
1991 - 2018	-0.02	-0.02	-0.01	-0.0002	-0.014	Twenty eight years interval
1991 - 2000	-0.15	-0.1	-0.05	-0.002	-0.08	Ten years interval
2001 - 2010	0.001	0.0004	0.0003	0.0001	0.0004	Ten years interval
2011 - 2018	-0.08	-0.09	-0.05	-0.02	-0.10	Eight years interval
1991 - 1995	-1.93	-1.88	-0.11	-0.003	-0.18	Five years interval
1996 - 2000	-0.08	-0.05	-0.03	-0.01	-0.04	Five years interval
2001 - 2005	-0.01	-0.01	-0.01	-0.003	-0.01	Five years interval
2006 - 2010	0.01	0.01	0.01	0.003	0.01	Five years interval
2011 - 2015	-0.06	-0.07	-0.05	-0.03	-0.07	Five years interval
2016 - 2018	0.16	0.09	0.03	0.01	0.09	Three years interval

Note: GNIKeig = EIG with respect to GNI, PPP (constant 2011 international $, GNIK); GDPKeig = EIG with respect to GDP, PPP (constant 2011 international $, GDPK); GDPCeig = EIG with respect to GDP, PPP (current international $, GDPC); GDPneig = EIG with respect to nominal GDP (Gross Domestic Product at Current Basic Prices - Annual (₦' Billion)); and GDPreig = EIG with respect to real GDP (GDP at 2010 Constant Basic Prices - Annual (₦' Billion)).
Source: Author's computation (2020).

Generally, the results indicate negative EIG across different periods with few positive coefficients recorded. For the periods 1991-2018, 1991-2000, 2011-2018, 1991-1995, 1996-2000, 2001-2005, and 2011-2015; the coefficients were negative across all the growth data while positive EIG was recorded for the periods 2001-2010 and 2016-2018. Even with that the positive coefficients for the period 2001-2010 approached zero. The highest negative coefficient, -1.93 was recoded within 1991-1995 period.

3.3. Employment Intensity of Growth in Nigeria, Political Regime Analysis, 1991-2018

The analysis of EIG was also performed based on different political dispensations in Nigeria over the period 1991-2018. This is presented in Table 4 below.

For all the regimes identified, EIG was negative as evident in Table 4. During the military rule, which spanned 1991-1998, EIG hovered between -0.002 and -0.15. The situation during the civilian era (1999-2018) was not different from what occurred in the military dispensation. The value of EIG recorded was between -0.01 and -0.006. Furthermore, the disaggregation of the civilian period did not present divergent results, as EIG remained negative for the entire periods. In fact, the magnitude of the EIG coefficient was high during the current civilian dispensation (2015-2018) than the previous ones. The minimum EIG was -0.02 while the maximum was -1.68.

Table 4. Employment intensity of growth for Nigeria, per period analysis, 1991-2018

Year	GNIKeig	GDPKeig	GDPCeig	GDPneig	GDPreig	Period
1991 - 1998	-0.15	-0.15	-0.06	-0.002	-0.10	Military rule
1999 - 2018	-0.01	-0.01	-0.006	-0.001	-0.01	Civilian rule
1999 - 2007	-0.001	-0.001	-0.0005	-0.0001	-0.001	Obasanjo regime
2007 - 2010	-0.003	-0.003	-0.003	-0.001	-0.003	Umaru Musa Yar'Adua regime
2010 - 2015	-0.04	-0.05	-0.03	-0.02	-0.05	Goodluck Jonathan regime
2015 - 2018	-1.68	-0.56	-0.09	-0.02	-0.54	Muhammadu Buhari regime

Note: GNIKeig=EIG with respect to GNI, PPP (constant 2011 international $, GNIK); GDPKeig=EIG with respect to GDP, PPP (constant 2011 international $, GDPK); GDPCeig=EIG with respect to GDP, PPP (current international $, GDPC); GDPneig=EIG with respect to nominal GDP (Gross Domestic Product at Current Basic Prices - Annual (₦' Billion)); and GDPreig=EIG with respect to real GDP (GDP at 2010 Constant Basic Prices - Annual (₦' Billion)).

Source: Author's computation (2020).

3.4. Discussion

Generally, the findings overwhelmingly revealed negative EIG, implying that the growth experienced by the country during the period under consideration did not generate enough employment, rather employment declined as the economy grew. The results from disaggregated data into different periods and political regimes did not differ from the annual findings. The findings revealed jobless growth situation, and signifies simultaneous increase in unemployment and output in Nigeria, which suggests a low labor absorptive capacity of the economy. The result is counterintuitive because it diverges from the Okun's law, which postulates a positive linear relationship between output growth and employment.

However, the outcome is consistent with empirical findings across literature, such as Ajakaiye *et al*. (2016) for Nigeria, Leshoro (2014) that reported negative EIG for the Botswana and Herman (2011) that discovered low and negative EEG for EU countries between 2000 and 2010.

The issue of jobless growth as reported for Nigeria in this paper is not surprising. The nation's economy is dominated by the oil sector, which employs a very minute proportion of the labor force. Its contribution to the GDP is high and serves as the main source of foreign exchange earnings for the country. The nation needs to aggressively diversify her economy away from oil, which does not have a future. Dauda (2019a) argues that oil is no longer fashionable since nations are currently developing alternatives to oil as well as electric cars, which will eventually lead to continuous declines in demand for oil. A fall in oil was the main reason for the recession Nigeria experienced in 2016, and accounts for the negative EIG for the period 2015-2018 reported in this study. Even during this COVID-19 pandemic, oil price has crashed and the country has to readjust her budget for the year.

In addition, poor governance and corruption pose great challenge to the Nigerian economy, and as such the nation's income is not well expended, rather it goes through the back doors into private purses instead. In fact, the country has not enjoyed good leadership since independence, as "most persons occupying leadership positions in" the country do not possess the "requisite qualities, skills, character, ability, and political will to formulate and implement policies" needed to promote development and improve employment level (Dauda 2019b, 259). The issue of corruption is critical, and manifests itself in different dimension. The nation ranks 146 out of 180 countries in the latest corruption perception index and the fourth most corrupt countries in West Africa (Transparency International, 2020).

Another fundamental issue affecting the nation's economy, and preventing growth from generating employment is infrastructure decay, deficit and inadequacy. This has hampered activities of private firms, which spend huge sum of money on power generation and other infrastructure. The result is high cost of production, low employment, low pay, retrenchment of staff, and relocation of firms to neighboring countries.

Population growth also contributes to unemployment in Nigeria. Currently, her population size, which is growing at approximately 2.60% stands at 195.87 million (World Bank 2020) and comprises about 43.0% youths while the nation is projected to emerge as the third most populous country globally by 2050 (United Nations 2019). This poses serious unemployment challenge for the country.

Another problem Nigeria is currently battling with is insecurity caused by the activities of terrorists, bandits, kidnapers and herders, who frequently attack farmers and innocent citizens across the country. Several farmers can no longer farm while companies and small scale enterprises operating in the affected areas have closed down, thereby contributing to unemployment.

3.5. Implication of Findings for Development

The findings indicating jobless growth reported in this paper have a lot of implications for development in Nigeria. Employment generation is one of the key development policies. Explaining development within the perspective of the new economic view, Todaro and Smith (2015, 17) noted that economic development is "the reduction or elimination of poverty, inequality, and unemployment within the context of a growing economy." In fact, sustenance (the ability to meet basic needs), which is one of the three core values of development cannot be achieved without employment. Employment generates income that gives the people access to the life-sustaining basic human needs of food, shelter, health, and protection. In a jobless growth society like Nigeria, sustainability is threatened.

The three objectives of development ("to increase the availability and widen the distribution of basic life-sustaining goods", "to raise levels of living", and "to expand the range of economic and social choices"), as enumerated by Todaro and Smith (2015, 24) cannot be met without job creation. This explains why the issue of employment was included in the sustainable development goals (SDGs), and most of its targets are employment compliance.

Moreover, in a country like Nigeria, where out-of pocket health expenditure is as high as 77.25% (World Bank 2020), a high level of unemployment as depicted by the findings in this paper can have negative impact on the health status of the populace. For instance, an unemployed person will have limited access to both quantity and quality of food (to boost health status) and healthcare services, which are capable of increasing all forms of mortality and reduce average life expectancy in the country.

Finally, in a jobless growth society, the level of crime and insecurity will be very high as currently witnessed in Nigeria.

Conclusion

This paper is based on the proposition of linear inverse (positive) relationship between unemployment (employment) and output growth otherwise known as the Okun's law. It adopted a quantitative technique of analysis, using elasticity procedure to examine employment intensity of growth in Nigeria over the period 1991-2018. The findings contrast significantly with the position of the law. Overwhelming negative relationship between employment and output growth was discovered across different growth measures covering different periods and regimes.

The study contributes significantly to current research and practice in growth and development literature; particularly as it relates to employment and economic growth. Studies along this area have not considered it necessary to disaggregate scope into different periods and regimes due to the methodologies employed. Moreover, in Nigeria, most available works in this area focus on unemployment impact on growth, and not the other way round.

Therefore, the findings of this study provide policy direction on how to make growth generate employment in Nigeria. Specifically, the nation's economy needs urgent and aggressive diversification away from oil. Poor governance and corruption should be addressed. The country needs to develop her infrastructure, particularly electricity. Population growth should be checked, especially in the Northern region while insecurity should be addressed.

The above notwithstanding, the findings of the study are limited by the data set employed. Data from other sources may produce different results. Therefore, further studies could employ data from different sources.

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