

Emerging Countries' Counter-Currency Cycles in the Face of Crises and Dominant Currencies

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Abstract

This article explores how emerging economies use countercyclical monetary policies, such as interest rate adjustments, foreign exchange interventions, and capital controls, to manage crises and fluctuations in dominant currencies like the US dollar and the euro. Highlighting economic cycles and financial crises - including 1997, 2008, and the COVID-19 pandemic - the article emphasizes the vulnerabilities of emerging markets to external shocks.

Through case studies of Brazil, India, and Nigeria, it demonstrates how these nations navigate economic instability with monetary tools, despite structural and institutional constraints. An econometric analysis using a VAR model evaluates the effectiveness of these policies on GDP, inflation, and exchange rates, showing how emerging economies can adapt to external shocks and stabilise growth in the long term.

Keywords: economy, emerging countries, international economy, GDP, change rate.

JEL Classification: C53, C01, E17, E47.

Introduction

Global economic cycles are characterized by alternating phases of expansion and recession, influenced by a multitude of economic, political and social factors. These cycles are often punctuated by major financial crises, such as the Asian crisis of 1997, the global financial crisis of 2008, and more recently, the economic turbulence induced by the COVID-19 pandemic. These events not only disrupted international financial markets, but also had a profound impact on emerging economies, which are often more vulnerable due to their dependence on foreign capital flows and exports.

In this context, monetary policy plays a crucial role for emerging economies. Central banks in these countries have to navigate a complex environment, marked by volatile global markets and fluctuations in dominant currencies such as the US dollar and the euro. Monetary policy decisions, whether they involve adjusting interest rates, intervening in the foreign exchange market or imposing capital controls, are essential to stabilizing national economies, controlling inflation and promoting sustainable economic growth.

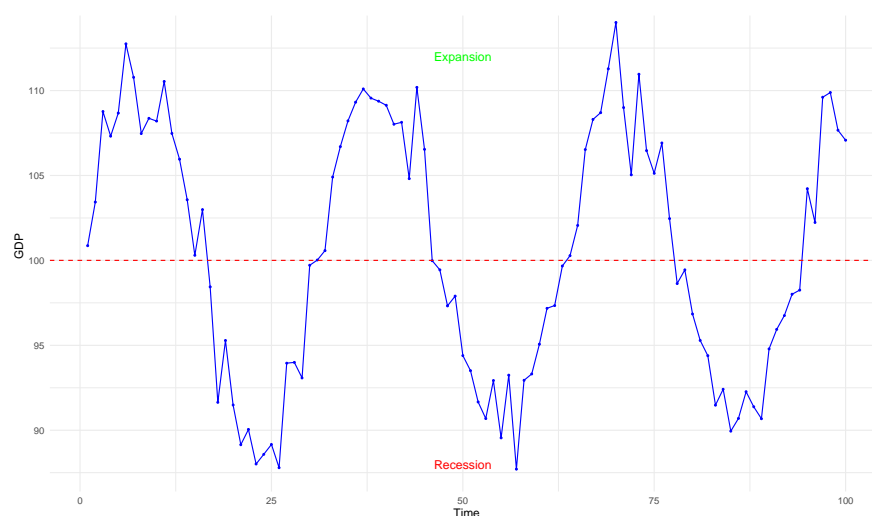
Faced with these challenges, a fundamental question arises: how do emerging countries use counter-cyclical monetary policies to protect themselves from economic crises and mitigate the effects of fluctuations in dominant currencies? Monetary counter-cycling refers to the use of monetary policies to moderate economic fluctuations, by tightening or easing monetary conditions in response to internal or external shocks. This approach is particularly relevant for emerging economies, which are often exposed to violent external shocks, such as sudden changes in global financial conditions or abrupt variations in commodity prices. What's more, as emerging economies are often more fragile, the risks of inflation are high, and these risks are vital to avoid if emerging economies are to develop and achieve economic convergence with more developed economies.

1. Theoretical and Historical Context

1.1. Economic Cycles and Financial Crises

Business cycles are recurring fluctuations in global economic activity, characterized by phases of expansion (economic growth) and contraction (recession). These cycles are generally measured by macroeconomic indicators such as gross domestic product (GDP), employment, investment and industrial production. The phases of a typical business cycle include expansion, when GDP rises, employment and incomes improve, and investment is buoyant; peak, the highest point in the business cycle when the economy reaches its highest level before beginning to slow; recession, a period of economic decline characterized by falling GDP, rising unemployment, falling incomes and reduced investment; and finally, trough, the lowest point in the business cycle before the economy begins to recover.

Figure 1: Modelling economic cycles



These cycles can be influenced by a variety of factors, such as demand and supply shocks, monetary and fiscal policies, and technological change.

Financial crises, on the other hand, are severe disruptions to the financial system, often marked by bank failures, stock market collapses and acute economic contractions. Financial crises can have a variety of origins, including speculative bubbles, shocks to confidence or macroeconomic imbalances.

Notable examples of major financial crises include the Asian crisis of 1997, which began in Thailand with the collapse of the baht and spread rapidly to other Asian economies such as Indonesia, South Korea and Malaysia, leading to massive currency devaluations, severe economic contractions and structural reforms imposed by the International Monetary Fund (IMF); the global financial crisis of 2008, triggered by the collapse of the US real estate market and the bankruptcy of Lehman Brothers, which led to a global recession, affecting emerging countries through falling exports, capital flight and exchange rate volatility; and the European sovereign debt crisis of 2010-2012. Although centered in Europe, this crisis had global repercussions, affecting emerging countries in particular through financial contagion and falling demand for their exports.

1.2. Role of Dominant Currencies

Leading currencies, such as the US dollar (USD) and the euro (EUR), play a central role in the global economy due to their extensive use in international transactions, foreign exchange reserves and financial markets. Their importance lies in several key aspects: as a store of value, where the world's central banks hold substantial reserves in USD and EUR to stabilize their own currencies and manage economic crises; as a medium of exchange, as the dollar and euro are widely used for international trade, facilitating exchanges between countries; and as a unit of account, as many financial contracts, including international loans, are denominated in USD or EUR, reinforcing their central role.

Fluctuations in the dominant currencies can have a significant impact on emerging economies, affecting their economic and financial stability. Fluctuations in exchange rates between dominant currencies and local currencies can lead to unpredictable fluctuations in import costs and export revenues. Emerging economies that borrow in USD or EUR may see the cost of their debt rise if their local currency depreciates. In addition, interest rate variations in dominant economies can lead to volatile capital flows, with capital outflows on interest rate rises and inflows on interest rate falls.

1.3. Concept of Monetary Counter-Cycle

Counter-cyclical policies are strategies implemented by monetary authorities to smooth economic fluctuations and stabilize the economy. These policies aim to smooth economic cycles by reducing the scale of expansions and contractions to maintain stable economic growth, prevent financial crises by using preventive measures to avoid asset bubbles and macroeconomic imbalances, and stabilize prices by keeping inflation low and stable, adjusting interest rates and foreign exchange reserves.

Emerging countries use counter-cyclical policies to protect themselves from external shocks and economic crises. The history of their use reveals a variety of approaches. In the 1990s, following the financial crises of that period, many emerging countries adopted structural reforms and strengthened their monetary policy frameworks to include counter-cyclical measures. For example, the Asian crisis of 1997 prompted several countries to accumulate substantial foreign exchange reserves and adopt flexible exchange rate policies to better

absorb external shocks. Similarly, during the global financial crisis of 2008, emerging economies used monetary and fiscal stimulus policies to support domestic demand and stabilize their economies in the face of the global recession, whereas the more developed economies first promoted austerity to stabilize the economic situation before launching large-scale stimulus plans.

2. Analysis of Monetary Counter-Cycle

2.1. Monetary Strategies Adopted by Emerging Countries

Emerging economies, faced with often volatile economic and financial environments, can implement a variety of monetary strategies to stabilize their economies. These strategies are crucial to managing economic shocks, whether in times of global financial crisis or in the face of significant fluctuations in dominant currencies. The main monetary strategies adopted by these countries include interest rate policies, foreign exchange intervention, capital controls and other measures that can be classified as unconventional.

Interest Rate Policies

Interest rate policies are one of the main instruments of monetary policy in emerging economies. Central banks adjust key interest rates to influence the cost of credit and, consequently, consumption and investment in the economy. Lower interest rates tend to stimulate economic activity by making borrowing cheaper, encouraging companies to invest and consumers to spend. Conversely, higher rates are generally aimed at containing inflation by dampening aggregate demand.

In times of crisis or economic slowdown, emerging economies often resort to an accommodating monetary policy, lowering interest rates to support growth. For example, during the 2008 financial crisis, many emerging countries cut interest rates to mitigate the effects of the global recession. However, this approach is not without risks, as interest rates that are too low can lead to an overheating economy or financial instability, particularly if it leads to excessive debt accumulation.

Foreign Exchange Intervention

Foreign exchange intervention is another key strategy used by central banks in emerging countries to manage their exchange rates. These interventions can take the form of buying or selling foreign currencies to influence the value of the domestic currency. For example, to avoid excessive currency depreciation, central banks may sell foreign currency reserves to buy the local currency, thereby increasing its demand and value.

These interventions are primarily aimed at stabilizing the exchange rate, avoiding excessive volatility and maintaining the competitiveness of exports. In economies where imports of everyday consumer goods are significant, a depreciation of the local currency can quickly translate into imported inflation. Foreign exchange intervention also helps to boost investor and consumer confidence, by mitigating unpredictable exchange rate fluctuations.

However, foreign exchange interventions can be costly, especially if they require the massive use of foreign exchange reserves, which are often lower in emerging countries. What's more, they can sometimes be perceived as currency manipulation by trading partners, which can lead to international tensions and a retraction of international trade for the country linked to the currency instability induced by these possible manipulations.

Capital Controls and Other Unconventional Measures

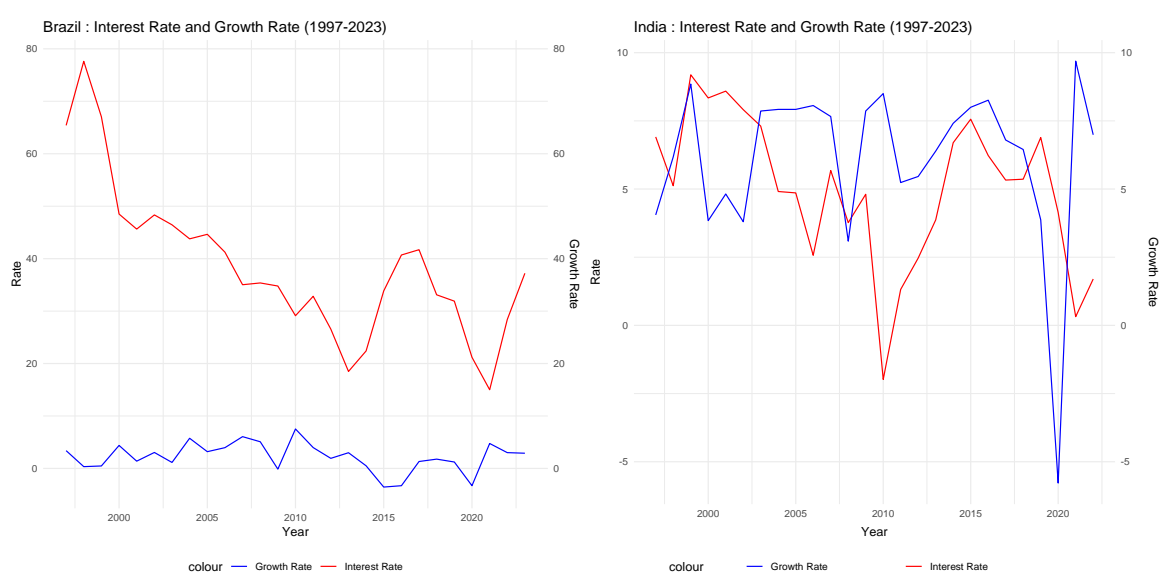
Capital controls and other unconventional measures are instruments often used by emerging countries to manage capital flows and prevent financial crises. Capital controls include restrictions on capital inflows and outflows, which may take the form of taxes, quotas or specific regulations on international financial transactions. These measures are designed to protect the national economy against volatile capital movements, which can destabilize financial markets and the local currency. In particular, during periods of high financial instability or speculative pressure, emerging countries may impose restrictions on capital outflows to avoid massive currency flight, which could weaken their currencies and accentuate economic imbalances. Capital controls can also be used to regulate capital inflows, particularly short-term flows which can create asset bubbles and increase financial vulnerability.

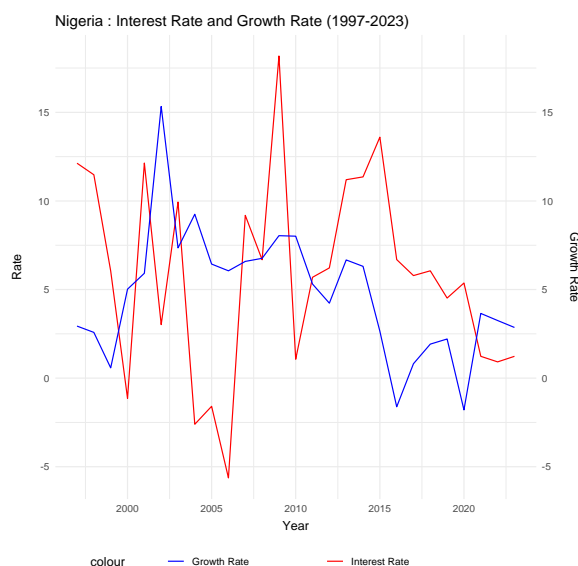
In addition to capital controls, emerging countries may resort to other unconventional measures, such as the use of macroprudential policies to manage systemic risks, or direct interventions in certain segments of the financial market to stabilize monetary conditions. These unconventional measures, while sometimes necessary, can present challenges, particularly in terms of economic costs and effects on investor confidence. Capital restrictions can deter foreign investment and undermine long-term growth. In addition, mismanagement of these policies can distort financial markets, exacerbating existing imbalances.

2.2. Monetary Strategies Adopted by Emerging Countries

Brazil, as one of the largest emerging economies, has employed various monetary policies to stabilize its economy in the face of crises and fluctuations in dominant currencies. India has also implemented counter-cyclical monetary policies to stabilize its economy, particularly in times of global financial crisis and dominant currency volatility, in order to become a major South Asian economy. Nigeria, reputed to be Africa's largest and most promising economy, has employed several monetary strategies to manage the impact of economic crises and dominant currency fluctuations.

Figure 2: Comparison between Brazil, India and Nigeria of growth rate and interest rate





Source: World Bank Group

Brazil's central bank has often adjusted interest rates to control inflation and stimulate economic growth. For example, after the global financial crisis of 2008, the interest rate was reduced to encourage investment and consumption. This policy was aimed at boosting the Brazilian economy by increasing domestic demand. In addition, the Brazilian Central Bank regularly intervenes on the foreign exchange market to stabilize the Brazilian real. This includes buying foreign currencies to boost reserves and selling currencies to support the domestic currency. These interventions are designed to alleviate pressure on the real and avoid excessive depreciation, which could harm the economy. The country has also imposed capital controls during periods of high volatility. For example, to limit speculative movements and protect the national economy, measures such as taxes on short-term foreign investments have been put in place. These controls aim to prevent capital flight and stabilize domestic financial markets.

The Reserve Bank of India (RBI) regularly adjusts interest rates to manage inflation and support growth. During the global financial crisis of 2008, India lowered interest rates to stimulate the economy. This rate cut was intended to encourage borrowing and investment, in order to boost economic activity. The Reserve Bank of India also intervenes in the foreign exchange market to manage the value of the Indian rupee against dominant currencies such as the US dollar. These interventions are crucial to stabilizing the currency and avoiding depreciations that could exacerbate economic imbalances. In addition, India has imposed various restrictions on capital movements to stabilize its financial market. These include restrictions on foreign direct investment and strict regulations on short-term capital flows. These controls are designed to protect the Indian economy from volatile capital flows that could destabilize financial markets.

The Central Bank of Nigeria adjusts interest rates to control inflation and stimulate growth. For example, in response to falling oil prices in 2015, the central bank raised interest rates to contain inflation. This policy was aimed at stabilizing the Nigerian economy, which is heavily dependent on oil exports. The Central Bank of Nigeria actively intervenes on the foreign exchange market to stabilize the Nigerian naira. In times of strong pressure on the currency, such as major fluctuations in oil prices, the central bank buys or sells foreign currencies to

stabilize the exchange rate. These interventions are essential to protect the economy from the adverse effects of currency devaluation. In response to market volatility, Nigeria has also imposed capital controls to limit currency outflows and stabilize the local economy. These measures include restrictions on foreign currency transactions and strict regulations on the transfer of funds abroad. These controls are aimed at preventing capital flight and stabilizing domestic financial markets.

2.3. Challenges and Limitations of Countercyclical Policies

Structural and Institutional Constraints

Emerging countries often face structural constraints that reduce their ability to implement effective counter-cyclical policies. These constraints include underdeveloped financial infrastructures, a narrow tax base, and fragile legal or political systems. One example is economies where financial markets are shallow and poorly regulated, and the ability of monetary authorities to influence interest rates and inject liquidity can be considerably reduced. In addition, the absence of efficient public administration and endemic corruption can complicate the implementation of counter-cyclical fiscal policies, limiting the effectiveness of stimulus or austerity measures.

Institutional constraints also play a major role. In many emerging countries, central banks lack independence, which can lead to monetary policy decisions being influenced by short-term political considerations rather than long-term macroeconomic stability objectives. Furthermore, the weakness of domestic financial institutions limits their ability to absorb economic shocks, which can exacerbate crises rather than alleviate them, as in the Thai crisis mentioned above.

Reactions from Financial Markets and International Investors

Counter-cyclical policies in emerging economies can also be limited by the reactions of financial markets and international investors. Foreign investors, in particular, are often sensitive to changes in economic policy in emerging countries. Indeed, expansionary monetary policy aimed at stimulating economic growth can lead to capital flight if investors perceive an increased risk of inflation or currency depreciation. This capital flight can then exacerbate pressure on the domestic currency, forcing the authorities to tighten monetary policy procyclically, i.e. in the opposite direction to what was initially intended. In addition, emerging countries are often vulnerable to fluctuations in global financial conditions, due to their dependence on external financing. Rising interest rates in advanced economies, for example, can make debt servicing more expensive for emerging countries, limiting their ability to pursue counter-cyclical policies. Financial markets can also react negatively to expansionary fiscal policies, especially if they are perceived as unsustainable in the long term, by increasing the risk premiums demanded on sovereign bonds.

3. Mathematical Development and Analysis

To analyse the interactions between the main economic variables in the context of countercyclical policies of emerging countries, we use a Vector AutoRegression (VAR) model introduced by Sims (1980). The VAR model is an econometric tool for capturing dynamic relationships between several economic time series without imposing a strict theoretical structure. Thus, the main economic variables that will be considered in this model are:

GDP (Y_t), Interest rate (i_t), Inflation (π_t), Exchange rate (e_t)^{1, 2}.

3.1. Formulation of a VAR Model

The VAR model consists of a set of equations where each economic variable depends on the past values of all variables in the model, including itself. In the 4-variable VAR model as presented previously the equations will be as follows:

$$Y_t = \alpha_0 + \alpha_1 Y_{t-1} + \alpha_2 i_{t-1} + \alpha_3 \pi_{t-1} + \alpha_4 e_{t-1} + \epsilon_{Y,t} \quad (1)$$

$$i_t = \beta_0 + \beta_1 Y_{t-1} + \beta_2 i_{t-1} + \beta_3 \pi_{t-1} + \beta_4 e_{t-1} + \epsilon_{i,t} \quad (2)$$

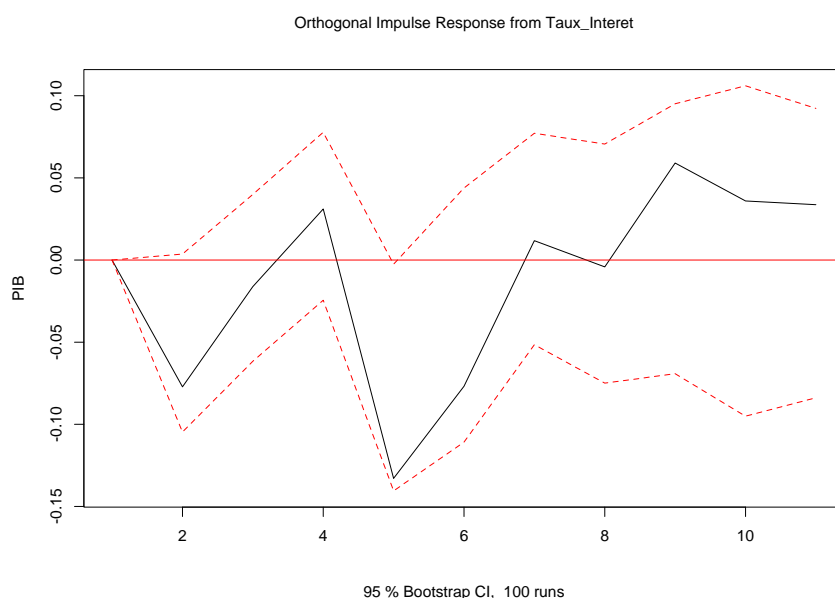
$$\pi_t = \gamma_0 + \gamma_1 Y_{t-1} + \gamma_2 i_{t-1} + \gamma_3 \pi_{t-1} + \gamma_4 e_{t-1} + \epsilon_{\pi,t} \quad (3)$$

$$e_t = \delta_0 + \delta_1 Y_{t-1} + \delta_2 i_{t-1} + \delta_3 \pi_{t-1} + \delta_4 e_{t-1} + \epsilon_{e,t} \quad (4)$$

3.2. Brazil VAR Analysis

VAR GDP / Interest rate model

Figure 3: Response to an interest rate shock in Brazil



The graph illustrates the orthogonal impulse response of GDP to a standard interest rate shock and will be simulated for each country.

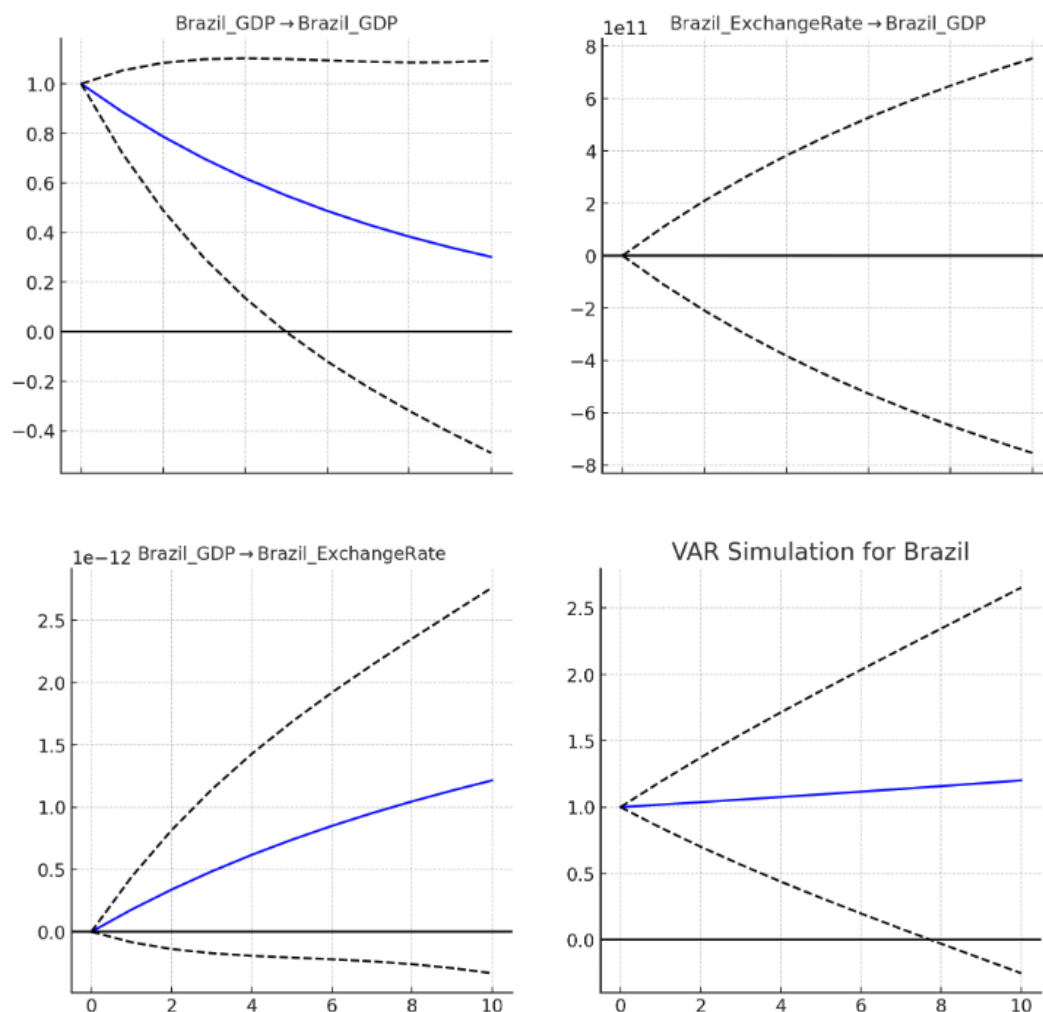
According to this model, a positive interest rate shock initially leads to a fall in GDP. This negative response is in line with economic theory, which states that a rise in interest rates tends to dampen investment and consumption, thus reducing economic activity in the short term. The effect of higher interest rates on GDP seems to persist for several periods before diminishing. This suggests that monetary policy has a lasting impact on economic activity.

However, to analyze the impact of a dominant currency in a country's economy we need to run the same simulation but, on the GDP/exchange rate variables.

¹ Currencies studied here: Brazil: Real (BRL), India: Indian Rupee (INR), Nigeria: Naira (NGN)

² Here, the exchange rate of each currency will be analyzed against the dollar, the dominant reference currency, but the analysis can also be carried out against the euro.

Figure 4: Forecast model for Brazil



The 1st graph at top left shows the response of GDP (Brazil_GDP) to an exogenous shock in the exchange rate (Brazil_ExchangeRate). Immediately after the shock, we observe a negative response in GDP, suggesting that an initial depreciation in the exchange rate has a negative impact on the Brazilian economy, possibly by increasing the cost of imports, which weighs on domestic production. This negative response continues for several periods before beginning to stabilize. This suggests that the effect of the exchange rate is significant in the short term, but that the economy can slowly adjust.

The 2nd graph at top right shows the direct effect of the exchange rate on itself. This graph shows how the exchange rate reacts to a shock to GDP. The flat line suggests that changes in GDP do not have an immediately perceptible effect on the exchange rate. However, GDP appears to be an important determinant of exchange rate fluctuations in subsequent periods, although the relationship is not linear.

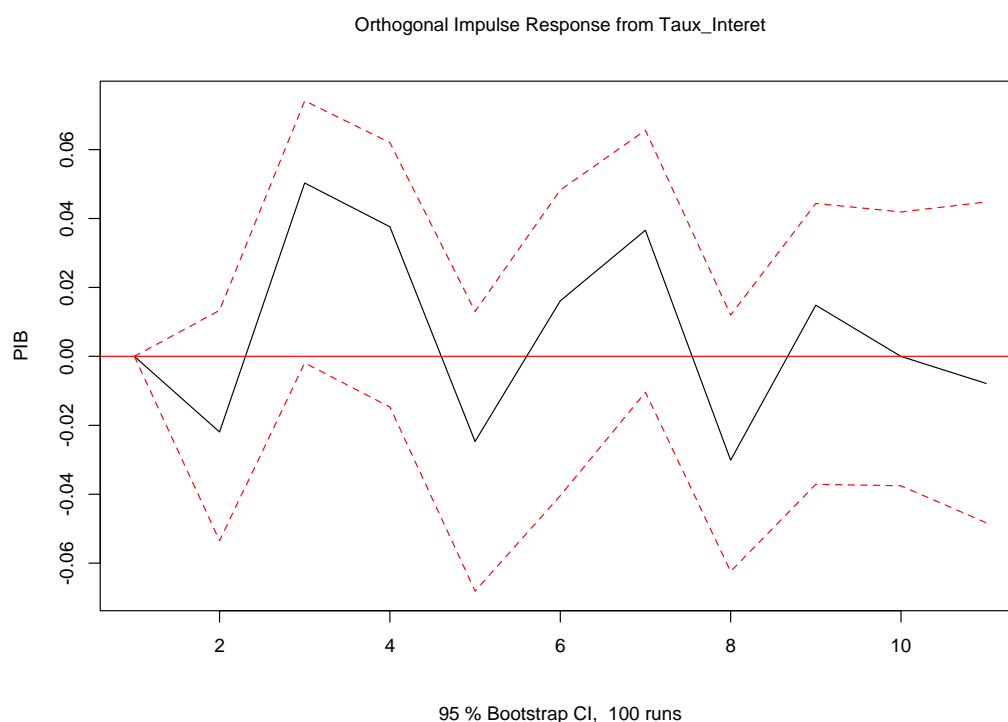
The bottom left and right graphs show the cross-interactions between GDP and exchange rate. The bottom left-hand chart suggests that the effect of an exchange rate shock is gradually absorbed by the economy, allowing for a slight improvement in GDP over the long term. This could materialize through structural adjustments or economic policies that come into play to stabilize the economy.

Thus, the results show that Brazilian GDP seems particularly sensitive to exchange rate shocks, especially in the short term. This demonstrates the importance of maintaining a stable exchange rate policy to avoid significant negative impacts on the economy. In the long term, relative stability suggests that appropriate interventions, such as interest rate adjustments or fiscal policies, can help mitigate the negative impact of the exchange rate on GDP.

3.3. India VAR Analysis

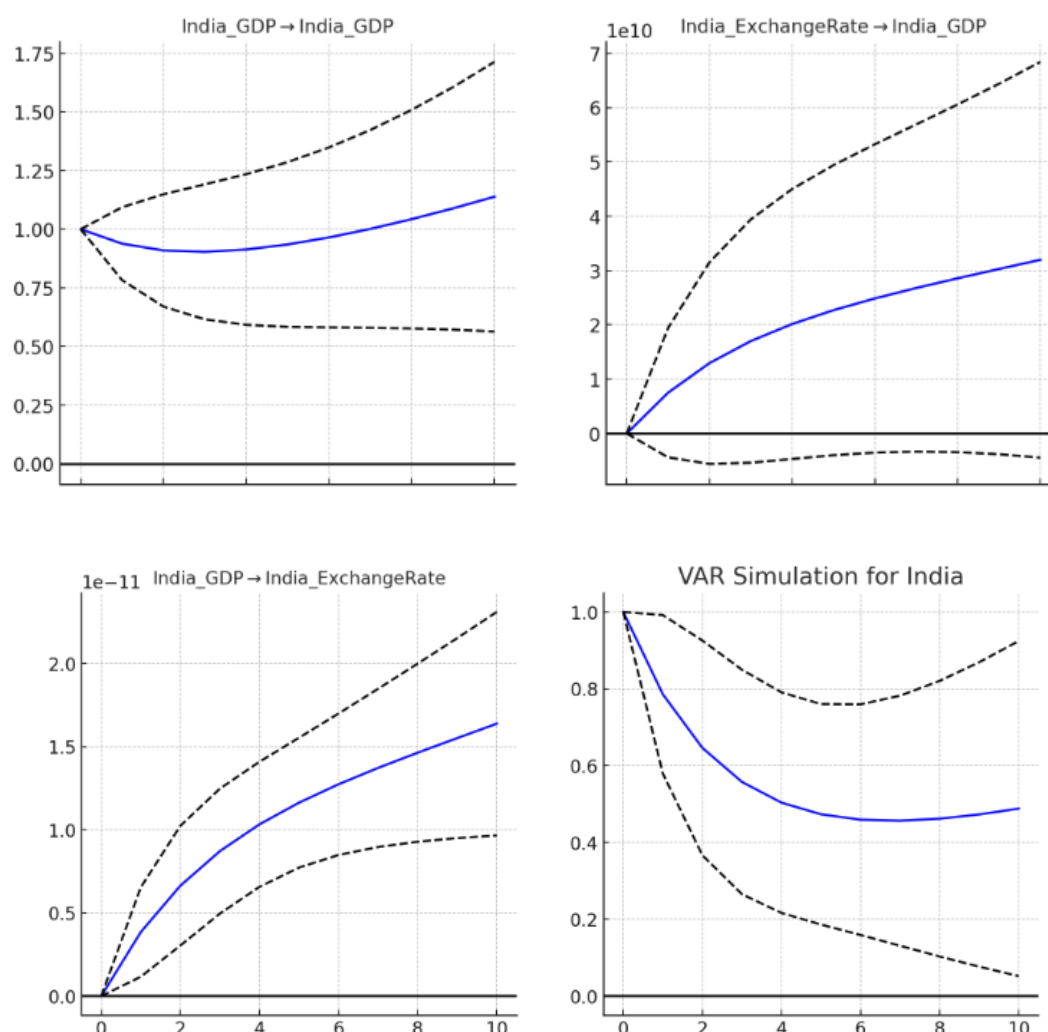
VAR GDP/Interest Rate Model

Figure 5: Response to an interest rate shock in India



From the initial shock, we see a slight drop in GDP. This initial negative response suggests that rising interest rates may be reducing domestic demand, possibly by making credit more expensive, thus affecting consumer and investment spending. GDP begins to react positively after the initial decline. This could reflect an adaptation of the Indian economy to the new monetary situation, where companies and consumers adjust their behaviour in response to higher interest rates. After the increase, GDP fluctuates, moving above and below the baseline. These oscillations indicate medium-term economic instability, probably due to competing forces - on the one hand, reduced domestic demand, and on the other, a possible improvement in the trade balance thanks to a potentially stronger currency-. The end of the analysis horizon shows that the GDP response converges towards the baseline, indicating that the effect of the interest rate shock diminishes over time, even if a downward propensity remains, pointing to chronic instability.

Figure 6: Forecast model for India



Following a positive shock to the exchange rate, GDP shows an initial negative reaction. This suggests that currency depreciation leads to an increase in the cost of imports, which may reduce domestic consumption and investment in the short term. After the initial negative effect, GDP begins to show signs of recovery after 2-3 periods. This recovery can be attributed to the increased competitiveness of Indian exports due to the weaker currency, stimulating production and incomes in export-oriented sectors.

In the longer term, GDP response tends to stabilize, gradually returning towards the baseline. This indicates that the Indian economy is capable of absorbing exchange rate shocks over an extended period, surely through internal adjustment mechanisms and economic diversification.

A positive shock to GDP leads to an immediate appreciation of the exchange rate. This seems logical, as a growing economy attracts more foreign investment, thus increasing demand for the local currency. The initial exchange rate appreciation is followed by a slight correction, where the exchange rate stabilizes at a level slightly above the baseline. This suggests that the positive effects of economic growth on the value of the currency are long-lasting, but moderated by other macroeconomic factors such as inflation and the trade balance.

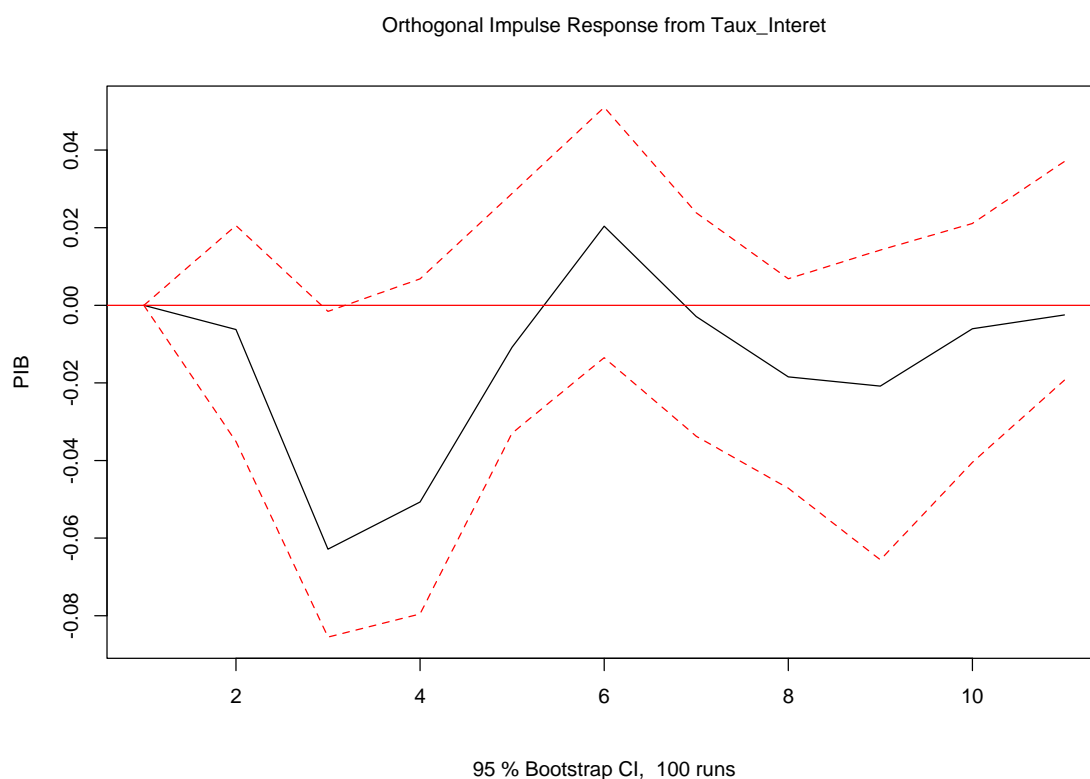
A positive shock to GDP leads to an immediate and significant increase in GDP in subsequent periods. This persistence indicates the ripple effect of economic growth, where initial growth stimulates further consumption, investment and production, creating a virtuous cycle of economic growth. This mechanism is recurrent in emerging economies, enabling more or less prolonged phases of uninterrupted growth, particularly in countries with a large production base enabling them to export.

The results indicate that the Indian economy is sensitive to exchange rate fluctuations, with short-term negative effects on GDP in the event of currency depreciation. However, the ability to recover in the medium and long term suggests economic resilience and effective adjustment mechanisms. The recovery of GDP after an exchange rate depreciation shock underlines the importance of exports in the Indian economy. A weaker currency makes Indian products more competitive on the international market, boosting production and employment. However, the results highlight the need to further diversify the Indian economy and strengthen its resilience to external shocks.

3.4. Nigeria VAR Analysis

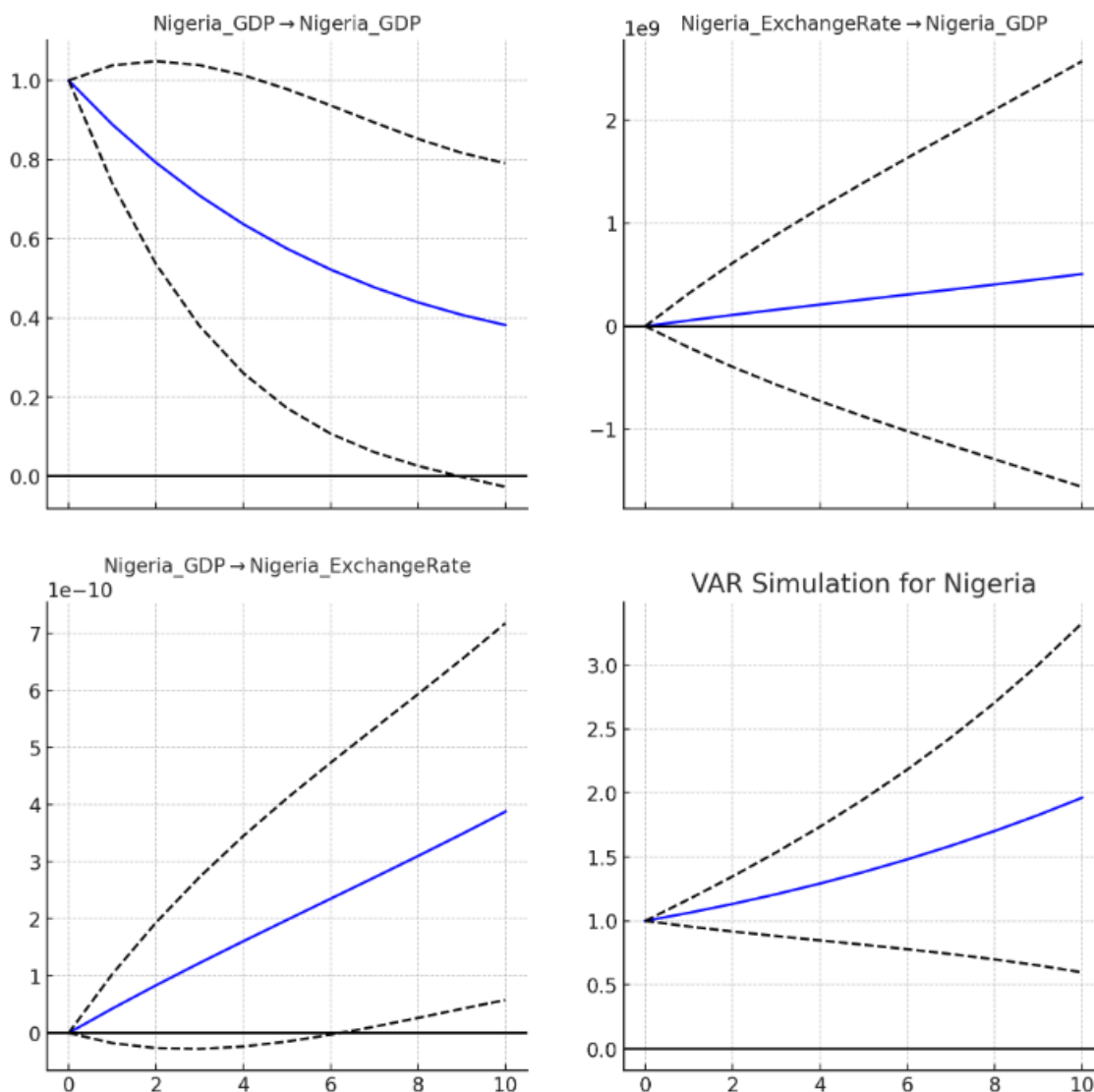
VAR GDP / Interest Rate Model

Figure 7: Response to an interest rate shock in Nigeria



The initial shock shows a significant drop in GDP in the first few periods. This movement suggests that the Nigerian economy is relatively dependent on stable and relatively low interest rates. However, periods 4 to 6 show an upturn in GDP, indicating that corrective action by regulatory agencies may be paying off. However, the final periods show a reverse effect, with GDP falling and remaining below the 0 line, indicating risks to the long-term stability of the Nigerian economy if the right macroeconomic decisions are not taken.

Figure 8: Forecast model for Nigeria



After an initial positive shock, GDP gradually declines over time, suggesting that initial economic growth may fade as the positive effects of the shock dissipate. This could indicate a difficulty in maintaining sustained growth after an initial growth shock. In addition, an increase in GDP could lead to a slight appreciation of the currency, but this effect is small, suggesting that other external factors or monetary policies play a more decisive role in determining the exchange rate in Nigeria. An initial depreciation of the exchange rate could stimulate economic growth by making Nigerian exports more competitive, thereby increasing demand for domestic goods. However, this relationship could also reflect internal adjustments where a currency depreciation is followed by a gradual economic improvement.

A shock to the exchange rate leads to a continued increase in the exchange rate, although this response is more moderate. This suggests that exchange rate shocks can generate a continuous appreciation dynamic, potentially reinforced by market expectations or restrictive monetary policies in response to inflationary pressures.

The VAR simulation for Nigeria reveals a complex interaction between GDP and the exchange rate. Impulse responses suggest that Nigeria needs to adopt prudent monetary and economic policies to manage internal and external shocks, in order to sustain economic growth while maintaining exchange rate stability.

4. Other Mathematical Development and Results

The typical DSGE (Dynamic Stochastic General Equilibrium) model is a powerful tool for analysing complex economic interactions and the impact of economic policies in emerging economies. It is based on several key blocks that represent different parts of the economy, each playing a specific role in determining general equilibrium.

Households in the DSGE model are represented as rational economic agents seeking to maximize their intertemporal utility. Their utility depends on two main factors: consumption (C_t) and leisure, which is inversely related to labour (L_t). The household utility function is often specified as a CES function (Constant Elasticity of Substitution), which makes it possible to model preferences for current versus future consumption, and for work versus leisure. Households face a budget constraint that is determined by their income, including earned income (wages, ω_t), capital income (interest and dividends, r), and government transfers (T_t). This budget constraint is mathematically formulated by an equation in which consumption, investment (I_t), and savings (B_t) must be balanced by total revenue.

Companies are modelled as profit-maximizing entities that produce goods and services. They use a production function, often of the Cobb-Douglas type, which describes the relationship between capital (K_t) and labour (L_t) to generate production (Y_t). The production function includes a term for technological progress (A_t), and is generally expressed as $Y_t = A_t K_t^\alpha L_t^{1-\alpha}$ where α represents the elasticity of production with respect to capital. This function implies diminishing returns to scale, meaning that each additional unit of capital or labor leads to smaller and smaller increases in output, while holding other factors constant. Companies decide on the optimal allocation of capital and hiring of labor to maximize their profits, and this directly influences the supply of goods and services on the market.

The government plays a key role in the economy through the implementation of monetary and fiscal policies. Monetary policy is often modelled by a Taylor rule, which describes how the central bank adjusts the nominal interest rate (i_t) in response to deviations from target inflation (i_t) in response to deviations from target inflation (π^*) and potential output (y^*). The Taylor rule is usually expressed as $i_t = \rho + \phi_\pi(\pi_t - \pi^*) + \phi_y(y_t - y^*)$, where ρ is the natural rate of interest, ϕ_π and ϕ_y are the response coefficients to inflation and the output gap, respectively. Fiscal policy, on the other hand, includes public spending and taxes, which affect aggregate demand and the level of economic activity. Budgetary decisions directly influence household and business consumption and investment and can be used to stimulate or restrain the economy, depending on macroeconomic conditions.

In addition to the preceding elements, the DSGE model includes a representation of the economy's main markets:

- **Goods market:** In this market, companies offer goods and services, while households express their demand for these products. Equilibrium on this market is reached when business supply equals household demand, thus determining the level of production and prices of goods.

- Labour market: This market is defined by the interaction between household labor supply and business labour demand. Households offer labour in exchange for wages (ω_t), while companies demand labor to produce goods and services. Equilibrium on this market determines the level of employment and the wage rate.
- Financial market: The financial market is crucial in determining interest rates and asset prices. It regulates the flow of savings and investment into the economy. Interest rates influence corporate investment and household savings decisions, having a direct impact on aggregate demand and overall economic activity.

Model Equations:

Household utility function

$$U(C_t, L_t) = \sum_{t=0}^{\infty} \beta^t \left(\frac{C_t^{1-\sigma}}{1-\sigma} - \chi \frac{L_t^{1+\varphi}}{1+\varphi} \right) \quad (5)$$

where C_t is consumption, L_t is labour, β is the discount factor, σ is the risk aversion coefficient and χ and φ are disutility parameters of work.

Production function of companies:

$$Y_t = A_t K_t^\alpha L_t^{1-\alpha} \quad (6)$$

where Y_t is production, A_t is technology lever, K_t is capital, L_t is labor and α is the capital sharing coefficient.

Budgetary constraints of households and businesses:

$$C_t + I_t + B_t = \omega_t L_t + r_t K_t + \Pi_t + T_t \quad (7)$$

where I_t is investment, B_t are bonds, w_t is salary, r_t is return on capital, Π are corporate profits and T_t are government transfers.

Monetary policy rule:

$$i_t = \rho + \phi_\pi(\pi_t - \pi^*) + \phi_y(y_t - y^*) \quad (8)$$

where i_t is the nominal interest rate, ρ is the natural interest rate, π_t is inflation, π^* is inflation target, y_t is output and y^* is potential output.

Results

Table 1: Database of GDP

Year	Brazil	India	Nigeria
2000	655,448,000,000	468,396,000,000	69,171,451,627
2001	559,984,000,000	485,440,000,000	73,557,840,064
2002	509,795,000,000	514,939,000,000	95,054,059,303
2003	558,234,000,000	607,701,000,000	104,739,000,000
2004	669,289,000,000	709,153,000,000	135,765,000,000
2005	891,634,000,000	820,384,000,000	175,671,000,000

Year	Brazil	India	Nigeria
2006	1,107,630,000,000	940,260,000,000	238,455,000,000
2007	1,397,110,000,000	1,216,740,000,000	278,261,000,000
2008	1,695,860,000,000	1,198,900,000,000	339,476,000,000
2009	1,667,000,000,000	1,341,890,000,000	295,009,000,000
2010	2,208,840,000,000	1,675,620,000,000	366,990,000,000
2011	2,616,160,000,000	1,823,050,000,000	414,467,000,000
2012	2,465,230,000,000	1,827,640,000,000	463,971,000,000
2013	2,472,820,000,000	1,856,720,000,000	520,117,000,000
2014	2,456,040,000,000	2,039,130,000,000	574,184,000,000
2015	1,802,210,000,000	2,103,590,000,000	493,027,000,000
2016	1,795,690,000,000	2,294,800,000,000	404,649,000,000
2017	2,063,510,000,000	2,651,470,000,000	375,746,000,000
2018	1,916,930,000,000	2,702,930,000,000	421,739,000,000
2019	1,873,290,000,000	2,835,610,000,000	474,517,000,000
2020	1,476,110,000,000	2,674,850,000,000	432,199,000,000
2021	1,670,650,000,000	3,167,270,000,000	440,839,000,000
2022	1,951,920,000,000	3,353,470,000,000	472,625,000,000

Table 2: Data base of interest rate

Year	Brazil	India	Nigeria
2000	48.5047	8.3426	-1.1409
2001	45.6378	8.5914	12.1387
2002	48.3404	7.9072	3.0235
2003	46.4474	7.3079	9.9357
2004	43.7792	4.9101	-2.6048
2005	44.6352	4.8551	-1.5937
2006	41.2403	2.5706	-5.6280
2007	35.0225	5.6818	9.1872
2008	35.3668	3.7718	6.6849
2009	34.7920	4.8086	18.1800
2010	29.1158	-1.9839	1.0677
2011	32.8335	1.3180	5.6856
2012	26.5821	2.4735	6.2248
2013	18.4988	3.8660	11.2016
2014	22.4037	6.6952	11.3562
2015	33.8323	7.5565	13.5962
2016	40.6984	6.2327	6.6862
2017	41.7138	5.3276	5.7906
2018	33.1023	5.3617	6.0560

Year	Brazil	India	Nigeria
2019	31.9031	6.8949	4.5222
2020	21.1972	4.1360	5.3713
2021	15.0109	0.3169	1.2277
2022	28.3961	1.7046	0.9192

Table 3: Data base of exchange rate

Year	Brazil	India	Nigeria
2000	7.044	4.009	6.933
2001	6.84	3.779	18.874
2002	8.45	4.297	12.877
2003	14.715	3.806	14.032
2004	6.597	3.767	14.998
2005	6.87	4.246	17.863
2006	4.184	5.797	8.225
2007	3.641	6.373	5.388
2008	5.679	8.349	11.581
2009	4.888	10.882	12.538
2010	5.039	11.989	13.740
2011	6.636	8.912	10.826
2012	5.403	9.479	12.224
2013	6.204	10.018	8.496
2014	6.329	6.666	8.047
2015	9.03	4.907	9.009
2016	8.739	4.948	15.697
2017	3.446	3.328	16.502
2018	3.665	3.939	12.095
2019	3.733	3.730	11.396
2020	3.212	6.623	13.246
2021	8.302	5.131	16.953
2022	9.280	6.699	18.847

Table 4: Data base of change rate in USD

Year	Brazil	India	Nigeria
2000	1.8294	44.9416	101.6973
2001	2.3496	47.1864	111.2313
2002	2.9204	48.6103	120.5782
2003	3.0775	46.5833	129.2224
2004	2.9251	45.3165	132.8880
2005	2.4344	44.1000	131.2743

Year	Brazil	India	Nigeria
2006	2.1753	45.3070	128.6517
2007	1.9471	41.3485	125.8081
2008	1.8338	43.5052	118.5667
2009	1.9994	48.4053	148.8800
2010	1.7592	45.7258	150.2975
2011	1.6728	46.6705	153.8625
2012	1.9531	53.4372	157.5000
2013	2.1561	58.5978	157.3117
2014	2.3529	61.0295	158.5526
2015	3.3269	64.1519	192.4403
2016	3.4913	67.1953	253.4920
2017	3.1914	65.1216	305.7901
2018	3.6538	68.3895	306.0837
2019	3.9445	70.4203	306.9210
2020	5.1552	74.0996	358.8108
2021	5.3944	73.9180	401.1520
2022	5.1640	78.6045	425.9792

Conclusion

The study of counter-cyclical monetary policies in emerging economies highlights their strategic importance in the face of global economic crises and fluctuations in dominant currencies such as the US dollar and the euro. These policies, which include interest rate adjustments, foreign exchange interventions and capital controls, are essential tools for mitigating external economic shocks, stabilizing prices and supporting sustainable growth. The examples of countries such as Brazil, India and Nigeria illustrate the various approaches adopted and the challenges faced by these economies.

Brazil has relied on active foreign exchange intervention and interest rate adjustments to control inflation and stimulate domestic demand. In India, monetary policies played a dual role, both encouraging investment and boosting export competitiveness following currency devaluations. Nigeria, on the other hand, has demonstrated the limits of such strategies, particularly in a context of heavy dependence on raw material exports, where international price fluctuations weigh heavily on economic stability. These examples underline the fact that, despite their relative effectiveness, these policies are often constrained by limited economic infrastructures, a narrow tax base and sometimes fragile institutions.

Econometric analysis, using the VAR model, confirms the sensitivity of these economies to external shocks, whether linked to variations in exchange rates or world interest rates. It also demonstrates their capacity to adapt, thanks to well-calibrated economic policy adjustments. However, these adjustments are no substitute for structural reforms. Greater independence for central banks, better-regulated financial markets and strengthened public

institutions are essential prerequisites for maximizing the effectiveness of counter-cyclical policies.

In addition, economic diversification remains an unavoidable priority. Reducing dependence on raw material exports and broadening the industrial and technological base would enable these countries to better absorb external shocks and build a more resilient growth dynamic. Added to this is the need for greater regional integration, fostering collective mechanisms for economic stabilization and development.

In short, counter-cyclical policies represent a fundamental pillar of resilience for emerging economies. However, their effectiveness depends on a combination of short-term actions and long-term structural reforms. Investing in solid institutions, fostering stable economic governance and promoting industrial and commercial diversification are key steps for these economies in their quest for sustainable, balanced growth, even in a context of heightened global volatility.

Credit Authorship Contribution Statement

Author work to all aspects of this work, including the conceptualization, methodology, data analysis, writing, and review of the manuscript. Author have read and approved the final version of the manuscript and agree to take responsibility for the accuracy and integrity of the work.

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Conflict of Interest Statement

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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