Journal of Applied Economic Sciences
Volume XIX, Winter, Issue 4(86)

The Consequences of Universal Basic Income

Mohsen MOHAGHEGH
https://orcid.org/0000-0002-4870-5187
Indian Institute of Management Ahmedabad, India[1]
Mohsenm@iima.ac.in

Article's history:

Received 27th of August, 2024; *Received in revised form* 24th of September, 2024; *Accepted* 4th of October, 2024; *Available online*: 15th of October, 2024. *Published* as article in the Volume XIX, Winter, Issue 4(86), 2024.

Suggested citation:

Mohaghegh, M. (2024). The consequences of universal basic income. *Journal of Applied Economic Sciences*, Volume XIX, Winter, 4(86), 359– 367. https://doi.org/10.57017/jaes.v19.4(86).01

Abstract:

Universal Basic Income (UBI) has gained attention in both academic and policy circles. However, its implications are not fully understood. This paper develops a general equilibrium model with uninsured income risks to examine such implications. Multiple policy alternatives are considered under both deficit-expanding and deficit-neutral structures. If the UBI policy is not financed through additional taxation, its impact on measures of inequality is unclear. The consumption and income inequality decrease while wealth inequality rises. Deficit-neutral UBIs resolve this ambiguity as the higher marginal tax rates prevent the wealth inequality from rising, which leads to a more equal distribution of consumption and income. However, the aggregate effects are amplified. The income tax must be as high as 80% of the output to keep the deficit from expanding. The interest rate rises, and the output and capital-to-output ratio sharply fall as the precautionary saving motives are weakened.

Keywords: universal basic income, incomplete markets, inequality, budget deficit.

JEL Classification: H30, D52, D31, H60.

Introduction

Universal Basic Income (UBI) is a social -and economic- policy proposal that involves providing all individuals within a society with a regular public transfer, regardless of their demographic, economic or social status. The main objective of this policy is to ensure a 'basic' level of economic security for every member of a nation. In that sense, UBI is an alternative for a myriad of social and economic policies that aim to provide financial stability to a 'targeted' group in the nation. Both sets of policies aim to address poverty and inequality, but their design and implementation are very different.

Targeted or conditional social welfare programs provide financial assistance to specific groups of individuals or households based on certain economic or demographic criteria such as income level, employment status, or ethnicity. By definition, any such program includes a set of eligibility criteria, which de ne the program's target. This can be accomplished through means-testing. Therefore, receiving the benefits will be conditional on meeting the eligibility requirements. A simple example are popular cash transfers to households whose income falls below a certain threshold. Such programs can be more resource efficient as they can potentially minimize the financial cost and maximize the impact of the program. Some examples of these policies include the Oportunidades in Mexico and the Bolsa Familia in Brazil.

Though very popular, implementing conditional welfare policies has been proven challenging, primarily due to issues related to identifying eligible recipients. Generally speaking, conditional programs face several practical issues including three widely discussed factors: (1) the benefits conditional programs often do not fully reach their intended targets. This inclusion error is known as "incomplete take-up"; (2) conditional programs are often found to include individuals who are not entitled to. This exclusion error is called "illegitimate transfers"; and (3) conditional programs require costly screening and monitoring, which increase their "administrative costs". Such issues threaten the effectiveness of conditional programs and may even lower the aggregate welfare (Guimaraes & Loureno, 2024).

[1] Indian Institute of Management Ahmedabad, Vastrapur, Ahmedabad, Gujarat, India 380015.

As a result, targeted social programs have not been very successful in practice. This has strengthened the case for UBI policies as such policies are, by definition, inclusive and unconditional. The fact that under UBI everyone receives the social benefit immediately resolves the identification challenges. In addition to that, UBI programs are straightforward to administer, as they involve direct payments to all individuals without any complex application or verification processes. Moreover, UBI can replace multiple small and targeted welfare programs - e.g., food subsidy, direct cash transfers- that many governments already run. This can reduce the aggregate administrative costs for the government and improve its ability to redistribute resources to the poor more effectively.

Despite these advantages, both the feasibility and implications of universal social programs are not extensively studied. A UBI policy could burden society with an insurmountable cost that may lead to a large deficit or even high inflation. Moreover, even if such a policy is feasible and funded properly, its implications for macroeconomic variables such as savings, work incentives, and national welfare are unclear. This paper aims to contribute to this strand of the literature by examining long-term and aggregate implications of adopting UBI with a special emphasis on wealth vs. consumption inequality. This study develops a standard general equilibrium model with heterogeneous workers in the spirit of Aiyagari (1994) and Huggett (1996) where workers face uninsured income risk. After calibrating the model to the data, multiple policy alternatives are considered, and their implications are examined. These policies are either fiscally balanced, or fiscally unbalanced. Under fiscally unbalanced policies, there is no change in the tax schedule, and thus, the government's budget deficit will increase with the size of the UBI program. This, though unrealistic, provides the least disruptive framework to analyse the impact of the UBI policy on measures of inequality and welfare as well as its implications for the aggregate economy. Under fiscally balanced policies, however, the income tax code is adjusted to raise the funds for the UBI program. In each case, several policies are examined where the size of the UBI program increases up to 20% of the aggregate output. Several measures of inequality, aggregate performance and government performance are reported.

When the implementation of the UBI policy is deficit-expanding, both income and consumption inequality gradually and consistently decrease. However, wealth inequality rises, which suggests, even after abstracting from tax distortions, the welfare impact of a UBI policy is unclear. In addition to that, both the output and capital-to-output substantially decline while the interest rate increases. Overall, a scally-unbalanced UBI policy shrinks the size of the economy, expands government deficit, and has ambiguous welfare implications. On the other hand, if the marginal tax rate changes so that the government's deficit remains unchanged, then the implications of the UBI policy for measures of inequality are clear. Wealth inequality remains -almost- constant while both consumption and income inequality substantially decrease. For instance, under the largest UBI policy - when the size of the UBI transfer is 20% of the output- the Gini coefficient of the consumption distribution falls from 0.37 in the steady state to 0.21, which represents a 75% reduction in consumption inequality compared to the steady state. For comparison, when tax schedules are not adjusted, the same UBI policy reduces the consumption Gini to 0.30, which is 26% lower than its steady state value. Therefore, tax adjustments improve the welfare implications of a UBI policy, especially if an equal distribution of income and consumption is desired. However, this is the result of a more progressive tax schedule, which leads to a significant rise in the ratio of tax revenue to GDP. The income tax levied by the government must rise to nearly 80% of the output to keep the deficit from expanding, which disrupts the aggregate economy. The interest rate rises by almost 70% to nearly 8% while both the output and capital-to-output ratio noticeably fall as the precautionary saving motives are weakened.

The remainder of this paper is organized as follows. Section 1 provides a brief overview of the literature. Section 2 introduces the economic model environment and the parameter values. Section 3 reports quantitative findings of the paper, and last section conclude.

1. Literature Review

A large literature addresses the challenges of conditional social programs. Firstly, despite the theoretical appeal, a number of practical problems make identifying eligible recipients very difficult. For example, the income information of many potential beneficiaries may not be observable due to tax exemption policies. Tax income data, even in developed economies are more reliable for middle-class and top earners, which are less likely to be targeted. This is a much more concerning issue in developing countries where most potential recipients work in the informal sector and verifiable records of their earnings may not exist (Ko & Moffitt, 2022; Alatas et al., 2012). In addition to that, social stigma, unawareness, and other 'costs' of enrolment can prevent eligible recipients from participating in the program (Currie, 2004), which leads to inadequate coverage[2].

[2] A large body of literature discusses the importance of identification as both inclusion and exclusion errors can harm the impact of conditional social programs. See Banerjee et al. (2022) for a comprehensive review.

Second, the effectiveness of execution of conditional programs, especially in large scales, has been subject to many criticisms (Besley et al., 2011; Niehaus & Atanassova, 2013), particularly when political and ethnic factors are involved Dunning & Nilekani (2013). These have played a role in the increased popularity of UBI policies, which are easier to implement and less costly to administer. For example, during the COVID pandemic universal policies were adopted by most economies (Gentilini et al., 2020) and are more likely to be adopted in the future in both developed and developing nations (Francese & Prady, 2018)[3].

However, the macroeconomic implications of such policies are not well understood. A recent and growing body of literature aims to address this gap, but the debate on whether UBI is feasible and effective seems far from settled. There is no conclusive agreement about the generational impacts of UBI. For example, Daruich & Fernández (2024) use a general equilibrium model with imperfect capital and labour markets to argue that UBI increases welfare for older generations but leads to massive losses for younger generations while Conesa & li (2023) show that specially if financed through consumption taxes, UBI reforms benefit young uneducated households -though the overall result would still be a welfare loss for majority of the population. In addition to that, welfare and aggregate implications of UBI, which have been subject to many studies, are also somewhat undetermined. Luduvice (2024) finds that a large UBI policy decreases employment as voluntary unemployment becomes more attractive. He shows that as a result of a UBI policy income inequality rises while wealth inequality remains relatively stable over time. Other studies, however, have found contrasting results. For example, some have shown that replacing the conditional programs with a UBI would increase capital stock, employment, and output, and lower inequality (Guimaraes & Louren, 2024) while others argue that a UBI policy reduces the aggregate income and is unable to achieve its welfare objective since it will increase poverty and inequality (Ferreira et al., 2021; Luduvice, 2024). This study contributes to this strand of the literature by analysing long-term effects of several UBI policies on measures of inequality and the aggregate economy. I examine how such effects vary with respect to a change in the tax schedule aimed to fund the UBI, and whether this has any implications for the effectiveness of the UBI policy[4].

2. Research Methodology

Model Environment

The economy is populated by a unit mass of ex-ante identical individuals who supply their labour in a competitive market. Each worker, at the beginning of each period draws an idiosyncratic shock from a time-invariant distribution of labour productivities F(z) which determines her labour earnings in that period. All individuals maximize their expected discounted life time utility, which is characterized by a period utility, their expectations about their future labour productivity, and a constant time discount factor β ∈ [0,1]. All workers have access to a risk-free asset a that pays a fixed rate of return r at the beginning of the next period. Therefore, an individual's state is given by two variables (z,a) where z is her current labour productivity and a denotes her wealth. To complete the model, workers pay a progressive tax income on the sum of their labour and capital earnings, which is denoted by a progressive tax function $\tau(y)$. Equation 1 characterizes the dynamic programming problem each worker:

$$V(z,a) = \max_{\{c,a'\}} u(c) + \beta \mathbb{E}_{z'|z} V(z',a') \text{ subject to:} \quad (1)$$

$$c + a' \leq y - \tau(y) + a$$

$$y = wzn + ra$$

A representative rm hires both labour and capital in perfectly competitive markets and uses a standard CRS technology to produce a homogeneous consumption good. The capital share in the production technology is γ. A constant equilibrium wage rate is paid for an effective hour supply of labour. Also, the rm pays a rental rate r for every unit of capital it borrows, and capital depreciates at a constat rate δ. The firm maximizes its profit given by:

$$\pi = AK^{\gamma}L^{1-\gamma} - wL - (r+\delta)K \quad (2)$$

[3] For a comprehensive discussion on the difference between conditional and unconditional transfers see Guimaraes & Loureno (2024) and Ferreira et al. (2021). It is worth mentioning that, in response to inefficiencies of conditional programs, a rich literature aims to design optimal means-tested transfers schemes. Though, reviewing this literature is beyond the scope of this study, interested readers may, among others, refer to Ferriere et al. (2022).

[4] Several studies have examined the implications of unconditional cash transfers on household decisions including labour supply and savings. These studies, which typically use randomized controlled trials, fall outside the scope of this study, which is more focused on aggregate effects of UBIs. Two recent examples include Egger et al. (2022), Jones & Marinescu (2022).

where: A is the total factor productivity. The first order conditions imply that equilibrium prices are given by:

$$\begin{cases} r &= A\gamma K^{\gamma-1}L^{1-\gamma} - \delta \\ w &= A(1-\gamma)K^{\gamma}L^{-\gamma} \end{cases} \tag{3}$$

Lastly, the government levies progressive income taxes from individuals according to a function $\tau(y)$, and pays a universal social security benefit, R_b, to everyone, which represents a policy for UBI. The government's budget in period *t* is given by:

$$T_t = TR_t + G_t \tag{4}$$

where: T_t, TR_t, and G_t are the total tax income, the aggregate transfers, and government expenditure in period *t*. The government keeps a balanced budget in the steady state. However, as we will discuss later, when a UBI policy is implemented, *TR* rises and without changing the tax code, the government deficit will inevitably rise.

Steady State Equilibrium

Although workers are ex-ante identical, in the steady state, there will be time-invariant distribution of workers across both wealth and individual labour productivity. Formally, let the individual labour productivity be represented by a Markov process of order 1 where $\pi = [\pi_{ij}]$ is its transition matrix such that $\pi_{ij} = \Pr(z_{t+1} = z_j | z_t = z_i)$. Workers' optimal saving policy is a function $g(z,a)$. Then, the stationary measure of workers $\mu(.)$ is given by:

$$\mu(z', a') = \int_z \int_a \pi_{zz'}\, \mu(z,a) 1_{(g(z,a)=a')} da\, dz \tag{5}$$

Thus, the total tax revenue is:

$$T = \int_z \int_a \mu(z,a)\tau(y) da\, dz \tag{6}$$

A recursive competitive equilibrium (RCE) in this economy is a set of functions for values V(z,a), individual policies for savings $g(z,a)$, government policies $\{\tau(y), R_b, G\}$, factor prices $\{r, w\}$, and a stationary probability measure of workers over the state space $\mu(z,a)$such that:

- value functions solve individual's optimization problem given by equation (1) where individual policies are the associated solutions.
- prices are determined competitively according to equation (3).
- the government keeps a balanced budget as per equation (4) and equation (6).
- the evolution of steady state distribution of workers follows equation (5).

Calibration

This section reviews the functional forms of various functions, and the values of parameters used in quantitative analyses. Individuals have a CRRA period utility:

$$u(c_t) = \frac{c_t^{1-\sigma}}{1-\sigma}$$

where σ determines the intertemporal elasticity of substitution.

The only parameter that is needed to identify this utility function is σ, which ranges between 1 and 3 in different studies in the literature. We set the value of this parameter equal to 1.50 in this study[5]. Another parameter in the household problem is the time discount factor, β, which is determined in the calibration process to target a risk-free interest rate of 2%-3%. Finally, workers' individual productivity follows an AR(1) process:

$$z_t = \rho_z z_{t-1} + \varepsilon_t \qquad \text{where} \qquad \varepsilon_t \sim N(0, \sigma_z^2) \tag{7}$$

where: ρ_z is the persistence rate of individual labour productivity, and σ_z is the standard deviation of i.i.d. random shocks. The US data shows a high persistence, which indicates that shocks to an individual's productivity

[5] This study abstracts from assuming any dis-utility for working. This implies an inelastic supply of labour on the part of individual workers. The main reason for this simplifying assumption is that the focus of my study is on the dynamics of consumption and wealth inequality. In addition to that, empirical evidence suggests that changing the supply of labour as an insurance mechanism to achieve consumption smoothing may not be as strong in the data (Heathcote et al., 2014).

tend to have long-lasting effects. Though, the estimates vary from one study to another, ρ_z typically ranges from 0.95 to 0.98. We follow Heathcote et al. (2010) who estimate the value of this parameter to be 0.96[6].

The production sector is identified with two parameters: the capital share of income, γ and the capital depreciation rate, δ. Both are standard parameters whose values are known in the literature. Piketty & Zucman (2014) suggest that the capital share of income in the US has been rising since the 1980s, from around 30% to over 35% in recent years. A similar trend was reported by Barkai (2020). Therefore, we set γ = 0.35. Also, according to the National Income and Product Accounts (NIPA) section in Bureau of Economic Analysis (BEA), the aggregate depreciation rate - a.k.a., consumption of fixed capital - for the US economy is between 6% to 7% annually. Thus, the parameter for capital depreciation rate was set at δ = 0.07.

Table 1. Parameter values

Parameter	Description	Value	Target/Reference
β	time discount factor	0.965	r ≈ 2.5%
σ	elasticity of substitution	1.500	1-3
δ	capital depreciation rate	0.070	BEA reports
γ	capital share of output	0.350	Piketty & Zucman (2014)
ρ_z	persistence of labour productivity shocks	0.960	Heathcote et al. (2010)
σ_z^2	variability of labour productivity shocks	0.062	see text
α_1	parameter of the income tax function	0.850	see text
α_2	parameter of the income tax function	0.814	Heathcote et al. (2020)

Lastly, for the income tax schedule, following Benabou (2002), I assume individual income taxes are such that the disposable income has an exponential form. In other word, the income tax for a worker whose income is *y*, given by $\tau(y) = y - \alpha_1 y^{\alpha_2}$ so that after tax income is an exponential function of the pre-tax income:

$$y - \tau(y) = \alpha_1 y^{\alpha_2} \tag{8}$$

Heathcote et al. (2020) argue that this simple and parsimonious functional form accurately reproduces the tax code in the United States. In this function, the exponent α_2 is the parameter that captures the progressivity of the tax schedule. If α_2 = 1, we have a at tax rate where everyone pays $\tau(y) = (1 - \alpha_1)y$. In this case, all workers pay a constant fraction $1 - \alpha_1$ of their gross income. Therefore, this is not a progressive system. Conversely, if α_2 = 0, the tax code is extremely progressive as everyone will pay their entire income except for a constant term as $\tau(y) = y - \alpha_1$. In this system, all workers will have the same disposable income of α_1.

On the other hand, the parameter α_1 determines the average level of income tax policy. For a given α_2, a higher level of α_1 implies a lower average tax rate as $\frac{\partial\tau(y)}{\partial\alpha_1} = -y^{\alpha_2} < 0$. We use their baseline estimation of the progressivity of the US income tax data and set the value of α_2 = 0.814.

This leaves us with three parameters to determine in the calibration: $\{\beta, \sigma_z^2, \alpha_1\}$. A set of three empirical targets are used to determine the values of these parameters. Though, the calibration process considers all variables simultaneously, each empirical target is closely related to one parameter. The time discount factor, β, is connected to the equilibrium risk-free interest rate. The variability of income, which is captured through σ_z^2 reflects the extent of fluctuations in productivity levels that are not explained by persistent factors. This directly results in income inequality as more productive workers will earn a higher salary.

Therefore, the income Gini coefficient was considered as an empirical target for this variable. Lastly, the tax parameter α_1 determines the government's tax revenue, which as a fraction of output is easy to measure in the data. Table 1 reports the values of both internally and externally calibrate parameters.

[6] Similarly, Storesletten et al. (2004) estimate this parameter to be 0.97.

3. Quantitative Results

Table 2 reports the aggregate variables in the model economy. Almost all variables are close to their empirical targets. Though not perfect, the overall t of the model is acceptable for both moments that were targeted in the calibration and the ones that were not. Perhaps the largest deviation from the data is in wealth inequality. This is not out-of-the-ordinary for models with uninsured income risk. As DeNardi & Fella (2017), Guvenan et al. (2021) explain when the income process is calibrated to match cross-sectional distribution of income, the risk that top earners face will not be fully captured. As a result of that, wealth concentration will not be as high as observed.

Table 2. Steady state of the model economy

Variable	Data	Model
Capital-to-Output Ratio	3.705	3.500
Ratio of Tax Revenue to Output	0.253	0.250
Risk-free Interest Rate	0.025	0.025
Gini Coefficient of Income Distribution	0.450	0.480
Gini Coefficient of Wealth Distribution	0.604	0.720
Gini Coefficient of Consumption Distribution	0.370	0.340

Then, several UBI policy alternatives are studied under two major assumptions. First, we examine UBI policies where each worker receives a constant bene t but there is no change in the tax schedule. Therefore, implementing the policy will increase the government's budget deficit. The size of the program can increase up to 20% of the aggregate output. As tax policy does not change, the evolution of the government's budget is not surprising. This quantitative examination, however, reveals the impact of the UBI policy on measures of inequality and welfare as well as its implications for the aggregate economy.

Figure 1. Fiscally unbalanced UBI

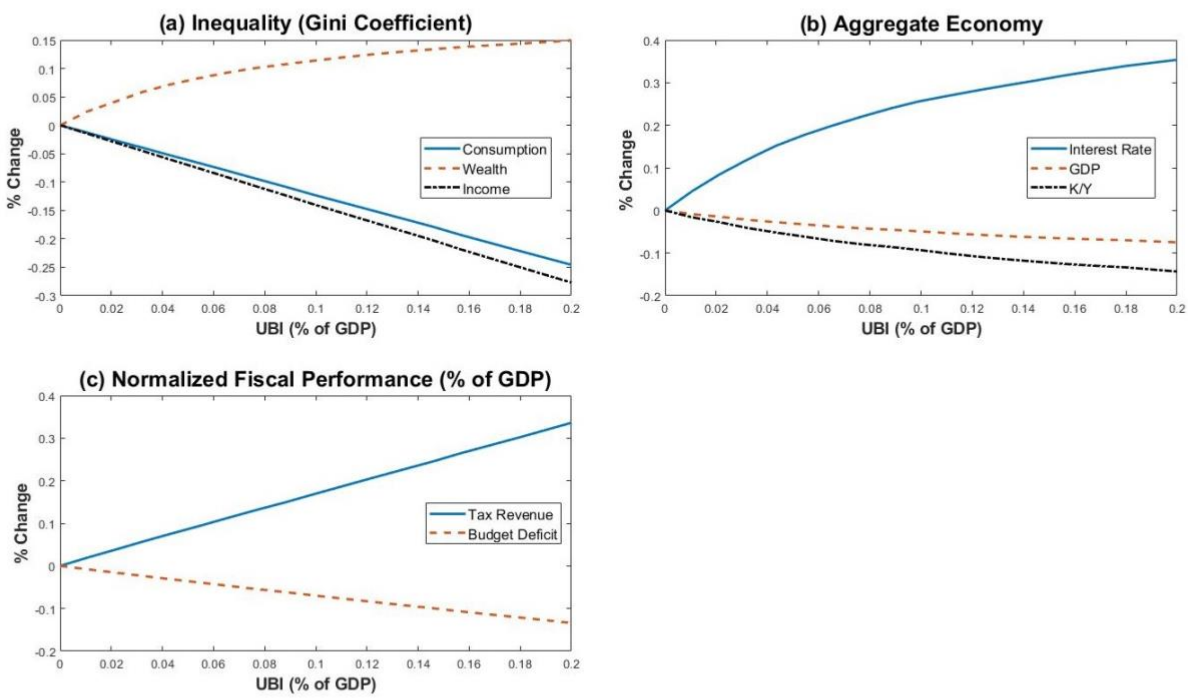
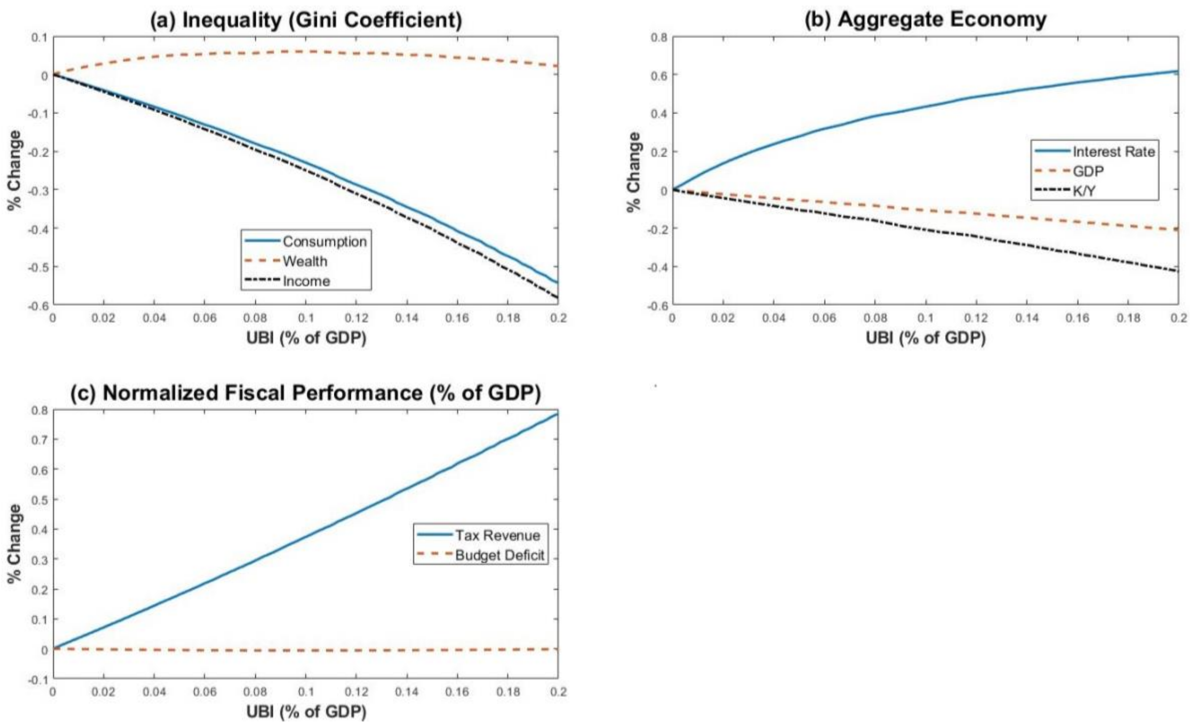


Figure 1 reports the results of these experiments. All variables are reported as percentage change with respect to the steady state. The first panel shows how measures of income, wealth and consumption inequality change. Consistent with expectations, as the size of the UBI policy increases, both income and consumption inequality gradually and consistently decrease. For instance, the Gini coefficient of the consumption inequality falls from 0.34 to nearly 0.27 when the size of the UBI program reaches up to 20% of the output. This is the intended goal of adopting UBI policies. However, unexpectedly, wealth inequality persistently rises. This result suggests that the welfare impact of a UBI policy is ambiguous. This is true even if we ignore the tax distortions in a deficit-expanding framework. In this exercise, we do not increase the marginal tax rate -which results in a massive budget deficit- but still the impact of UBI on wealth inequality is the opposite of one might expect. Similarly, panel (b) in Figure 1 shows how the aggregate economy evolves after implementing UBI policies. It is clear that both the output and capital-to-output substantially decline while the interest rate increases. At the highest value, the rate of interest in the economy is almost 3.9%, which is more than 35% higher than its steady state level. Overall, a UBI policy shrinks the size of the economy, and this effect is amplified as the size of the UBI program grows. In the model, this happens due to a decrease in precautionary savings, which reduces the supply of capital in the economy so that the ratio of capital-to-output at its lowest level is nearly 3.2, a 15% drop as compared to the steady state. Finally, the fiscal dynamics are as expected. Since UBI income is taxable, the ratio of total tax collected as a fraction of output steadily rises. This happens because both the tax revenue increases and the output decreases. Despite this rise, budget deficit expands linearly with the size of the UBI program.

Figure 2. Fiscally balanced UBI



The first simulation abstracted from the financing of the UBI. The second simulation includes a change in the marginal tax rate -the parameter α_2 in the tax function- so that the government collects all the funds necessary for the UBI through taxation and thus, its deficit does not rise. As panel (c) of Figure 2 shows, in this deficit -neutral simulation, the budget deficit is almost constant for all UBI policies as opposed to Figure 1 where the deficit linearly grows with the size of the policy. Of course, this is the result of a more progressive tax schedule, which nances public transfers but also leads to a significant increase in the ratio of tax revenue to GDP. This ratio must rise to nearly 80% of the output to keep the deficit from expanding, which may not be politically feasible. This massive increase in tax revenue is associated with increasing the marginal tax rate for the wealthy.

Therefore, as is evident in panel (a) of Figure 2, wealth inequality is almost constant under this regime. More precisely, the wealth Gini, which was 0.604 in steady state fluctuates between 0.642 and 0.588 for different UBI policies, which is a marginally change. Similar to the previous simulation, both consumption and income inequality fall.

The main difference between panel (a) of Figure 1 and Figure 2 is that when the text schedule is adjusted under the deficit-neutral regime, the impact of UBI on consumption and income inequality is accelerated. For instance, under deficit-expanding UBIs, when the size of the UBI transfer reaches to 20% of the output, consumption Gini falls to 0.30, which is 26% lower than its steady state value. However, under a deficit-neutral regime, the same amount of transfer lowers the consumption Gini coefficient to 0.21, which indicates a 75% reduction in consumption inequality compared to the steady state. This, however, massively disrupts the aggregate economy as panel (b) of figure 2 reports. The interest rate rises to over 7.7%, which is almost 70% higher than its steady state value. On the other hand, savings decreases, which leads to a very low output and capital-to-output ratio. In comparison with the deficit-expanding policies, both variables drop more significantly. Under deficit-neutral UBIs, the aggregate output falls by more than 27% while the capital-to-output ratio, by more than 56% decrease, drops to 2.36. This shows that the more egalitarian distribution of consumption and welfare that is achieved by deficit-neutral UBIs is accompanied with magnified negative impacts on the aggregate performance of the economy.

Conclusion

Universal Basic Income (UBI) aims to ensure a 'basic' level of economic security for every member of a nation. That makes UBI policy an alternative for targeted social and welfare programs that are common in many countries. These targeted programs typically identify the eligible recipients through means-testing are popular but challenging. These challenges arise from the difficulty of defining inclusion and exclusion criteria as well as effectively and faithfully implementing them in practice. Such issues have strengthened the case for UBI policies as these policies, by definition, are inclusive and resolve many such problems. However, the implications of UBI programs are not extensively studied. The long-term and aggregate implications of adopting UBIs were examined in a standard general equilibrium model with heterogeneous workers who face uninsured income risks. After calibrating the model to the data, multiple policy alternatives were considered under deficit-expanding and deficit-neutral regimes. The implications of these policies under each scenario were studied in an environment where the size of the UBI program can increase to 20% of the aggregate output. Our findings suggest that if the implementation of the UBI policy is not financed through additional taxation, its welfare implications will be ambiguous as the wealth inequality will rise with the size of the program. Also, a scally-unbalanced UBI policy shrinks the size of the economy as the aggregate output falls and the interest rate rise. Under a deficit-neutral regime, however, a UBI policy has a more direct impact on inequality as wealth inequality remains constant while consumption and income inequality decrease. This, of course, comes with a more progressive tax schedule, which disrupts the leads to a significant rise in the ratio of tax revenue to GDP. The income tax levied by government is substantially more than deficit-expanding UBIs. The government must collect nearly 80% of the output to keep its budget balanced, when it pays a UBI at the size of almost 20% of the output. The interest rate rises, and both the output and capital-to-output ratio noticeably fall as the precautionary saving motives are weakened. These findings suggest that more debate is needed to clarify the costs and benefits of adopting large-scale UBI policies.

Credit Authorship Contribution Statement

M.M is responsible for conceptualization and the design of this study. He conducted the quantitative analysis and simulation using MATLAB. He interprets the results and writes the initial draft of the manuscripts. He also handles the revisions based on feedback from peer reviewers and makes substantial contributions to the final manuscript.

Conflict of Interest Statement

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

References

[1] Aiyagari, S. R. (1994). Uninsured idiosyncratic risk and aggregate saving. *Quarterly Journal of Economics*, 109(3), 659-684.

[2] Alatas, V., Banerjee, A., Hanna, R., Olken, B. A., & Tobias, J. (2012). Targeting the poor: Evidence from an eld experiment in Indonesia. *American Economic Review*, 102, 1206-40. https://doi.org/10.1257/aer.102.4.1206

[3] Banerjee, A., Hanna, R., Olken, B. A., & Lisker, D. S. (2022). Social protection in the developing world. Retrieved from https://economics.mit.edu/sites/default/files/2022-09/220919%20social%20protection%20review% 20manuscript.pdf

[4] Barkai, S. (2020). Declining labour and capital shares. *Journal of Finance*, 75(5), 2421-2463. https://doi.org/10.1111/jo .12909

[5] Benabou, R. (2002). Tax and education policy in a heterogeneous-agent economy: What levels of redistribution maximize growth and efficiency? *Econometrica*, 70(2), 481-517. https://doi.org/10.1111/1468-0262.00293

[6] Besley, T., Pande, R., & Rao, V. (2011). Just rewards? Local politics and public resource allocation in South India. *World Bank Economic Review*, 26, 191-216. https://www.jstor.org/stable/41679558

[7] Conesa, J. C., Bo. L., & li, Q. (2023). A quantitative evaluation of universal basic income. *Journal of Public Economics*, 223, 104881. https://doi.org/10.1016/j.jpubeco.2023.104881

[8] Currie, J. (2004). The take up of social benefits. Working Paper No. 10488. *National Bureau of Economic Research*. https://doi.org/10.3386/w10488

[9] Daruich, D., & Fernández, R. (2024). Universal basic income: A dynamic assessment. *American Economic Review*, 114(1), 38-88. https://doi.org/10.1257/aer.20221099

[10] DeNardi, M., & Fella, G. (2017). Saving and wealth inequality. *Review of Economic Dynamics*, 26, 280-300. https://doi.org/10.1016/j.red.2017.06.002

[11] Dunning, T., & Nilekani, J. (2013). Ethnic quotas and political mobilization: Caste, parties, and distribution in Indian village councils. *American Political Science Review*, 107, 35-56. https://doi.org/10.1017/S0003055412000573

[12] Egger, D., Haushofer, J., Miguel, E., Niehaus, P., & Walker, M. (2022). General equilibrium effects of cash transfers: Experimental evidence from Kenya. *Econometrica*, 90(6), 2603-2643. https://doi.org/10.3982/ECTA17945

[13] Ferreira, P. C., Peru o, M. C., & Valorio, A. C. (2021). Universal basic income in developing countries: Pitfalls and alternatives. Working Paper No. 821. *EPGE Brazilian School of Economics and Finance*. Retrieved from https://repositorio.fgv.br/bitstreams/4b2ebab8-114e-4a5e-84d9-6fb3f38ed04e/download

[14] Francese, M., & Prady, D. (2018). Universal basic income: Debate and impact assessment. Working Paper No. 273. *International Monetary Fund*. Retrieved from https://www.imf.org/en/Publications/WP/Issues/2018/12/10/Universal-Basic-Income-Debate-and-Impact-Assessment-46441

[15] Ferriere, A., Grubener, P., Navarro, G., & Vardishvili, O. (2022). On the Optimal Design of Transfers and Income-Tax Progressivity. *SSRN Working Paper*. https://ssrn.com/abstract=4199815

[16] Gentilini, U., Almen, M., Orton, I., & Dale, P. (2020). Social protection and jobs responses to Covid-19: A real-time review of country measures. *World Bank*. https://hdl.handle.net/10986/33635

[17] Guimaraes, L., & Loureno, D. (2024). The imperfections of conditional programs and the case for universal basic income (Working Paper No. 19964). *University Library of Munich*. Retrieved from https://mpra.ub.uni-muenchen.de/119964/

[18] Guvenan, F., Karahan, F., Ozkan, S., & Song, J. (2021). What do data on millions of U.S. workers reveal about life-cycle earnings dynamics? *Econometrica*, 89(5), 2303-2339. https://doi.org/10.3982/ECTA14603

[19] Heathcote, J., Perri, F., & Violante, G. L. (2010). Unequal we stand: An empirical analysis of economic inequality in the United States, 1967-2006. *Review of Economic Dynamics*, 13(1), 15-51. https://doi.org/10.1016/j.red.2009.10.010

[20] Heathcote, J., Storesletten, K., & Violante, G. L. (2014). Consumption and labour supply with partial insurance: An analytical framework. *American Economic Review*, 104(7), 2075-2126. https://doi.org/10.1257/aer.104.7.2075

[21] Heathcote, J., Storesletten, K., & Violante, G. L. (2020). How should tax progressivity respond to rising income inequality? Working Paper No. 28006. *National Bureau of Economic Research*. https://doi.org/10.3386/w28006

[22] Huggett, M. (1996). Wealth distribution in life-cycle economies. *Journal of Monetary Economics*, 38(3), 469 - 494. https://doi.org/10.1016/S0304-3932(96)01291-3

[23] Jones, D., & Marinescu, I. (2022). The Labour Market Impacts of Universal and Permanent Cash Transfers: Evidence from the Alaska Permanent Fund. *American Economic Journal: Economic Policy*, 14(2), 315–40. https://doi.org/10.1257/pol.20190299

[24] Ko, W., & Moffitt, R. A. (2022). Take-up of social benefits. Working Paper No. 30148. *National Bureau of Economic Research*. https://doi.org/10.3386/w30148

[25] Luduvice, A. V. D. (2024). The macroeconomic effects of universal basic income programs. *Journal of Monetary Economics*, 103615. https://doi.org/10.1016/j.jmoneco.2024.103615

[26] Niehaus, P., & Atanassova, A. (2013). Targeting with agents. *American Economic Journal: Economic Policy*, 5, 206-238. https://doi.org/10.1257/pol.5.1.206

[27] Piketty, T., & Zucman, G. (2014). Capital is back: Wealth-income ratios in rich countries 1700-2010. *Quarterly Journal of Economics*, 129(3), 1255-1310. https://doi.org/10.1093/qje/qju018

[28] Storesletten, K., Telmer, C. I., & Yaron, A. (2004). Cyclical dynamics in idiosyncratic labour market risk. *Journal of Political Economy*, 112(3), 695-717. https://doi.org/10.1086/383105