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Wealth & Income Heterogeneity in South Africa:

Implications for Monetary Policy

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1. Introduction

Most current macroeconomic models rely on the representative-agent to model the macroeconomy, so as to determine optimal policy responses and economic forecasts. Our experience from recent crises and rising wealth inequality, however, teaches us that these simplistic models neither offer desirable results, nor provide us with accurate representations of the macroeconomy; which we already know is heterogenous by design. While the charges of complexity and marginal improvement are often levied against those models that have attempted to capture the heterogeneous nature of the macroeconomy, so-called heterogenous agent-based models are gaining traction in the literature on the modelling of monetary policy. This paper explores the increasing complexity of macroeconomic models through the lens of wealth & income heterogeneity and their implications for monetary policy in South Africa. Firstly, the fundamental differences between wealth and income heterogeneity are discussed, following an exploration of heterogeneity in South Africa. Severe inequalities with regards to wealth and income are shown to exist in the country. Finally, the implications for monetary policy are discussed. The paper finds that the pervasive inequality found in South Africa requires complex modelling techniques based on heterogenous agents to take account of changes in wealth distribution, consumption, and labour demand due to the implementation of monetary policy. The paper also argues that regional heterogeneity should also be accounted for to determine how monetary policy shapes aggregate outcomes differentially over time.

2. Wealth & Income Heterogeneity

We study heterogeneity in monetary models, not only because inflation and the growth rate of money impacts heterogenous agents unequally, but because wealth and income heterogeneity also produce different outcomes with regards to monetary policy (Gokan & Turnovsky, 2021: 226; Krueger, Perri, Pistaferri & Violante, 2010: 9). Heterogenous agent models started gaining traction with novel work by Krussel & Smith (1998) and has recently grown a substantial body of literature.

As a point of departure, the paper will distinguish between wealth and income heterogeneity, as there are stark differences between the two (especially within the context of South Africa).

Specifically, economic shocks affect income and wealth differently for different groups which imply that there are fundamental determinants of different types of inequality.

Income heterogeneity has been studied extensively in the literature and mainly refers to earnings from labour, financial income, transfers, and disposable income of individuals (Coibion, Gorodnichenko, Kueng & Silvia, 2017: 73). A common pattern concerning earning, which is observed generally across the globe, is that negative economic shocks sharply affect inequality at the bottom end of the income distribution due to increased unemployment or inflationary pressures (Almeida, 2020: 79; Bodea, Houle & Kim, 2021: 3). On the other hand, disposable income inequality mainly rests with country specific policies on interest rates, taxes, and unemployment insurance (Krueger, et al., 2010: 9). For example, Coibion, et al., find that contractionary monetary policy shocks produce persistant increases in income inequality (2017: 79).

Concerning wealth inequality, the literature is much more scarce due to data limitations (Bagchi, Curran & Fagerstrom, 2019: 23). For this paper, wealth may be understood as the total stock of assets owned by an individual, which may be in the form of physical capital, financial assets, and/or monetary assets. Typically, the bottom end of the wealth distribution mainly holds wealth in the form of money, wheres as richer households hold tend to hold wealth in the form fo capital or high yielding financial assets (Krueger, et al., 2010: 6; Almeida, 2020: 86; Kasa & Lei, 2018: 66). Typically, richer households have access to higher saving (more monetary wealth), higher investment returns (ability to invest in high-yielding assets) and collateral (capital wealth), which allows for greater access to credit and thus fortifies richer households against negative economic shocks. This induces greater wealth inequality, as poorer households are generally not able to weather shocks as proficiently.

3. Wealth & Income Inequality in South Africa

The aim of this section is to provide an overview of wealth & income heterogeneity in South Africa, as these characteristics have important implications for the remainder of the paper. I first explore the landscape of heterogeneity, after which sources of income and wealth are discussed. Severe wealth & income heterogeneity persists and is increasing across both

demographic and geographic groups, which, as we will later see, have important implications for monetary policy modelling.

3.1.   Exploring the Wealth & Income Distribution

Figures 1 and 2 chart income[1] and wealth inequality respectively for South Africa, showing a clear increase in heterogeneity between different groups of income and wealth. Specifically in figure 2, while data is not available for the share of wealth of all groups, there is a powerful upward trend shaping wealth inequality in South Africa, with the top 1% richest households owning more than half of total wealth in the country. The sharp increase in wealth holdings of the top of the distribution during the great recession (figure 2) further supports the claim that the wealthy are better prepared against negative economic shocks, even though the great recession mostly harmed financial assets (which are mostly owned by the rich).
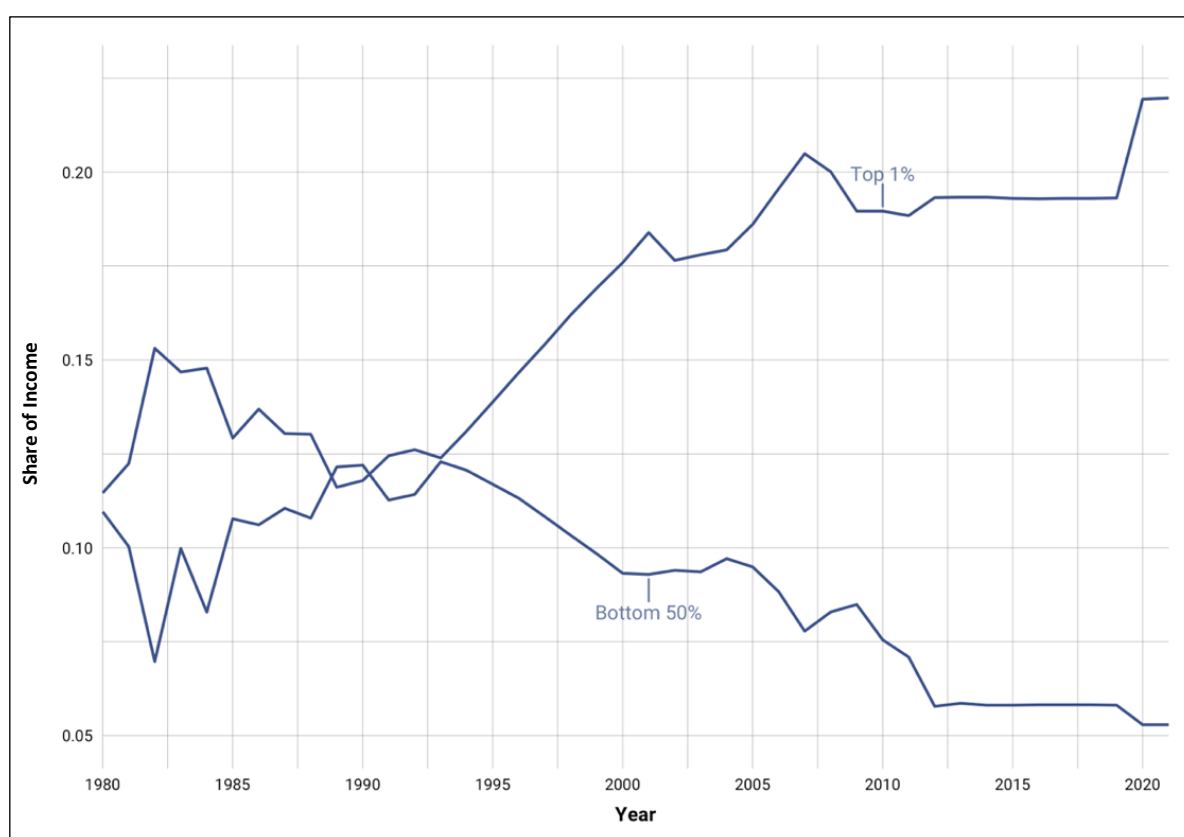

Figure 1: Income inequality in South Africa. Source: the author's own. Data: World Inequality Database.

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[1] Here income represents total monthly income – wage income, social grant income, and other income sources.
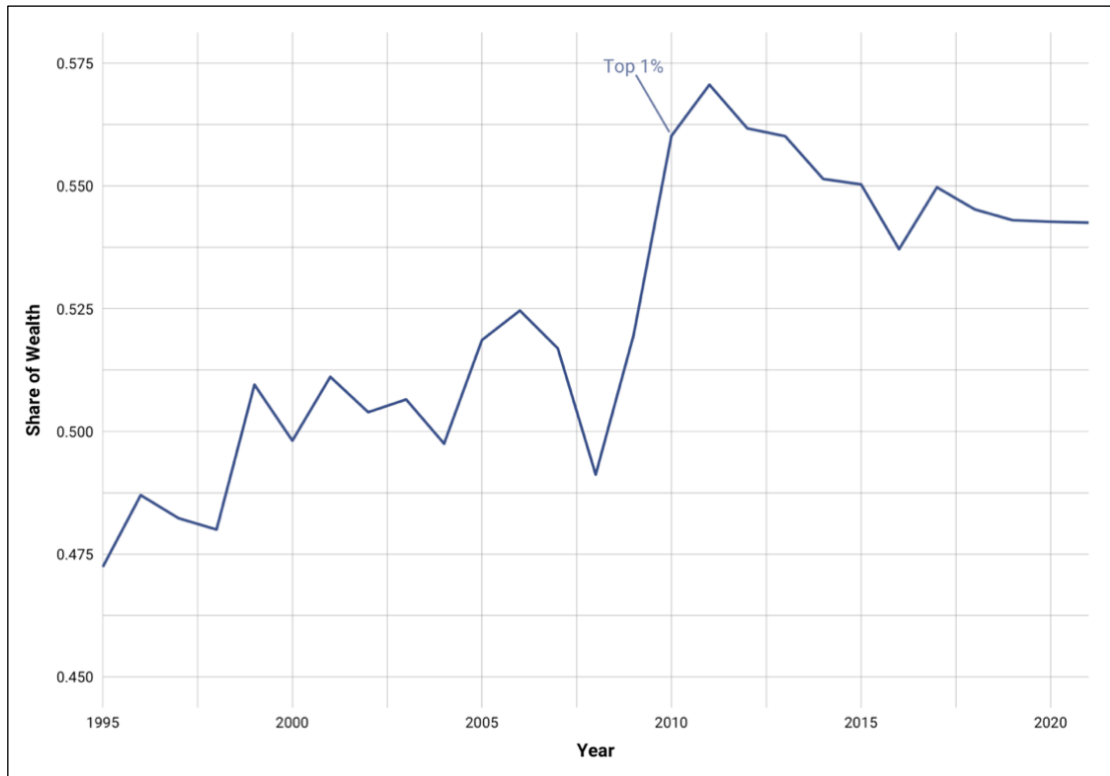
Figure 2: Wealth Inequality in South Africa. Source: the author's own. Data: World Inequality Database.
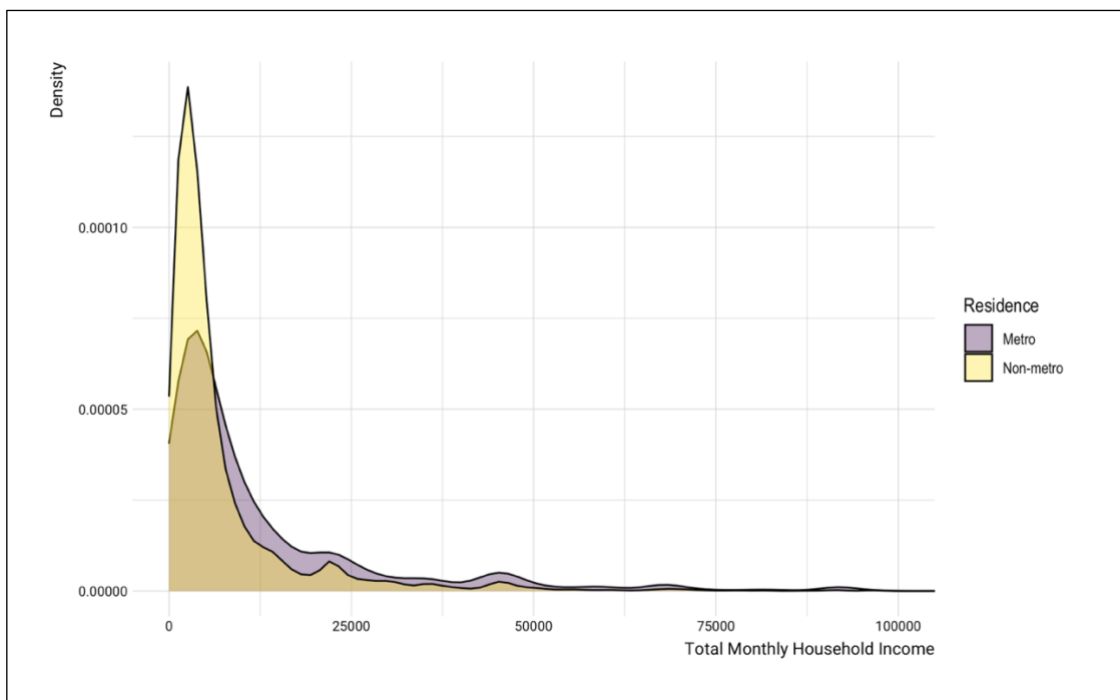

Figure 3: Income heterogeneity in place of residence. Source: the author's own. Data: Statistics SA (2021).

Additionally, South Africa does not only consist in heterogeneity between different groups of income and wealth – inequality also manifests geographically. Figure 3 plots the income distribution of households living in metro and non-metro areas. While both geographical areas are severely skewed to the right, a much larger proportion of non-metro households (more than double relative to metro) are at the bottom of the income distribution.
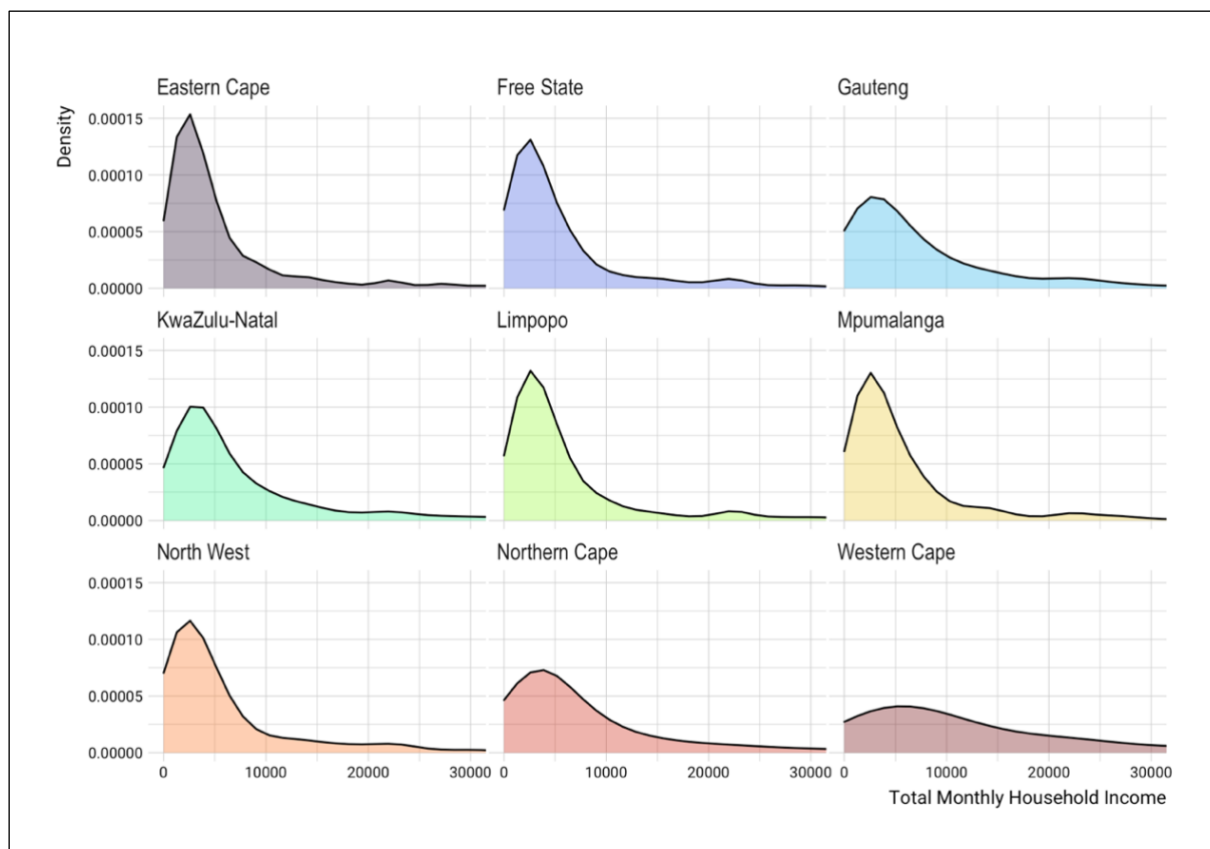

Figure 4: Income heterogeneity in provinces of South Africa. Source: the author's own. Data: Statistics SA (2021).

Figure 4 indicates income distributions by each of South Africa's nine provinces. The distributions indicate striking heterogeneity between different regions as well, with all nine provinces consisting in high income inequality. While the most prevalent view regarding monetary policy is that it should be focused on aggregate economic outcomes (excluding geographic heterogeneity from modelling), large regional differences and the metro/non-metro divide may have important roles in complicating monetary policy models. This view is also shared by Fratantoni & Schuh (2003), who argue that regional differences can and do severely influence aggregate responses to monetary policy.

3.2. Sources of Income and Wealth

Another factor which may potentially complicate the process of monetary policy modelling are heterogenous sources of income. The source of income has important implications for the generation of wealth through saving and consumption[2]. In South Africa, transfers from government, or social grants, are a crucial source of income for many households. Figure 5 illustrates the main sources of income for South African households per province. In all provinces, grants are a major source of income for households, with salaries and wages remaining the top source of household income for most households in the country. The role of transfers, thus, ought to play a huge role in South Africa's monetary policy modelling.
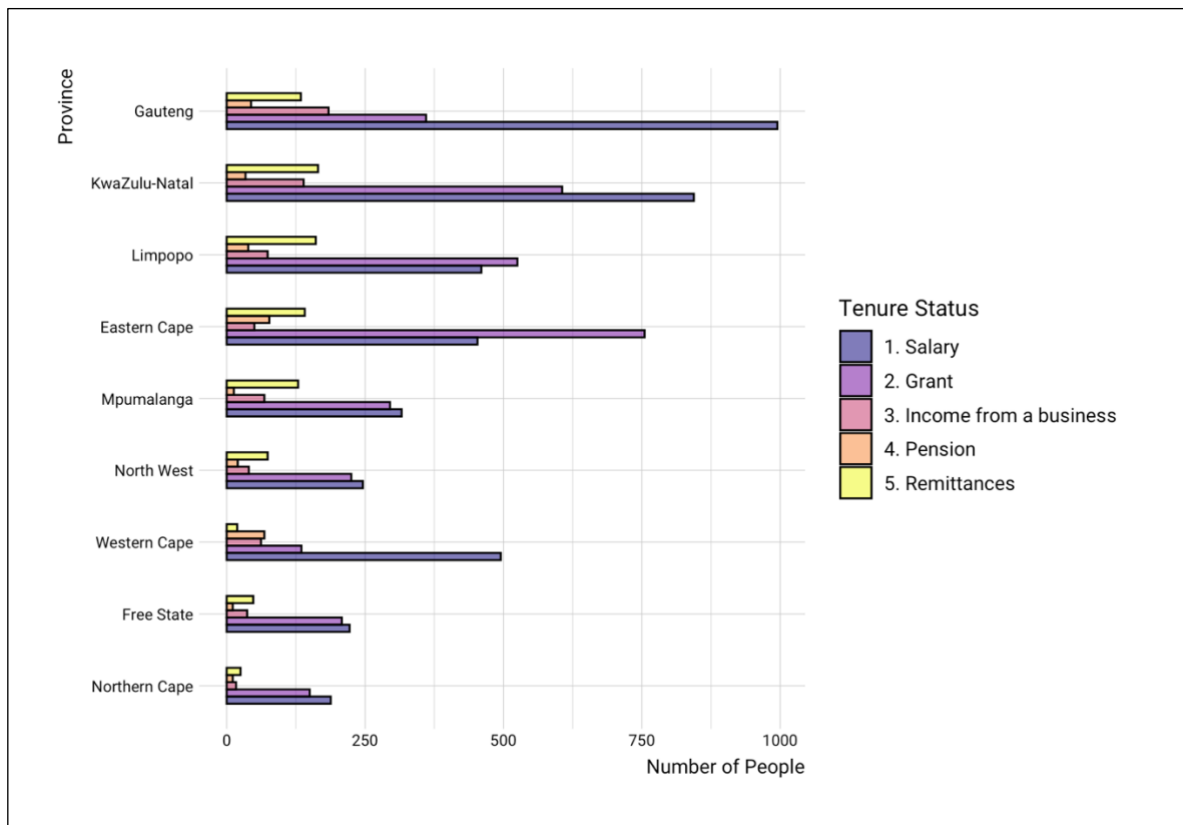

Figure 5: Main source of income per province. Source: the author's own. Data: Stats SA (2021).

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[2] Consumption is mainly influenced through changes in disposable income. For more on the literature, see Japelli & Pistaferri (2010).

4. Implications for Monetary Policy

Given what we observe in South Africa, what are the implications for monetary policy modelling? The South African Reserve Bank (SARB) recently launched a new monetary policy implementation framework, formally known as a 'tiered floor' framework (SARB, 2022a: 19). Under the new framework, the SARB moved from a money market shortage of R30 billion to a surplus of R50 billion (SARB, 2022a: 19). The motivation behind the move is that the SARB can more efficiently control interest rates by saturating banks' demand for reserves through excess supply of reserves, while also paying the policy rate to banks with a deposit facility (SARB, 2022b: 5). Crucially, however, banks face a quota or tier which adjusts the rate they earn on their balances, providing incentive for banks to lend additional reserves to other banks creating artificial 'scarcity' for reserves (SARB, 2022b: 5). Hence, monetary policy in South Africa is implemented by means of interest rates to target inflation.

The first important implication for monetary policy is its role in exacerbating heterogeneity. Imrohoroglu & Zhao (2022) study this question through a heterogenous agent model with overlapping generations. They primarily find that while lowering interest rates increase wealth heterogeneity, it is also welfaring enhancing (2022: 95). The intuition for inceasing wealth inequality is that lower interest rates reduce the return on saving (primarily hurting the poor) while increasing access to finance (primarily for high income households). However, lowering interest rates also increase returns on wages, which may be welfare enhancing.

In South Africa, since the most prevalent source of income is wages and salaries, lowering interest rates may explain the divergence in wealth inequality, as shown in figure 2. Below, the policy rate is plotted over time in figure 6. There has been a clear downward trend of the policy rate over time which (interestingly) almost coincides with what we see in wealth heterogeneity over time.

These results, however, are not interesting in and of themselves so far – we can infer the same results from traditional representative agent models. At this point, it is important to distinguish between direct and indirect effects of monetary policy. Direct effects are those effects that are brought on by changes in interest rates regardless of changes in disposable income and pertains to intertemporal substitution – the interaction between saving and

spending over time. Indirect effects, then, concern changes in labour demand brought on by changes in interest rates.
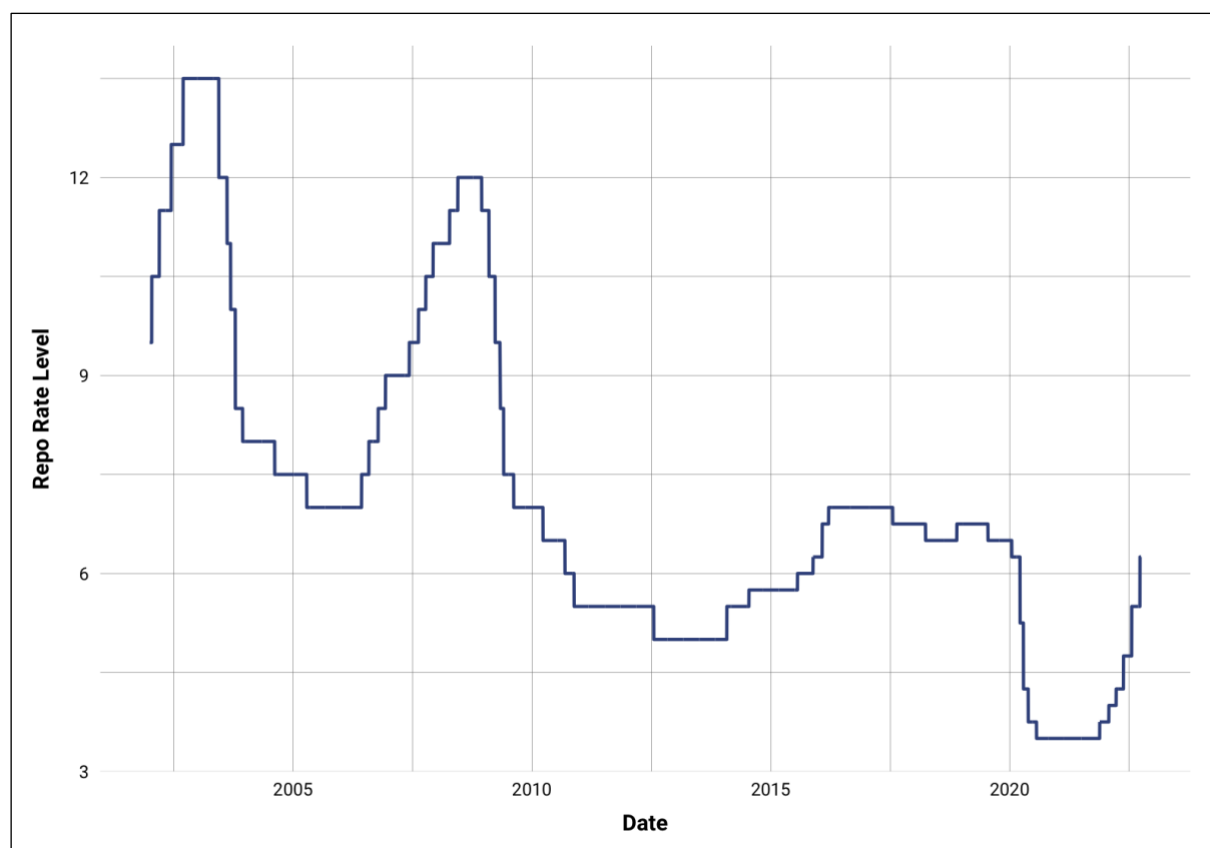

Figure 6: SARB repo rate over time. Source: the author's own. Data: Codera Analytics (n.d.).

In studying the differences between representative agent models and heterogenous agent models, Kaplan, Moll & Violante (2018: 727) find that their Heterogenous Agent New Keynesian (HANK) model accounts for approximately 80 percent of the consumption response following a monetary shock. This result differs sharply from the traditional representative agent model. The implication is that the effects of monetary policy on labour demand can be forecasted much more accurately through the use of heterogenous agent models. Even though these models are more difficult and complicated to solve, recent advances in computational power, methods and research has made producing and solving heterogeneous agent models much easier (Guvenen, 2011: 256; Ahn, Kaplan, Moll, Winberry & Wolf, 2017: 55).

Taking account of regional differences is a final implication discussed in this paper for monetary policy modelling. Fratantoni & Schuh (2003) attempt to incorporate regional

heterogeneity into monetary policy modelling by using a heterogenous agent vector autoregression (HAVAR) model. The results of the HAVAR model imply that there may be significant variation in the size and duration of dynamic responses to monetary shocks (2003: 582). This supports the idea that geographic heterogeneity indeed influences aggregate outcomes and how we forecast and understand them. From a South African point of view, the vast differences between metro and non-metro households – and even between provinces – may require more complex monetary modelling in order to understand how policy affects heterogenous regions and shapes aggregate outcomes differentially over time.

5. Conclusion

This paper explored the increasing complexity of macroeconomic models through the lens of wealth heterogeneity and their implications for monetary policy in South Africa. It was shown how South Africa's households are characterised by intensive income and wealth heterogeneity, and increasingly so. It was shown that households at different ends of the income and wealth distribution share different reactions with regards to monetary policy outcomes, where wealth inequality is often exacerbated due to policy. It was argued that in the milieu of increasing inequality, heterogenous agent models offer more realistic and desirable accounts of monetary policy outcomes – especially with regards to the indirect effects of monetary policy shocks. Regardless of complexity, these models pave the way for future monetary policy in the wake of several destructive crises, of which the poor got the short end of a stick that is incessantly becoming shorter and shorter.

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