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ORIGINAL ARTICLE

Monetary policy, inflation and distributional impact: South Africa's case

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Abstract

This paper presents further empirical support for the finding that the impact of inflation and that of policy instruments to manage inflation are not distributed equally across households of different income groups. In particular, the evidence using South African data suggests that monetary policy tightening, which seeks to maintain low and stable inflation, has a relatively modest effect on real consumption of poorer households, who tend to rely on government grants and spend larger shares of income on food stuff, while the reduction in real consumption of wealthier households is much larger. This may be due to the fact that low and stable inflation help maintain the value of government grants and cap food prices both in real terms, and higher interest rates reduce labour income, weaken asset price performance and increase debt service cost.

KEYWORDS

distributional effects, inflation, monetary policy, South Africa

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1 | INTRODUCTION

South Africa achieved noteworthy progress over an initial period (of about 15 years) after the end of apartheid. Poverty fell, and access to education and healthcare expanded. An expansion in social housing, water and electricity coverage improved living conditions.[1] Taxes and social spending redistributed income in a progressive manner. Government debt declined to below 30% of gross domestic product (GDP) by the late 2000s amid robust economic growth. The unemployment rate, which had risen to above 30% after the transition to democracy, declined to somewhat above 20% by the late 2000s. Strong economic institutions supported these advances.

[1]For instance, the poverty headcount ratio at $2.15 a day (2017 PPP) fell from 33.5% in 1993 to 28.3% in 2005 and further to 18% in 2010. Primary school gross enrollment rose from 81% in 1988 to 111% in 1995 and remained 100 or above through 2017. The government has delivered more than 3.5 million free homes since 1994. Access to electricity rose from 58% in 1996 to 72% in 2000 and 85% in 2012. Real per-capita GDP rose during the decade and a half after the end of apartheid before flatting. See The World Bank South Africa page for more detail.

Despite the progress, low growth and the legacies of apartheid continue to weigh on income distribution. As economic policies failed to adapt to the end of the commodity price boom of the 2000s, productivity deteriorated, and business confidence faltered. The impact of adverse shocks was exacerbated by widespread corruption, state capture and difficulties to muster political support to implement much-needed reforms. Growth disappointed, with per-capita real output stagnating in the decade preceding the pandemic as private investment lost dynamism and the contribution of total factor productivity turned negative. Fiscal space has been eroded amid large fiscal deficits and relatively high and growing public debt. The education system has been unsuccessful to equip the youth with sufficient human capital. Unemployment, poverty and inequality are unacceptably high. South Africa started the 1990s with already elevated inequality as the policy of apartheid excluded a large swath of the population from economic opportunities. South Africa's Gini—an index that measures inequality—has increased further in the early 2000s and remained high ever since. Meanwhile, its peers have been able to make inroads in reducing inequality.[2]

One notable achievement has been a trend decline in inflation both in level and volatility terms. Inflation fluctuated in a 10–20% range until the early 1990s. Subsequently, as interest rates remained relatively high (the prime lending rate was 15–20%), inflation declined, registering single digit outturns for the first time in almost a decade at the end of 1992. Inflation continued to moderate, with its average rate during 1993–1999 at around 8%. Following the formal inception of inflation targeting in February 2000, inflation was initially volatile—it spiked towards the end of 2001 after the rand weakened sharply and again in 2008 on higher commodity prices.[3] However, inflation became more stable since 2010 and moderated towards the mid-point of the 3–6% target range in the late 2010s aided by significant crop food price disinflation, exchange rate appreciation, a tightening of the monetary policy stance (the real policy rate turned positive) and central bank communication to de-facto target the midpoint of the target range.[4] Some of the trend decline may be due to global disinflation trend. Inflation volatility has remained relatively low. The coefficient of variation—standard deviation normalised by the level of inflation—shows a similar decline in volatility since the early 2000s. During the COVID-19 pandemic, which stated in early 2020, inflation declined to the lower end of the 3–6% target band, but its volatility edged up. As the economy re-opened and supply constraints worsened globally, inflation has risen to above the upper end of the target range.[5]

In a country with very high inequality, one key question is how inflation and the policy instruments to control inflation would affect inequality. Low and stable inflation would generally have favourable distributional effects to the extent that the poor are more negatively affected by higher inflation than the rich (Gill & Nagle, 2022). The rich may be better able to protect themselves against the effects of higher inflation, owing to greater access to financial instruments that hedge in some way against inflation, than the poor who likely have a larger share in cash. State subsidies, transfers and pension payouts may not be fully indexed, and inflation may reduce their real incomes. Easterly & Fischer (2001) provide supporting evidence based on large cross-country data and household survey results. Albanesi (2007) highlights that inflation and inequality are positively related across different countries. Findings by Bulíř (2001) are more nuanced, where the reduction in inflation from hyperinflationary levels significantly lowers income inequality, but further reduction towards a very low level of inflation seems to bring about negligible additional gains. Inflation could instead reduce the real value of debt and favour the less well-off in a borrower-lender context; even moderate inflation leads to a sizable redistribution of wealth from rich, old households (net creditors) to middle-class, young households (net debtors) in the United States (Doepke & Schneider, 2006).

Turning to the distributional impact of the policy instruments to control inflation, addressing inequality is not part of the SARB's mandate, but if monetary policy has certain distributional effects in South Africa, it is an important issue to understand. Here, findings in the literature are mixed potentially

[2]See IMF (2019) and a related blog post 'Six Charts Explain South Africa's Inequality'.
[3]The intention to adopt inflation targeting was announced in August 1999.
[4]For such communication, see, for instance, Kganyago (2019).
[5]For inflation in emerging and developing economies more generally, see World Bank (2019).

as the mechanisms linking monetary policy and inequality are complex, depending on a multitude of factors including macroeconomic conditions and the distributions of income and wealth.[6] For instance, contractionary monetary policy could either reduce inequality by dampening asset and goods price inflation or increase it by benefiting savers (wealthier) over borrowers (less wealthy). In the United States, unconventional monetary policy easing helped reduce inequality by stimulating economic activity (Bivens, 2015).[7] Similarly, contractionary monetary policy in the United States systematically increases inequality in labour earnings, total income, consumption and total expenditures (Coibion et al., 2017). By contrast, the announcement of the ECB's Outright Monetary Transactions programme representing monetary policy easing benefited the wealthier (Adam & Tzamourani, 2016).[8] Unconventional monetary policy easing in Japan led to higher income inequality as older individuals with assets benefitted from asset price gains, but wages failed to increase due to labour market rigidities (Saiki & Frost, 2020). Findings could be mixed also because the type of a monetary policy shock may matter. In a panel of 32 advanced and emerging countries, unexpected monetary policy tightening could increase inequality, but observed increases in policy rates would reduce inequality (Furceri et al., 2018).

While results in the literature are mixed, specifically in the South African context, monetary policy action aimed at maintaining low and stable inflation could reduce consumption inequality (Kganyago, 2018). First, monetary policy tightening would have a much stronger contractionary impact through higher borrowing costs on households at higher ends of the income distribution than on the rest of the population. Individuals with higher income borrow far more in volume than those with lower income. In addition, interest rates faced by lower income borrowers are affected more heavily by information asymmetries and default risk than the level of the policy rate itself. Second, as most assets are owned by people at the top end of the income distribution, low interest rates and higher asset prices would increase inequality. Third, South Africa's growth tends to strengthen and generate more jobs when inflation is low, mostly from stronger private sector investment and productivity growth (Fedderke & Liu, 2018; Vermeulen, 2017). Also, an important share of high unemployment is structural, on which monetary policy has little impact. Finally, monetary policy action that helps lower inflation can increase the consumption of the poorest South Africans, even as it reduces the purchasing power of the richer South Africans. This is because poorer people have less choice over spending, and it is harder for them to protect their wages and savings against inflation.

Against this backdrop, this paper assesses what distributional effects monetary policy action aimed at maintaining low and stable inflation could have in South Africa. It relies on the National Income Dynamics Study (NIDS), the first national panel study in South Africa, which provides empirical data on the changing lives of South Africans during 2008–2017, tracking a large number of same individuals across five waves (see Section 4.2 for details).[9] Importantly, the data include the unemployed and those relying mainly on grants for income. In particular, 'per-capita household' consumption (household consumption per adult adjusted for age group) in real terms is regressed on the estimated 'exogenous' monetary policy shock (net of the anticipated component due to macroeconomic conditions, which can influence both monetary policy action and consumption), controlling for a range of macroeconomic factors and individual-level characteristics. After investigating potential transmission channels, distributional effects are estimated using the interaction of the exogenous monetary policy shock with consumption decile dummies.

Our work adds to the literate in at least two ways, by introducing an exogenous monetary policy shock and survey using data that include the unemployed and those receiving social grants. For instance, Aye et al. (2020) consider the impact of monetary policy on inequality in South Africa but observed

[6]Inequalities affect economic growth in a complex way (Marrero & Rodriguez, 2013). Income inequality is a composite measure of inequality of opportunity and inequality of effort. Data for the United States lend robust support for a negative relationship between inequality of opportunity and growth and a positive relationship between inequality of effort and growth.

[7]Endogenous output and sticky prices allow monetary policy to have real effects on the economy.

[8]Similar to an unexpected loosening of the monetary policy rate by 175 basis points.

[9]During the COVID-19 pandemic, additional waves of phone-based surveys, or the Coronavirus Rapid Mobile Surveys, were released. They are not used in this paper based on variable availability.

interbank short-term interest rates and Treasury bill yields may not be good indicators of monetary policy action. Moreover, the tax data they use do not include the poor. Merrino (2021) is probably the closest work to ours, where an exogenous monetary policy contraction is found to increase wage inequality, but our work includes, in addition to wage earners, those without a job and relying on grants for income.

Estimated results suggest that monetary policy tightening would reduce consumption inequality in South Africa. In response to exogenous monetary policy tightening, the real consumption of individuals with lower consumption levels declines relatively modestly or even increases. These individuals rely more on government transfers in the form of social grants, thus less so on labour income, consume a larger share of food and appear to benefit mainly from lower inflation. The real consumption of individuals with higher consumption levels appears to be affected mainly by lower labour income, weaker asset price performance and higher debt service cost. Our findings differ from the literature partly as the data include the unemployed and those who rely mainly on grants for income. A main limitation of our work is that the results may reflect an unanticipated reduction in inflation (due to an unanticipated increase in the policy rate), rather than an unanticipated increase in the policy rate. This paper is unable to disentangle these two aspects and investigates them collectively.

This paper is structured as follows. The next section discusses potential key transmission channels of monetary policy relying on a descriptive data analysis. Section 3 estimates the exogenous monetary policy shock. Section 4 discusses the econometric methodology and data. Section 5 discusses the estimated results, and Section 6 concludes.

2 | POTENTIAL DISTRIBUTIONAL IMPACT OF INFLATION AND MONETARY POLICY ACTION IN SOUTH AFRICA—DESCRIPTIVE DATA ANALYSIS

Individuals with lower consumption in South Africa would most benefit from lower and more stable inflation. These individuals tend to face higher inflation in both level and volatility (Table 1). Average inflation over the sample period of 2008–2017, which corresponds to the data used for our econometric analysis, is 6.1% for the lowest two consumption deciles, above the 5.4% for the highest two consumption deciles. Volatility of inflation, measured by both standard deviation and the coefficient of variation (standard deviation scaled by average), faced by the lowest two consumption deciles is twice as high as that faced by the highest two consumption deciles. The chance of facing the highest inflation is the highest for the lowest two consumption deciles (56–57%). This is partly because food stuff accounts for a large share of the Consumer Price Index (CPI) basket—around 45% of total for the lowest two consumption deciles, significantly above the 15–25% of total for the highest two consumption deciles (Table 2). During 2020, those in the lower consumption deciles, the most affected by the COVID-19 pandemic, generally faced relatively high inflation. Those in the highest deciles also faced relatively high inflation in terms of both level and volatility.

By contrast, individuals with lower consumption are less likely to be impacted by monetary policy action through labour income, asset prices or debt service cost. Table 2 summarises key variables from the dataset used for our econometric analysis. Low employment rates suggest labour income is probably a less important channel of monetary policy transmission for these individuals. Employment rates for the lowest two consumption deciles are 28–34%, around one half of 54–65% for the highest two deciles. Social grants, an important fiscal policy tool to support the poor's livelihood, are a relatively stable source of nominal income, gain in real value as inflation declines and are relatively insulated from business cycles.[10] More than 80% of those in the lowest 4 consumption deciles receive social grants, significantly more than the shares for the higher deciles. Individuals consuming less tend to own less assets, debt and

[10]Results from the 2018 General Household Survey suggest that about 44% of households received at least one kind of grants and that grants were the main source of income for almost 20% of households nationally.

TABLE 1 Inflation characteristics by consumption decile: 2009–2017 and 2020.

Consumption decile	Average inflation (per cent)	Standard deviation (decile 1 = 1)	Coefficient of variation (decile 1 = 1)	Probability of facing highest inflation (per cent)	Average inflation, when decile faces highest inflation (per cent)	Average inflation (per cent)	Standard deviation (decile 1 = 1)	Coefficient of variation (decile 1 = 1)
	(January 2009–December 2017)					(January–December 2020)		
1	6.1	1.0	1.0	56	7.0	3.8	1.0	1.0
2	6.1	1.0	1.0	57	7.0	3.8	0.8	0.8
3	6.0	0.9	0.9	7	8.3	3.4	0.8	0.9
4	6.0	0.9	0.9	7	8.3	3.2	0.8	1.0
5	5.9	0.8	0.9	4	6.7	3.0	0.7	0.9
6	5.9	0.8	0.8	4	6.7	2.9	0.7	0.9
7	5.7	0.6	0.7	6	5.4	2.9	0.9	1.2
8	5.8	0.6	0.7	6	5.4	2.9	1.1	1.4
9	5.4	0.4	0.5	22	5.0	3.2	1.2	1.4
10	5.4	0.4	0.5	22	5.1	3.5	1.2	1.3

Note: Decile-level inflation index data start from January 2008 (thus inflation rates from January 2009).
Sources: Stats SA and the author's calculations.

TABLE 2 Selected characteristics by consumption decile: NIDS wave 5.

Consumption decile	Food consumption (per cent)	Employment (per cent)	Grant recipient (per cent)	Total assets (Rand)	Financial assets (Rand)	Debt (Rand)	Net worth (Rand)
1	46	28	85	13,601	136	707	12,996
2	44	34	85	20,762	419	1048	19,664
3	42	38	83	28,168	350	1531	26,527
4	41	41	87	29,814	492	1399	28,323
5	37	42	79	36,774	1249	2191	36,269
6	36	44	75	51,982	1371	3558	50,046
7	33	49	67	67,190	1494	4728	63,823
8	30	54	57	74,418	1616	5971	69,710
9	25	54	38	153,236	2336	16,036	140,148
10	15	65	21	930,792	28,522	81,129	854,859
Average	35	45	68	140,674	3799	11,830	130,237

Note: Some decile-level estimates for assets and net worth are replaced with interpolations due to odd results. Asset, debt and net worth data are not used in econometrics due to data limitations in both time and cross-sectional dimensions.
Abbreviation: NIDS, National Income Dynamics Study.
Sources: NIDS Wave 5 and the author's calculations.

net worth.[11] It is important to note that the less well-off could be relatively highly indebted. For instance, NIDS data suggest that those in the lowest consumption decile are as indebted relative to income as those in the highest consumption decile. However, to the extent that the former borrows from lenders charging very high interest rates, monetary policy action in 25 or 50 basis point increments would have subdued effects on their debt service cost.

3 | IDENTIFYING THE EXOGENOUS MONETARY POLICY SHOCK

We estimate the 'exogenous's monetary policy shock. Economic conditions can influence—at least in the short term—both consumption and monetary policy actions. Therefore, estimating the causal effect of monetary policy on consumption requires using 'exogenous' monetary policy shocks. Thus, the anticipated component due to macroeconomic conditions, which can influence both monetary policy action and consumption in our econometric specifications, is removed from the observed monetary policy shock. This is expected to help avoid generating the 'inflation puzzle', where a rate hike (cut) is associated with a rise (fall) in inflation (Section 5 presents econometric results using observed monetary policy action as well for comparison).

The 'exogenous' monetary policy shock is estimated following Furceri et al. (2018) and Auerbach and Gorodnichenko (2012). First, unexpected changes in the policy rate i in year t are proxied by the forecast error FE^i_t, that is, the difference between the policy rate i observed at the end of year t $\left(ACT^i_t\right)$, and the policy rate expected during the course of the year $\left(EXP^i_t\right)$:

$$FE^i_t = ACT^i_t - EXP^i_t. \tag{1}$$

Forecast errors of headline inflation $\left(FE^\pi_t\right)$ and GDP growth $\left(FE^y_t\right)$ are computed similarly. Exogenous monetary policy shocks (MPS) are the residuals ε_t from the regression of the forecast errors of the policy rates on those of inflation and output growth.

[11]Net worth represents an off-the-shelf variable in the dataset rather than the author's calculations.

$$FE_t^i = \alpha + \beta FE_t^{\pi} + \Upsilon FE_t^{y} + \varepsilon_t. \quad (2)$$

Inflation and GDP growth data are taken from different vintages of the October WEO. Policy rate expectations are taken from the October vintages of *Consensus Economics* data.

The estimated exogenous monetary policy shock displays the following characteristics.[12] In some years, it moves in the opposite direction than the observed policy rate, highlighting the importance of analysing unanticipated effects. Our estimates for South Africa are similar to those by Furceri et al. (2018) and Romer & Romer (2004) for the United States, potentially reflecting the view that global central banks' reaction functions may have become less diverse as the shocks these central banks face have become more similar. The estimated exogenous monetary policy shock for South Africa averages around zero with standard deviation of 0.34 for 2000–2019. The statistics for the NIDS wave years (shaded areas in Figure 1) are similar, at zero and 0.25. The comparable statistics for the policy rate for 2000–2019 and 2008–2017 are averages of −41 and −27 basis points and standard deviation of 1.6 and 1.5. Econometric results in Table 3 suggest that a positive exogenous monetary policy shock, indicating tightening, is associated with a reduction in inflation but has a muted relationship with real GDP growth, real private sector consumption growth, real private sector per-worker wage growth and the unemployment rate. This is consistent with findings in related studies that the growth cost of monetary tightening tends to be small in South Africa (Loewald et al., 2022; Miyajima, 2020). A one standard deviation exogenous monetary policy shock, or tightening, is associated with around 1 percentage point reduction (=–3.395 * 0.34) in the rate of inflation. An observed increase in the policy rate (detrended, to alleviate the chance of spurious correlation) is associated with a rise in inflation (the *inflation puzzle*).

4 | METHODOLOGY AND DATA

4.1 | Methodology

In our model, per-capita household real consumption in log (see Section 4.2 for computation) is regressed on the exogenous monetary policy shock obtained in Section 3 and a range of controls.[13] The analysis investigates the impact over a 12- to 18-month horizon, commonly understood as the transmission lag of monetary policy action, which is broadly similar to the distance between NIDS survey waves. This is different from the medium-term effect by Furceri et al. (2018). Macroeconomic conditions are controlled for by real GDP level in log. Micro-level individual characteristics are controlled for by dummy variables representing the food to total consumption ratio, employment status, grant receipt status, education attainment and geography.[14] The geography dummies are also interacted with real GDP levels in log as commonly done in the literature. Distributional effects are estimated by interacting the exogenous monetary policy shock with consumption decile dummies. Extreme values are removed by 'winsorizing' the data.[15]

A panel fixed effects approach is used without the lagged dependent variable as the latter is statistically insignificant (results with the lagged dependent variable is reported in Table A1):

$$lnc_{i,t} = \sum_j a_j X_{j,t} + \sum_{k,i} a_k Y_{k,i,t-1} + \sum_{l,i} a_l Z_{l,i,t-1} + \alpha_i + c + \varepsilon_{i,t}. \quad (3)$$

A vector of macroeconomic controls $X_{j,t}$ includes the log of real GDP level and the exogenous monetary policy shock for time t. A vector of micro-level controls k for indivudual i, $Y_{k,i,t-1}$ includes dummy variables capturing grant receipt status, employment status and educational attainment. It also includes the food to total consumption ratio. Individual characteristics are lagged by one period *(t-1)* to reduce

[12]The estimates do not display auto correlation.
[13]A multilevel analysis combining macro and micro-level data is standard (see, such as Imbens & Lancaster, 1994; and Mikucka et al., 2017).
[14]Spatial inequalities are related to the level of development (Lessmann, 2014).
[15]At 3rd and 97th percentiles.

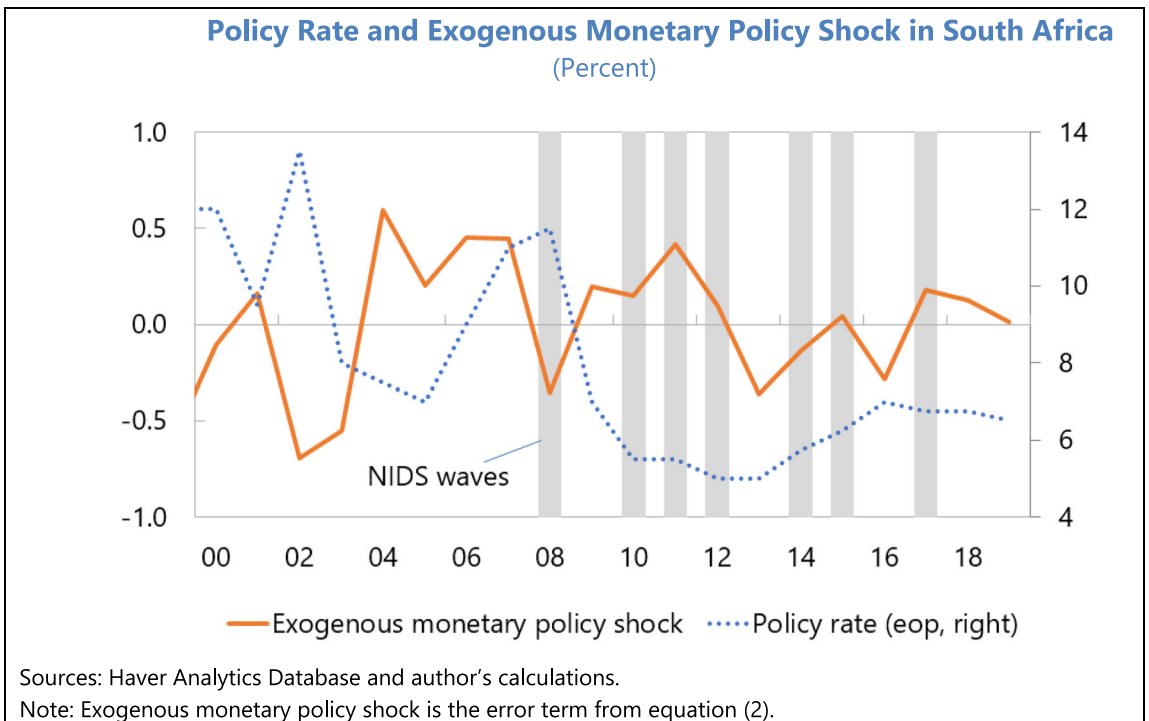

FIGURE 1 Policy rate and exogenous monetary policy shock in South Africa (per cent). *Note*: Exogenous monetary policy shock is the error term from Equation (2). *Sources*: Haver Analytics Database and author's calculations. [Color figure can be viewed at wileyonlinelibrary.com]

TABLE 3 Impact of exogenous monetary policy shock, 2000–2019.

	Dependent variable									
Independent variables	**Inflation**		**Real GDP growth**		**Real private consumption growth**		**Real private wage growth**		**Unemployment rate, detrended**	
Exogenous monetary policy shock	−3.395***	…	0.279	…	2.442	…	1.429	…	0.424	…
std. error	0.995	…	1.040	…	1.466	…	1.609	…	0.746	…
Policy rate, detrended	…	1.127***	…	−0.242	…	−0.621	…	−0.794	…	0.212
std. error	…	0.239	…	0.288	…	0.491	…	0.459	…	0.203
Inflation (L1)	0.258	0.000	−0.420 **	−0.344	−0.698*	−0.446	0.158	0.350	0.042	−0.061
std. error	0.174	0.167	0.181	0.202	0.330	0.447	0.273	0.286	0.124	0.141
Real GDP growth (L1)	0.487 **	0.258	0.461 **	0.504 **	0.508	0.229	0.002	0.183	−0.075	−0.156
std. error	0.185	0.162	0.194	0.195	0.681	0.757	0.292	0.292	0.162	0.168
Real private consumption growth (L1)	…	…	…	…	−0.210	0.134	…	…	…	…
std. error	…	…	…	…	0.522	0.619	…	…	…	…
Real private wage growth (L1)	…	…	…	…	…	…	0.068	-0.086	…	…
std. error	…	…	…	…	…	…	0.282	0.285	…	…
Unemployment rate, detrended (L1)	…	…	…	…	…	…	…	…	0.922***	0.833***
std. error	…	…	…	…	…	…	…	…	0.200	0.187
Constant	2.920 **	5.001***	3.747***	3.187 **	6.316***	4.577	0.525	−0.794	−0.053	0.622
std. error	1.221	1.192	1.277	1.437	0.522	2.891	1.989	2.046	0.901	1.036
N	20	20	20	20	20	20	20	20	20	20
Adjusted R^2	0.496	0.636	0.375	0.399	0.349	0.303	−0.177	−0.033	0.649	0.667

Note: L1 signifies a one period lag. This table reports estimations using OLS.
Abbreviation: GDP, gross domestic product.
***When statistically significant at the 1% level.
**When statistically significant at the 5% level.
*When statistically significant at the 10% level.
Source: Author's calculations.

TABLE 4 Average per-capita household real consumption level. (Not in log, normalised such hat decile 1 in wave 1 = 1.0.).

	Consumption decile									
Wave	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
1	1.0	1.4	1.8	2.3	2.9	3.6	4.6	6.6	11.2	46.4
2	1.0	1.5	1.9	2.4	2.9	3.6	4.6	6.5	11.5	58.1
3	1.1	1.6	2.1	2.7	3.3	4.2	5.4	7.6	12.9	53.6
4	1.5	2.1	2.7	3.3	4.1	5.1	6.6	9.1	15.5	59.1
5	1.7	2.3	3.0	3.6	4.4	5.4	7.0	9.5	15.5	51.8

Sources: NIDS and author's calculations.

the chance of capturing reverse causality. A vector $Z_{l,b,t-1}$ reprsents interaction terms between the exogenous monetary policy shock and micro-level controls l for indivudual i, including the food to total consumption ratio, the emplyment dummy, the grant dummy and the consumption decile dummies. α_i is time invariant fixed effects of individual i, c is constant and $\varepsilon_{i,t}$ is the error term.

Our approach has one major limitation. Given that there is a fairly significant lag between surveys, over which time the full effect of the monetary policy shock is expected to impact inflation, the results may reflect an unanticipated reduction in inflation (due an unanticipated increase in the policy rate), rather than an unanticipated increase in the policy rate. This paper is unable to disentangle these two aspects and investigates them collectively.[16]

4.2 | Data

The analysis relies on the NIDS data. NIDS is the first national household panel study in South Africa.[17] It started in 2008 with a nationally representative sample of over 28,000 individuals in 7300 households across the country. The survey is conducted approximately every 2 years, tracking same individuals with unique IDs. At present, five waves are available: 2008, 2010–2011, 2012, 2014–2015 and 2017. NIDS examines the livelihoods of individuals and households over time and provides information on a wide range of topics.[18] The sample is restricted to the adults who are successfully surveyed across the 5 waves (about 6700 adults).[19]

The dependent variable is per-capital household real consumption in log.[20] It is calculated as the household-level consumption divided by the number of adults following studies using NIDS data (Schotte et al., 2018; Zizzamia, 2020). It is further adjusted for age. Average consumption by age group is not available for South Africa and proxied by data from the U.S. Consumer Expenditure Survey. We use the data to adjust per-capita household consumption in South Africa for seven age groups. Table 4 shows that, for instance, adults in the 45–54 age group tend to consume the most, twice as much as those that consume the least (below 25 and above 75). Finally, per-capita household consumption is divided by the annual inflation index of the survey year. Individuals are surveyed in different years even in the same wave. Per-capita household real consumption calculated this way is skewed towards higher deciles, but from wave 1 to wave 5, it grew faster for lower deciles, somewhat increasing their shares of total. In our econometric analysis, per-capita household real consumption is introduced in logarithm.

[16]A number of structural models have been constructed for South Africa, which include details relating to the response of inflation to monetary policy shocks, such as Smal et al. (2007), Steinbach et al. (2009) and Alpanda et al. (2010), among others.
[17]NIDS data are available from an open data portal *DataFirst*.
[18]They include poverty, fertility, mortality, migration, labour market participation, economic activity, health, education, vulnerability and social capital.
[19]Phone-based survey results were recently released as NIDS CRAM to help understand the impact of the COVID-19 pandemic. CRAM is not used as it does not include some of the key variables used in the paper.
[20]Income data in the NIDS are less complete than consumption data.

The independent variables include both macroeconomic conditions and individual characteristics. Macroeconomic conditions are controlled for by real GDP level (in log) in the survey year. Indicators of educational attainment are created for 5 groups—no education (including 'other' and 'don't know'), lower primary (grades 1–7), upper primary (grades 8 and 9), secondary (grades 10–12, National Technical Certificate and National Vocational Certificate) and tertiary (everything above secondary). Food consumption is measured as a share of total consumption. The employment dummy takes value of 1 when the individual is 'employed' and zero otherwise (either 'not economically active', 'unemployed strict', 'unemployed discouraged' or 'refused'). Social grants represent an important fiscal policy tool to help address inequality, and the grant recipient dummy takes value of 1 for recipients and 0 otherwise. Geography dummies are created for 4 types, rural and urban, both formal and informal for each survey year. In addition, real GDP level (in log) is interacted with geography dummies to capture time by location effects as standard in the literature.

Table 5 summarises the individual characteristics. As for educational attainment in wave 5, the share of primary level education is the highest (36%), followed by secondary (32%), tertiary (19%) and no schooling (13%). The share of tertiary education rose by 12 points from wave 1, as those of primary and secondary education declined. Food consumption as a share of total declined from more than 40% in wave 1 to 35% in wave 5. Around 40% of the sample are employed in wave 5, up 7 points from wave 1. Around 2/3 of the sample receive social grants. Geographically, most of the sample population resides in rural informal and urban formal areas (around 40% each in wave 5).[21]

5 | ESTIMATED RESULTS

In the baseline model, effects of the exogenous monetary policy shock (*mps*) are estimated by interacting *mps* with potential channels of transmission, that is, the food to total consumption ratio, the employment dummy and the grant dummy. As a second step, *mps* is interacted with consumption decile dummies to investigate distributional effects. These models are also estimated with the lagged dependent variable to show that the latter is statistically insignificant (Table A1). The robustness of the baseline model is checked with additional variables that could capture potential channels of monetary policy transmission—a different measure of grants, indicators of access to finance and a different set of consumption deciles. Finally, the observed policy rate is used in place of *mps* to re-estimate the models.

5.1 | Baseline model—Exogenous monetary policy shock

Results from a fixed-effects approach suggest that exogenous monetary policy tightening (*mps*) impacts consumption positively through lower inflation and negatively through reduced labour income (Table 6 and Figure 2). As a reminder, a one unit change in *mps* represents around 3 standard deviations.

- The coefficient on *mps* is statistically insignificant when introduced 'alone' (Table 6, model 2). This appears consistent with the finding in related studies that the growth cost of monetary tightening tends to be small in South Africa (Loewald et al., 2022; Miyajima, 2020) and more generally the time-series analyses of macro-level data that find that consumption responds little to changes in the interest rate after controlling for income (Campbell & Gregory Mankiw, 1989; Canzoneri et al., 2007; Kaplan et al., 2018; Yogo, 2004).[22]

[21]Informality in South Africa is relatively low, at about 20–25% along with Mauritius and Namibia, and significantly below 50–65% in Benin, Tanzania and Nigeria (Medina et al., 2017).

[22]Micro survey data on household portfolios show that a sizable fraction of households hold close to zero liquid wealth and face high borrowing costs (Kaplan et al., 2014), reducing their insensitivity to small changes in interest rates (Kaplan et al., 2018). Vissing-Jorgensen (2002) finds those with no asset holdings react little to interest rate cuts.

TABLE 5 Individual characteristics (per cent).

	Education					Consumption	Jobs	Social grants	Geography			
		Primary							Rural		Urban	
Wave	No schooling	Lower	Upper	Secondary	Tertiary & up	Food 1/	Employed	Recipient 2/	Formal	Informal	Formal	Informal
1	13	27	18	34	7	41	38	69	10	46	38	6
2	13	24	16	36	10	42	33	62	10	45	39	6
3	13	24	14	36	12	39	39	68	10	43	40	7
4	13	24	14	33	17	36	45	68	10	42	41	7
5	13	23	13	32	19	35	45	68	10	41	41	7
Average	13	24	15	34	13	39	40	67	10	44	40	6

Note: 1/Food consumption as a share of total consumption. 2/Number of grant recipients as a share of total number of adults.
Sources: NIDS and author's calculations.

TABLE 6 Determinants of per-capita household real consumption in South Africa: Exogenous monetary policy shock (estimated coefficients).

Model #		1	2	3	4	5	6
Macro							
Real GDP	L0.	1.590***	1.921***	1.941***	1.891***	1.925***	1.727***
Exogenous monetary policy shock (*mps*)	L1.	…	−0.039	−0.222***	0.015	−0.036	−0.445***
Micro							
Education dummy							
No education	L1.	−0.134*	−0.135*	−0.137*	−0.129	−0.135*	−0.108
Lower primary	L1.	−0.275***	−0.277***	−0.278***	−0.267***	−0.277***	−0.245***
Upper primary	L1.	−0.224***	−0.225***	−0.228***	−0.219***	−0.225***	−0.212***
Secondary	L1.	−0.088***	−0.088***	−0.093***	−0.090***	−0.088***	−0.103***
Tertiary	L1.	…	…	…	…	…	…
Food share of total cons.	L1.	0.256***	0.259***	0.268***	0.259***	0.259***	0.257***
Employment dummy	L1.	0.049***	0.048***	0.049***	0.043***	0.048***	0.047***
Grant recipient dummy	L1.	−0.022	−0.022	−0.022	−0.022	−0.023	−0.023
Interaction with *mps*							
mps * Food share	L1.	…	…	0.491***	…	…	…
mps * Employment dummy	L1.	…	…	…	−0.122**	…	…
mps * Grant recipient dummy	L1.	…	…	…	…	−0.004	…
mps * consumption decile 1	L1.	…	…	…	…	…	0.854***
mps * consumption decile 2	L1.	…	…	…	…	…	0.827***
mps * consumption decile 3	L1.	…	…	…	…	…	0.729***
mps * consumption decile 4	L1.	…	…	…	…	…	0.629***
mps * consumption decile 5	L1.	…	…	…	…	…	0.438***
mps * consumption decile 6	L1.	…	…	…	…	…	0.364***
mps * consumption decile 7	L1.	…	…	…	…	…	0.239*
mps * consumption decile 8	L1.	…	…	…	…	…	0.253**
mps * consumption decile 9	L1.	…	…	…	…	…	0.324***
Other controls							
Location	L1.	Yes	Yes	Yes	Yes	Yes	Yes
Location * real GDP	L1.	Yes	Yes	Yes	Yes	Yes	Yes
Consumption decile	L1.	Yes	Yes	Yes	Yes	Yes	Yes
Individual effects	…	Yes	Yes	Yes	Yes	Yes	Yes
# of Obs.		26,876	26,876	26,876	26,876	26,876	26,876
Cross section (*N*)		6719	6719	6719	6719	6719	6719
Time series (*T*)		4	4	4	4	4	4
Adjusted R^2		0.115	0.115	0.115	0.115	0.116	0.126
Memo item:							
Total effect of mps							
Food share = 0.45	…	…	…	−0.001	…	…	…
Food share = 0.2	…	…	…	−0.124**	…	…	…

(Continues)

TABLE 6 (Continued)

Model #	1	2	3	4	5	6
Employment dummy	…	…	…	…	−0.108*	…	…
Grant recipient dummy	…	…	…	…	…	−0.041	…
Consumption decile 1	…	…	…	…	…	…	0.409***
Consumption decile 2	…	…	…	…	…	…	0.382***
Consumption decile 3	…	…	…	…	…	…	0.284***
Consumption decile 4	…	…	…	…	…	…	0.184*
Consumption decile 5	…	…	…	…	…	…	−0.007
Consumption decile 6	…	…	…	…	…	…	−0.081
Consumption decile 7	…	…	…	…	…	…	−0.205**
Consumption decile 8	…	…	…	…	…	…	−0.191*
Consumption decile 9	…	…	…	…	…	…	−0.121
Consumption decile 10	…	…	…	…	…	…	−0.445***

Note: This table reports estimated results from Equation (3). Dependent variable is per-capita household real consumption level in log. L0 and L1 signify contemporaneous value and one period lag. *Memo item* reports the total effects of *mps* calculated using Stata command *lincom*.

Abbreviation: GDP, gross domestic product.

***When statistically significant at the 1% level.

**When statistically significant at the 5% level.

*When statistically significant at the 10% level.

Sources: Haver, NIDS and author's calculations.

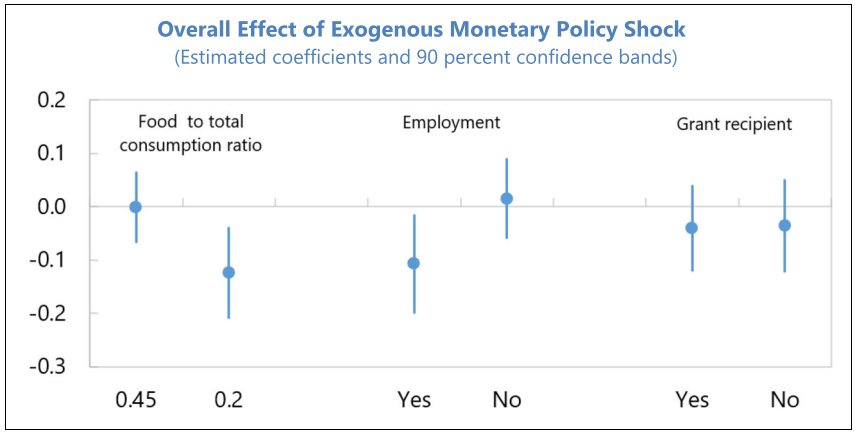

FIGURE 2 Overall effect of exogenous monetary policy shock (estimated coefficients and 90% confidence bands). *Note*: This figure plots results from models 3–5 in Table 6. *Source*: Author's calculations. [Color figure can be viewed at wileyonlinelibrary.com]

- When the interaction term between *mps* and the food to total consumption ratio is introduced, the overall effect of *mps* for those with a relatively high food consumption ratio is very low—for instance, the impact of *mps* is zero for those with a food consumption ratio of 0.45, corresponding to the lower end of consumption deciles in wave 5 (Figure 2). By contrast, the overall effect of *mps* is relatively large and negative for those with a low food consumption ratio—for those with a food consumption ratio of 0.2, corresponding to the higher end of consumption deciles in wave 5, the overall impact of exogenous monetary policy tightening is −0.12. This implies that a one-unit (one standard deviation) *mps* increase leads to a 12% (4%) reduction in per-capita household real consumption (Table 6, model 3).

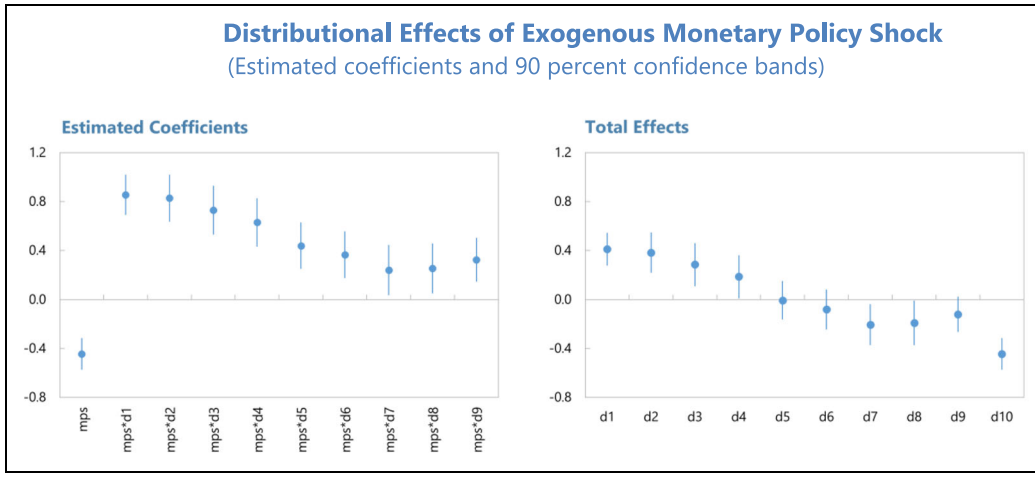

FIGURE 3 Distributional effects of exogenous monetary policy shock (estimated coefficients and 90% confidence bands). *Note*: Two panels plot results from model 6 in Table 6. Left panel plots coefficients on exogenous monetary policy shock (*mps*) and consumption deciles dummies 1–9 (*d1–d9*). Right panel plots the total effects, that is, *mps* + *mps* * *d1*, …, *mps* + *mps* * *d9* and *mps*. *Source*: Author's calculations. [Color figure can be viewed at wileyonlinelibrary.com]

- When the interaction term between *mps* and the employment dummy is introduced, the overall effect of exogenous monetary policy tightening for the employed is −0.11. This implies a one-unit (one standard deviation) *mps* increase leads to a 11% (3.5%) reduction in per-capita household real consumption (Figure 2). *mps* affects the consumption of the unemployed very little (Table 6, model 4).
- The interaction term between *mps* and the grant dummy does not generate statistically significant effects (Figure 2 and model 5 in Table 6).

Results from a fixed-effects model with consumption decile dummies suggest that exogenous monetary policy tightening exerts less negative or even positive effects on individuals on the lower end of the consumption distribution (Table 6, model 6). Figure 3 plots estimated coefficients on *mps* and its interaction terms with consumption deciles (left panel) and the sum of the two, that is, overall effects of the exogenous monetary policy shock (right panel).[23] Estimated coefficients on interaction terms are statistically significant and take larger values for lower consumption deciles (left panel). Therefore, the overall effect on the right panel is the largest for the first two deciles, where one unit (standard deviation) increase in *mps* leads to a 40% (13%) increase in consumption. The overall effect moderates to 0.3 for the third decile, 0.2 for the fourth decile and zero for the 5–6 deciles. The overall effect turns negative, to –0.2 for the 7–8th deciles and −0.45 for the 10th decile. The overall effect for the 9th decile is not statistically different from zero. The earlier discussions and estimated results suggest that the real consumption of those on the lower end of the consumption distribution would increase, benefitting from lower and more stable inflation, and being less negatively affected through lower labour income, weaker asset price performance and higher debt service cost.

Other control variables are important determinants of consumption (Table 6). A 1% increase in real GDP leads to a 1.5–2% increase in per-capita household real consumption. Higher educational attainment helps lift consumption—those with primary and secondary education tend to consume around

[23]Stata command *lincom* is used to estimate the overall effects and confidence intervals.

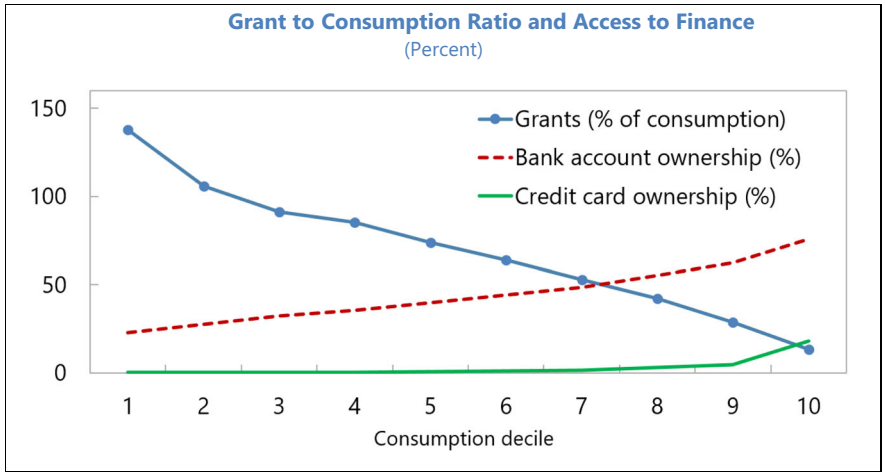

FIGURE 4 Grant to consumption ratio and access to finance (per cent). [Color figure can be viewed at wileyonlinelibrary.com]

20% and 10% less than those with tertiary education, respectively. The coefficient on the no education dummy is not statistically significant. The coefficient on the employment dummy is positive but small (suggesting that the employed consume around 5% more than the unemployed) potentially as some of the effect is absorbed by other individual characteristics and time invariant fixed effects. The grant dummy does not yield significant coefficients.

5.2 | Robustness Check 1: Different variables to capture monetary policy transmission

The robustness of the baseline model is checked with different variables that could capture potential channels of monetary policy transmission (Figure 4). First, a dummy variable capturing grant receipt is replaced by the ratio of the amount of grants received to total consumption. The ratio falls from above 1 for lower consumption deciles to 0.6–0.8 for the middle deciles and further to around 0.2 for the highest consumption decile. Second, bank account and credit card ownership dummies are introduced. Both increase with consumption level, even though bank account ownership is more important throughout.[24] Finally, consumption decile dummies are used for the 2nd through 10th deciles (instead of the 1st through 9th deciles in the baseline model).

Several observations emerge from the models (Table 7).[25] First, the total effect of *mps* is weaker for those individuals more reliant on social grants (and implicitly less reliant on labour income). The total effect of *mps* is −0.11 for those with the grant to consumption ratio of 0.25, corresponding roughly to the 8th consumption decile (model 7). The estimate is zero for those with the ratio of 0.9, corresponding to the 3rd consumption decile. Second, credit card ownership emerges as an important monetary policy transmission channel likely though debt service cost. The total effect of *mps* is around −0.45 for credit card owners, whereas it is zero for those without a credit card. Bank account ownership does not come out as an important monetary policy transmission channel, probably because bank accounts among a segment of the population are mainly used for receiving social grants rather than as a basis for financial services. Finally, the total effect of *mps* remains broadly unchanged when consumption decile dummies are used for the 2nd through 10th (instead of the 1st through 9th). Note that, in all cases, the lagged dependent

[24]The distribution of storecard ownership is qualitatively similar to that of credit card ownership and bank account ownership, rising with income level.

[25]Each model is estimated with and without the lagged dependent variable.

TABLE 7 Determinants of per-capita household real consumption in South Africa: Extension 1—Additional channels of monetary policy transmission (estimated coefficients).

		7	8	11	12	13	14	9	10
				Access to finance					
Model #		**Grant to consumption**		**Bank account**		**Credit card**		**Different decile dummies**	
Macro									
Real GDP (log)	L0.	2.668***	2.823***	1.841***	1.923***	1.932***	2.018***	1.750***	1.832***
Exogenous monetary policy shock (*mps*)	L1.	−0.146**	−0.177***	0.000	−0.012	−0.02	−0.033	0.389***	0.371***
Micro									
Per-capita household real cons. (log)	L1.	…	−0.188***	…	−0.076*	…	−0.077*	…	−0.074*
Education dummy									
No education	L1.	−0.153	−0.154*	−0.123	−0.123	−0.133*	−0.133*	−0.107	−0.107
Lower primary	L1.	−0.228***	−0.225***	−0.264***	−0.263***	−0.271***	−0.271***	−0.243***	−0.243***
Upper primary	L1.	−0.202***	−0.201***	−0.212***	−0.213***	−0.221***	−0.221***	−0.209***	−0.210***
Secondary	L1.	−0.112**	−0.114***	−0.085***	−0.086***	−0.088***	−0.090***	−0.101***	−0.102***
Tertiary	L1.	…	…	…	…	…	…	…	…
Food share of total consumption ratio	L1.	0.166***	0.149***	0.253***	0.245***	0.251***	0.243***	0.250***	0.243***
Employment dummy	L1.	0.046**	0.049**	0.042***	0.043***	0.049***	0.050***	0.048***	0.049***
Grant to consumption ratio	L1.	0.032*	0.027	…	…	…	…	…	…
Bank account	L1.	…	…	0.039**	0.040**	…	…	…	…
Credit card	L1.	…	…	…	…	−0.031	−0.030	…	…
Interaction with *mps*									
mps * grant to consumption ratio	L1.	0.088*	0.088*	…	…	…	…	…	…
mps * bank account	L1.	…	…	−0.088	−0.092	…	…	…	…
mps * credit card	L1.	…	…	…	…	−0.420***	−0.432***	…	…
mps * consumption decile 1	L1.	…	…	…	…	…	…	…	…
mps * consumption decile 2	L1.	…	…	…	…	…	…	−0.009	−0.003
mps * consumption decile 3	L1.	…	…	…	…	…	…	−0.110	−0.104

(Continues)

TABLE 7 (Continued)

		7	8	11	12	13	14	9	10
				Access to finance					
Model #		**Grant to consumption**		**Bank account**		**Credit card**		**Different decile dummies**	
mps * consumption decile 4	L1.	…	…	…	…	…	…	−0.204	−0.196
mps * consumption decile 5	L1.	…	…	…	…	…	…	−0.399***	−0.393***
mps * consumption decile 6	L1.	…	…	…	…	…	…	−0.471***	−0.465***
mps * consumption decile 7	L1.	…	…	…	…	…	…	−0.591***	−0.584***
mps * consumption decile 8	L1.	…	…	…	…	…	…	−0.579***	−0.574***
mps * consumption decile 9	L1.	…	…	…	…	…	…	−0.515***	−0.512***
mps * consumption decile 10	L1.	…	…	…	…	…	…	−0.831***	−0.827***
Other controls									
Location	L1.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Location * real GDP	L1.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Consumption decile	L1.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual effects	…	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# of Obs.		17,998	17,998	26,876	26,876	26,876	26,876	26,876	26,876
Cross section (N)		4500	4500	6719	6719	6719	6719	6719	6719
Time series (T)		4	4	4	4	4	4	4	4
Adjusted R^2		0.120	0.121	0.116	0.117	0.117	0.117	0.126	0.127
Memo item:									
Total effect of *mps*									
Grant to consumption = 0.9	…	−0.067	−0.098**	…	…	…	…	…	…
Grant to consumption = 0.25	…	−0.111**	−0.155***	…	…	…	…	…	…
Bank account	…	…	…	−0.087	−0.103*	…	…	…	…
Credit card	…	…	…	…	…	−0.443***	−0.469***	…	…
Consumption decile 1	…	…	…	…	…	…	…	0.389***	0.371***
Consumption decile 2	…	…	…	…	…	…	…	0.381***	0.368***
Consumption decile 3	…	…	…	…	…	…	…	0.28***	0.267***

TABLE 7 (Continued)

	7	8	11	12	13	14	9	10
			Access to finance					
Model #	**Grant to consumption**		**Bank account**		**Credit card**		**Different decile dummies**	
Consumption decile 4	…	…	…	…	…	…	0.185*	0.175*
Consumption decile 5	…	…	…	…	…	…	−0.009	−0.022
Consumption decile 6	…	…	…	…	…	…	−0.081	−0.094
Consumption decile 7	…	…	…	…	…	…	−0.201**	−0.213**
Consumption decile 8	…	…	…	…	…	…	−0.189*	−0.203*
Consumption decile 9	…	…	…	…	…	…	−0.126	−0.141
Consumption decile 10	…	…	…	…	…	…	−0.443***	−0.458***

Note: This table reports estimated results from Equation (3). Dependent variable is per-capita household real consumption level in log. L0 and L1 signify contemporaneous value and one period lag. *Memo item* reports the total effects of *mps* calculated using Stata command *lincom*.

Abbreviation: GDP, gross domestic product.

***When statistically significant at the 1% level.

**When statistically significant at the 5% level.

*When statistically significant at the 10% level.

Sources: Haver, NIDS and author's calculations.

variable, when included, is statistically significant even though mostly at the 10% level, indicating that these models either suffer from an omitted variable or Nickell bias, making the results rather suggestive.

5.3 | Robustness Check 2: Observed policy rate

Results from models using the real policy rate (*rpol*) are somewhat weaker (Table 8). The policy rate (period average) is deflated by 1 year ahead inflation expectations from the Bureau of Economic Research South Africa and detrended by taking first differences. The overall effects of *rpol* are statistically insignificant with respect to the food to consumption ratio, the employment dummy and the grant recipient dummy. When consumption deciles dummies are used, the coefficient on *rpol* is around −0.2, and the coefficients on consumption deciles (all statistically significant) start from 0.54 for the lowest consumption decile and decline in size to around 0.1 for the 5th decile and hover around 0.15–0.2 for the 6–10th consumption deciles. However, the overall effects of *rpol* are statistically significant at the 1% level for the lowest, 5th and highest consumption deciles only. The coefficients on other control variables are similar to those from the earlier models using *mps*.

However, overall effects of monetary policy tightening are larger than before in a few cases, even though the magnitude of *mps* and *rpol* may not be comparable. The average and standard deviation of *rpol* is −0.3 and 1.0 for 2008–2017. Thus, a one standard deviation increase in *rpol* leads to a 34% increase in per-capital household real consumption for the first consumption decile. This is larger than the 13% obtained earlier due to a one standard deviation move in *mps*. The impact for the 10th consumption decile, of around 20% reduction in consumption, is also larger than the 15% reduction due to a one standard deviation move in *mps*.

6 | SUMMARY AND DISCUSSION

The main finding of this paper suggests that monetary policy to safeguard low and stable inflation tends to have distributional effects in favour of the poor and contributes to the broader economic strategy to alleviate poverty and inequality in South Africa. This paper contributes to our understanding of the role of individual characteristics in the transmission mechanism of monetary policy in the context of South Africa. It adds to the literature of monetary policy and inequality in South Africa by explicitly considering individuals without work and those that rely largely on grants for income. This is an important issue in South Africa where poverty and inequality are unacceptably high, even as distributional considerations are not part of the SARB's mandate.

Exogenous monetary policy tightening exerts a modest and less unfavourable effect, or even a relatively large favourable effect, on the consumption of individuals at lower ends of the consumption distribution. Individuals with lower consumption levels tend to rely more on government transfers, thus less on labour income, and appear to benefit mainly from lower inflation. The consumption of individuals with higher consumption levels is more likely to be negatively affected through lower labour income, weaker asset price performance and higher debt service cost. Related studies using South Africa data reply on observed indicators to capture monetary policy action (Aye et al., 2020) or focus on wage inequality, excluding the unemployed or those relying largely on grants for income (Merrino, 2021).

The results should be interpreted with several limitations in mind. The results may reflect an unanticipated reduction in inflation (due an unanticipated increase in the policy rate), rather than an unanticipated increase in the policy rate. The paper is unable to disentangle these two aspects and investigates them collectively. Also, the paper's analysis is largely static, in the sense that it does not consider the dynamic effects of individuals transitioning to higher income bands as a result of factors such as economic stability or economic growth.

TABLE 8 Determinants of per-capita household real consumption in South Africa: Extension 2—Real policy rate (estimated coefficients).

Model #		11	12	13	14	15
Macro						
Real GDP	L0.	1.588***	1.588***	1.587***	1.577***	1.624***
Real policy rate (*rpol*)	L1.	0.003	−0.052	0.011	−0.028	−0.195***
Micro						
Education dummy						
No education	L1.	−0.124	−0.127	−0.124	−0.122	−0.122
Lower primary	L1.	−0.264***	−0.269***	−0.263***	−0.263***	−0.256***
Upper primary	L1.	−0.215***	−0.219***	−0.214***	−0.215***	−0.214***
Secondary	L1.	−0.076**	−0.081***	−0.077**	−0.077**	−0.098***
Tertiary	L1.	…	…	…	…	…
Food share of total cons.	L1.	0.385***	0.436***	0.385***	0.386***	0.251***
Employment dummy	L1.	0.038**	0.038**	0.035**	0.038**	0.045***
Grant recipient dummy	L1.	−0.018	−0.018	−0.019	−0.004	−0.023
Interaction with *rpol*						
rpol * Food share	L1.	…	0.180**	…	…	…
rpol * Employment dummy	L1.	…	…	−0.014	…	…
rpol * Grant recipient dummy	L1.	…	…	…	0.057**	…
rpol * consumption decile 1	L1.	…	…	…	…	0.536***
rpol * consumption decile 2	L1.	…	…	…	…	0.275***
rpol * consumption decile 3	L1.	…	…	…	…	0.232***
rpol * consumption decile 4	L1.	…	…	…	…	0.223***
rpol * consumption decile 5	L1.	…	…	…	…	0.103*
rpol * consumption decile 6	L1.	…	…	…	…	0.146**
rpol * consumption decile 7	L1.	…	…	…	…	0.167***
rpol * consumption decile 8	L1.	…	…	…	…	0.223***
rpol * consumption decile 9	L1.	…	…	…	…	0.182***
Other controls						
Location	L1.	Yes	Yes	Yes	Yes	Yes
Location * real GDP	L1.	Yes	Yes	Yes	Yes	Yes
Consumption decile	L1.	No	No	No	No	Yes
Individual effects	…	Yes	Yes	Yes	Yes	Yes

(Continues)

TABLE 8 (Continued)

Model #			11	12	13	14	15
# of Obs.			26,876	26,876	26,876	26,876	26,876
Cross section (*N*)			6719	6719	6719	6719	6719
Time series (*T*)			4	4	4	4	4
Adjusted R^2			0.108	0.109	0.108	0.109	0.124
Memo item:							
Total effect of *rpol*							
Food share = 0.45	…	…	…	0.028	…	…	…
Food share = 0.2	…	…	…	−0.017	…	…	…
Employment dummy	…	…	…	…	−0.003	…	…
Grant recipient dummy	…	…	…	…	…	0.029	…
Consumption decile 1	…	…	…	…	…	…	0.34***
Consumption decile 2	…	…	…	…	…	…	0.08
Consumption decile 3	…	…	…	…	…	…	0.036
Consumption decile 4	…	…	…	…	…	…	0.027
Consumption decile 5	…	…	…	…	…	…	−0.093*
Consumption decile 6	…	…	…	…	…	…	−0.049
Consumption decile 7	…	…	…	…	…	…	−0.028
Consumption decile 8	…	…	…	…	…	…	0.028
Consumption decile 9	…	…	…	…	…	…	−0.014
Consumption decile 10	…	…	…	…	…	…	−0.195***

Note: This table reports estimated results from Equation (3). Dependent variable is per-capita household real consumption level in log. L0 and L1 signify contemporaneous value and one period lag. *Memo item* reports the total effects of *mps* calculated using Stat command *lincom*.
Abbreviation: GDP, gross domestic product.
***When statistically significant at the 1% level.
**When statistically significant at the 5% level.
*When statistically significant at the 10% level.
Sources: Haver, NIDS and author's calculations.

Looking ahead, additional waves of NIDS will help solidify the paper's findings. As new survey vintages become available, different approaches could be considered, such as the local projection approach to assess longer-term dynamics in the data.

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APPENDIX A

TABLE A1 Determinants of per-capita household real consumption in South Africa: Exogenous monetary policy shock, with lagged dependent variable (estimated coefficients).

Model #		16	17	18	19	20	21
Macro							
Real GDP (log)	L0.	1.562***	2.009***	2.032***	1.983***	2.009***	1.823***
Exogenous monetary policy shock (*mps*)	L1.	…	−0.053	−0.236***	0.000	−0.053	−0.457***
Micro							
Per-capita household real cons. (log)	L1.	−0.055	−0.068	−0.07	−0.07	−0.068	−0.069
Education dummy							
No education	L1.	−0.130*	−0.132*	−0.134*	−0.125	−0.132*	−0.105
Lower primary	L1.	−0.273***	−0.275***	−0.276***	−0.266***	−0.275***	−0.244***
Upper primary	L1.	−0.223***	−0.226***	−0.229***	−0.220***	−0.226***	−0.212***
Secondary	L1.	−0.091***	−0.091***	−0.096***	−0.093***	−0.091***	−0.105***
Tertiary	L1.	…	…	…	…	…	…
Food share of total consumption	L1.	0.242***	0.244***	0.253***	0.244***	0.244***	0.243***
Employment dummy	L1.	0.051***	0.050***	0.051***	0.045***	0.050***	0.049***
Grant recipient dummy	L1.	−0.02	−0.022	−0.022	−0.021	−0.022	−0.022
Interaction with *mps*							
mps * Food share	L1.	…	…	0.488***	…	…	…
mps * Employment dummy	L1.	…	…	…	−0.123**	…	…
mps * Grant recipient dummy	L1.	…	…	…	…	0.001	…
mps * consumption decile 1	L1.	…	…	…	…	…	0.828***
mps * consumption decile 2	L1.	…	…	…	…	…	0.825***
mps * consumption decile 3	L1.	…	…	…	…	…	0.725***
mps * consumption decile 4	L1.	…	…	…	…	…	0.633***
mps * consumption decile 5	L1.	…	…	…	…	…	0.436***
mps * consumption decile 6	L1.	…	…	…	…	…	0.364***
mps * consumption decile 7	L1.	…	…	…	…	…	0.244**
mps * consumption decile 8	L1.	…	…	…	…	…	0.255**
mps * consumption decile 9	L1.	…	…	…	…	…	0.317***
mps * consumption decile 10	L1.	…	…	…	…	…	…
Other controls							
Location	L1.	Yes	Yes	Yes	Yes	Yes	Yes
Location * real GDP	L1.	Yes	Yes	Yes	Yes	Yes	Yes
Consumption decile	L1.	Yes	Yes	Yes	Yes	Yes	Yes
Individual effects	…	Yes	Yes	Yes	Yes	Yes	Yes

(Continues)

TABLE A1 (Continued)

Model #	16	17	18	19	20	21
# of Obs.	26,876	26,876	26,876	26,876	26,876	26,876
Cross section (*N*)	6719	6719	6719	6719	6719	6719
Time series (*T*)	4	4	4	4	4	4
Adjusted R^2	0.115	0.116	0.117	0.116	0.116	0.127

Note: This table reports estimated results from Equation (3). Dependent variable is per-capita household real consumption level in log. L0 and L1 signify contemporaneous value and one period lag. *Memo item* reports the total effects of *rpol* are calculated using Stat command *lincom*.
Abbreviation: GDP, gross domestic product.
***When statistically significant at the 1% level.
**When statistically significant at the 5% level.
*When statistically significant at the 10% level.
Sources: Haver, NIDS and author's calculations.