Does household net financial wealth explain the asymmetric reaction of household consumption to monetary policy shocks in South Africa?

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Abstract

Ndou et al (2019) showed that, in absolute terms, the decline in household consumption due to the monetary policy tightening shocks exceeds the increase in household consumption, following the monetary policy loosening shocks of the same magnitude. This paper applies a counterfactual vector autoregression (VAR) approach to determine whether the household net financial wealth explains the asymmetric reaction of household consumption to monetary policy shocks in South Africa. I find that the percentage of fluctuations in the consumption changes attributed to the wealth changes is much bigger to the monetary policy tightening shocks compared to the loosening shocks. In addition, I find that the household net financial wealth channel propagates the changes in the household consumption more to the monetary policy tightening shocks than to the monetary policy loosening shocks. I reach the same conclusion using the household net worth. This finding of asymmetric household consumption reaction implies that the monetary policy tightening stance will slow down economic growth more than the loosening shock can stimulate it.

JEL Classification: E21, E52, E58

Keywords: Household net financial wealth, consumption, monetary policy, counterfactual VAR model

1 Introduction

Ndou et al (2019) showed that the South African household consumption responds asymmetrically to monetary policy shocks. They find that, in absolute terms, the decline in household consumption due to the monetary policy tightening shock exceeds the increase in household consumption, following a monetary policy loosening shock of the same magnitude.[1] However, these authors did not

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[1] In addition, these authors showed that the lending rates adjust faster to the monetary policy tightening than to the monetary policy loosening shocks.

examine a possible factor amongst household debt, household disposable income and household net financial wealth that can explain the asymmetric reaction of household consumption to monetary policy shocks. The wealth-consumption channel is important because changes in the policy rates are transmitted via asset prices to consumer spending when using the household balance sheet data. I therefore examine whether the household net financial wealth channel can explain the asymmetric reaction of household consumption to monetary policy shocks in South Africa. This follows Manou and Palaios (2019) as well as MacDonald et al (2011) postulations that the interest rate changes may affect asset values inversely, and there may be asymmetric effects on consumption, at least in the short-term to medium-term. This has implications for the forecasting of inflation, consumption and economic growth dynamics during the policy loosening and tightening phases. This has implications for the contribution of consumption to economic growth.

The role of the household net financial wealth channel in explaining the asymmetric reaction of household consumption to monetary policy shocks has not been investigated in South Africa. For instance, Ncube and Ndou (2013) quantified the overall importance of housing wealth and housing market-related credit imperfections in the South African monetary transmission mechanism. The results were disaggregated according to four-house sizes. The results at the peak of the interest rate effects on consumption suggest that the proportion of consumption declines due to the combined effect of house wealth and credit changes, following monetary policy tightening, is 9.8 % in all-size, 3.7 % in small-size, 4.7 % in medium-size and 5.3% in large-size houses. These authors did not look at the effects of the monetary policy loosening shocks and the accompanying role of the wealth channel.[2] Thus, these authors did not examine whether household consumption reacts asymmetrically to the monetary policy shocks. In addition, Aron and Muellbauer (2013) examined the effects of liquidity and housing wealth on household consumption but did not examine the role of wealth in transmitting the monetary policy shocks to household consumption in South Africa. In the US, Siklos (2005) and Ludvigson et al (2002) found that the wealth channel plays a minor role in the transmission of monetary policy shocks to consumption. They indicate that a substantial portion of the real effect of a monetary policy shock to consumption is attributable to other channels than wealth.

In this paper, I use household net financial wealth and household net worth to capture the effects of the household balance sheet channel on consumption changes, following monetary policy shocks. The household net worth is used for robustness testing of the findings based on the household net financial wealth. The household net financial wealth is the difference between the household financial assets and household liabilities. Household net worth is the difference between the sum of the household financial and nonfinancial assets and household liabilities. These are comprehensive measures of the household balance

[2] Housing is an important form of wealth and its changes can have aggregate wealth effects and housing is a form of collateral for loans to households, some of which could be used for accessing credit (Manou and Palaios, 2019).

sheet compared to house prices used in Ncube and Ndou (2013). The main contribution of this paper is quantifying the role of the household balance sheet (household net financial assets and household net worth) in transmitting monetary policy shocks to household consumption using the counterfactual VAR approach and this has not been done in South Africa. I apply counterfactual VAR approach, use data in the inflation targeting period, and include variables such as disposable income and household net financial wealth which were not used in studies mentioned above. I quantify the role of the wealth channel in consumption, following monetary policy changes in two ways. First, I show the role of the wealth channel on consumption changes by the gap between the consumption impulse responses to policy shocks when this channel is operational and when it is shut off. Second, I show the role of the wealth channel on fluctuations in consumption changes using forecast error decomposition by the gap between consumption movements to policy shocks when this channel is endogenous in the model and when it is exogenous.

I show the influence of household net financial wealth and also report that due to household net worth for robustness testing. I find that the household net financial wealth channel propagates the changes in household consumption more to monetary policy tightening shocks than to monetary policy loosening shocks. I find that the percentage of fluctuations in consumption changes attributed to the wealth channel is much bigger to monetary policy tightening shocks compared to the loosening shocks. I reach same conclusions using household net worth. This indicates that the wealth channel makes the household consumption growth to respond asymmetrically to monetary policy changes. This finding is robust to different model specifications. This finding of asymmetric household consumption reaction implies that monetary policy tightening will slow down economic growth more than loosening shock can stimulate it. The bottom line is that the Household balance sheet matters.

2 Theory

Theoretical models indicate the transmission of monetary policy changes to household consumption can happen in two ways as shown in Figure 1. The one-stage process depicted by link 3 in Figure 1 suggests that monetary policy changes can affect household consumption. This follows the depiction in the IS-LM model which suggests that as interest rates rise, consumption spending declines, indicating an inverse relationship.[3] This is supported by evidence in the literature, which indicates that consumption declines to contractionary monetary policy shocks (Ncube and Ndou, 2013; Siklos, 2005; Ludvigson et al, 2002; Elbourne 2008). Link 2 in Figure 1 connects household wealth to household consumption. This arises from the predictions of the life-cycle theory of consumption which emphasizes that household wealth influences the planning for life-time consumption. Wealth is measured in different forms and purportedly impacts consumption in a symmetrical manner; however, recent empirical

[3] Durable consumption is sensitive to interest rate changes.

evidence indicates that wealth can impact consumption asymmetrically.

A two-stage transmission mechanism (see links 1 and 2) in Figure 1 suggests that monetary policy shocks will impact household net financial wealth, which in turn impacts consumption (see link 2 in Figure 1). This is similar to the link shown in Mishkin (2008), in which the interest rate changes first impact the stock prices, then financial wealth, thereafter, impact consumption. This happens when lower interest rates, through raising the market value of financial assets[4], increases financial wealth, which provides the liquidity for consumption spending (Manou and Palaios).[5] However, according to Duesenberry (1949), the influence of wealth on consumption can be asymmetric. Duesenberry suggests that the consumption function is steeper for the increases in wealth but flatter for wealth reduction. This is known as the *"Ratchet effects"* in consumption. The Ratchet effect in consumption, suggests that increases in wealth may lead to higher consumption while a decline in wealth may lead to smaller reduction in consumption in absolute terms.[6] This analysis examines whether the household net financial wealth channel explains the asymmetric reaction of household consumption to monetary policy shocks.

3 Does household net financial wealth channel affects household consumption growth asymmetrically?

This section determines the extent to which the household consumption growth responds to increases and decreases in the household net financial wealth, using quarterly (Q) data from 2000Q1 to 2018Q2. All the data used in this analysis are obtained from the South African Reserve Bank. I estimate various linear regression models to test the robustness of the findings. Two dummy variables for quarterly changes in household net financial wealth ($Wealth\_dummy_t$) are created. The positive wealth dummy equals to the positive values of the household net financial wealth growth and zero otherwise. The negative wealth dummy equals to the negative values of household net financial wealth growth and zero otherwise. The dependent variable in the linear regression models is the household consumption growth. The changes refer to quarter-on-quarter growth rates. The impacts are shown in Figure 2 and these are based on the same magnitude of the positive and negative household net financial wealth change. In Figure 2, in absolute terms, the negative household net financial wealth changes have big effects on household consumption compared to positive changes. These results

[4] This includes market price of shares and bonds

[5] Interest rate shocks can affect consumption through the wealth channel when the lower interest rates raise to higher house prices thereby raising the asset wealth of existing house owners. Under certain circumstances households can convert capital gains from property price appreciations into liquid spending power probable through mortgage equity withdrawal (Manou and Palaios, 2019)

[6] Manou and Palaios (2019) suggests this is because consumers may take use past savings or other sources of credit to mitigate the adverse impact of wealth reduction on consumption.

are robust to different model specifications. This is consistent with findings in Manou and Palaios (2019) in which they find that negative changes in household net financial wealth dominated the effects of positive wealth changes on consumption changes.

For further robustness analysis, I estimate equation (1) to get the impulses responses based on 10 000 bootstrap draws. The two-household net financial wealth dummy variables are included in the model separately. The other variables included in the model are household consumption growth ($Consumption\_g_{t-i}$), household debt growth ($debt\_g_t$), disposable income growth ($Disposble\,income\_g_t$) and the recession dummy. The recession dummy equals to one for the recession in 2009Q1-2009Q3 and 2018Q1-2018Q2 and zero otherwise. A second model (Model 2) excludes household debt growth. To enable the comparison of the results, household consumption responses to positive household wealth shocks are inverted.

$$Consumption\_g_t = constant + \sum_{i=1}^{4} Consumption\_g_{t-i} + \sum_{i=0}^{2} Wealth\_dummy_{t=i} \tag{1}$$

$$+ \sum_{i=0}^{4} Disposble\,income\_g_{t-i} + \sum_{i=0}^{4} debt\_g_{t-i} + \sum_{i=0}^{4} Recession\_dummy_{t-i} + \epsilon_t$$

In Figure 3, the household consumption growth responds more to a negative household net financial wealth shock compared to a positive household wealth shock of the same magnitude. This indicates the asymmetric reactions of household consumption to wealth changes.

4 The baseline counterfactual VAR model

This analysis examines the role of household net financial wealth growth in transmitting monetary policy shocks to household consumption growth using counterfactual VAR models. Counterfactual VAR models have been used in Ncube and Ndou (2013), Giuliodori's (2005), Siklos (2005), Ludvigson et al (2002), Elbourne (2008), Ndou et al (2017) , Ndou and Gumata (2017), Ndou et al (2019) and Ndou and Mokoena (2019). The counterfactual scenario examines, what would be the effect of monetary policy shocks on household consumption when the wealth channel had not responded to the monetary policy tightening shocks. In the counterfactual scenario, I set to zero the coefficients of the contemporaneous and lagged wealth coefficient in the consumption equation in the estimated VAR model.[7]

The baseline counterfactual VAR model includes the following endogenous variables: the policy rate dummy, the household net financial wealth growth and the household consumption growth. These are variables from Figure 1. The monetary policy tool is captured by the repo rate. Two policy dummy

[7] Giuliodori (2005) measures the importance of house prices in the transmission mechanism by simulating a model containing consumption when it does not respond directly to house prices through setting the coefficients of contemporaneous and lagged house prices in the consumption equation are set to zero.

variables are created to capture the policy rate changes. The policy rate tightening dummy takes the positive changes in the policy rate and zero otherwise. The policy rate loosening dummy takes the negative changes in the policy rate and zero otherwise. The dummy variables enter separately in the model. The variables in the baseline model are motivated by the theory as depicted in Figure 1. That is, monetary policy shocks impact financial wealth and then consumption. This suggests that consumption reacts contemporaneously to monetary policy changes and financial wealth. But monetary policy reacts with a lag to both financial wealth and consumption. The results are robust to the different ordering of the variables in the model. The models are estimated using two lags. The model includes a constant and a recession dummy as exogenous variable. The dummy equals to one for the recession in 2009Q1-Q3 and 2018Q1-Q2 and zero otherwise. The responses refer to a one positive standard deviation shock. I distinguish between actual and counterfactual responses. I refer to the reaction of consumption in the baseline model as *actual* when the wealth channel is included. In addition, I refer to the reaction when the wealth channel is shut off as *counterfactual*. The size of propagation in consumption due to household net financial wealth is calculated using equation (1).

The gap measuring the influence of wealth channel on consumption changes (ΔC) to policy shock is given by:

$$\Delta C = (Actual\, impulse\, response - Counter factual\, impulse\, response) \quad (2)$$

The proportion of consumption changes ($\%\Delta C$) attributed to the wealth channel to policy shock is given by

$$\%\Delta C = \frac{(Actual\, impulse\, response - Counter factual\, impulse)}{Actual\, Impulse\, response} * 100 \quad (3)$$
$$= \frac{Gap}{Actual\, impulse\, response} * 100$$

However, the percentage of consumption changes ($\%\Delta C$) attributed to the wealth channel to policy shock using technique in section 4.3.2 is calculated as:

$$\%\Delta C = \frac{(Impulse\, response\, wealth\, endogenous - Impulse\, response\, wealth\, exogenous)}{Impulse\, response\, wealth\, endogenous} * 100 \quad (4)$$

The change of fluctuations in the consumption growth (F_C) attributed to the wealth channel following policy shock using technique in section 4.3.2 is calculated as:

$$F\_C = (Fluctuations\, when\, wealth\, is\, endogenous - Fluctuations\, when\, wealth\, is\, exogenous) \quad (5)$$

The percentage change of fluctuations in consumption growth ($\%F\_\Delta C$) attributed to wealth channel following policy shock using technique in section

4.3.2 is calculated by

$$\%F\_\Delta C = \frac{(Fluctuations\,when\ wealth\,is\,endogenous - Fluctuations\,when\ wealth\,is\,exogenous)}{Fluctuations\,when\,wealth\,is\,endogenous} * 100 \tag{6}$$

4.1 The effects of monetary policy tightening shock and the role of household net financial wealth

Figures 4a) and b) show that the monetary policy tightening shock lowers household consumption, irrespective of whether wealth is included or not. Figures 4c) and d) show the adjustment happens via both household liabilities and financial assets which are components of the net wealth channel. I use equation (1) to calculate the gap that can be attributed to the wealth channel in transmitting the monetary policy shocks the consumption. The negative gap indicates that household net financial wealth, the net worth, the liabilities and assets channels exacerbate the decline in the household consumption spending, following monetary policy tightening shock. I use equation (2) to calculate the consumption changes attributed to the wealth channel following a monetary policy tightening shock. Figure 4b) shows that the monetary policy tightening shocks lower household consumption and this is accentuated by the household net financial wealth channel.

I show the percentage change in consumption calculated using equation (2) in Table 1. I calculate the percentage that is attributed to the household net financial wealth, the household net worth, the household liabilities and the household financial assets channels in consumption changes to the monetary policy tightening shocks. The repo rate has not been decomposed into positive and negative changes. This is preliminary evidence indicating there are changes in consumption which can be attributed to the wealth channel and the components of the household balance sheets, following the monetary policy tightening shocks.

4.2 Separating effects of monetary policy tightening and loosening shocks on household consumption

I now show the separate effects of the monetary policy tightening and loosening shocks on household consumption. The impulses responses in Figures 5a) and c) show that household consumption reacts more to the monetary policy tightening shocks compared to the monetary policy loosening shocks. This suggests that household consumption responds asymmetrically to the monetary policy shocks. Figures 5b) an d) show the change in consumption calculated using equation (1). The household net financial wealth and the net worth channels amplify the responses of household consumption more to the monetary policy tightening shocks compared to the monetary policy loosening shocks.

I show the percentage change in consumption calculated using equation (2) in Table 2. I calculate the percentage that is attributed to the wealth channel

in consumption changes to both monetary policy shocks. The percentage attributed to the wealth channel is higher under the monetary policy tightening shock compared to that due to the loosening shock. I conclude that the asymmetric reaction of household consumption to monetary policy shocks could be explained by the role of household net financial wealth. A similar pattern is observed using the household net worth, indicating the finding is robust to the net wealth measure used in the analysis.

4.3 Robustness analysis

4.3.1 Adding more variables to the baseline VAR model

I estimate a four-variable counterfactual VAR model to test the robustness of the preceding findings. The model includes the following endogenous variables: the policy rate dummy, the household net financial wealth growth, the disposable income growth and the household consumption growth. This model differs from the baseline counterfactual VAR model due to the inclusion of the disposable income growth. The models include a constant and a recession dummy as exogenous variables.[8] The model is estimated using two lags and 10 000 Monte Carlo Draws. I test the robustness of the finding to using the household net worth growth rather the net financial wealth.

In Figures 6a) and c) the household consumption responds asymmetrically to the monetary policy shocks. Figures 6b) and d) show the change in consumption calculated using equation (1). The gap based on equation (1) attributed to the wealth channel is higher under the monetary policy tightening shock compared to that due to the loosening shock. The household net financial wealth channel propagates the changes in the household consumption more to the monetary policy tightening shocks than to monetary policy loosening shocks. A similar conclusion is reached when using the household net worth. This evidence indicates the household net financial and the net worth channels explain the asymmetries in the household consumption reaction to the monetary policy shocks. The results are robust to different ordering of the variables.

I use equation (2) to calculate the percentage change in consumption that is attributed to the two wealth channels due to the monetary policy tightening and loosening shocks in both models. In Table 3 the percentage of consumption changes attributed to the wealth channel overtime is higher under the monetary policy tightening shock compared to that due to the loosening shock. I conclude that the asymmetric reaction of household consumption to the monetary policy shocks is explained by the household net financial wealth. This finding is robust to using the household's net worth.

[8] The recession dummy equals to one for the recession in 2009Q1-2009Q3 and 2018Q1-2018Q2 and zero otherwise.

4.3.2 Assessment from the Exogenous-Endogenous VAR model

I assess the robustness of the finding of the asymmetric response of consumption to monetary policy shocks by applying an Endogenous-Exogenous VAR approach. This modelling technique involves estimating two VAR models. This modelling approach has been used in Morsink and Bayoumi (2003),Khundrakpam and Jain (2012), Ndou and Gumata (2017), Ndou and Mokoena (2019), Ndou et al (2019) and Ndou et al (2018). In this modelling approach, the household net financial wealth is exogenous in one VAR model, whereas it is endogenous in the other model.[9] In endogenous scenario, wealth is permitted to interact with other variables allowing feedback effects which are not permitted under the exogenous assumption. The gap between the two responses of the household consumption in this modelling approach captures the role of the household net financial wealth channel on consumption as given in equation (3). The first VAR model includes the following endogenous variables: the policy rate dummy, the disposable income growth, the household net financial wealth growth and the household consumption growth. Thus, the household net financial wealth growth is an endogenous variable in this model. The second VAR model includes the following endogenous variables: the policy rate dummy, the disposable income growth and the household consumption growth. The household net financial wealth and its lags are exogenous in the second VAR model. Both models are estimated using two lags and 10 000 Monte Carlo draws. The models also include the GDP-growth-recession dummy as an exogenous variable. The dummy equals to one in 2009Q1-2009Q1 and 2018Q1-2018Q2 and zero otherwise. When testing for the robustness of the results, I replace in the preceding models household net financial assets with household net worth.

4.3.2.1 Determining the size of the wealth channel from impulse responses in the Endogenous-Exogenous VAR model

The responses of the household consumption growth to the monetary policy tightening and loosening shocks based on Endogenous-Exogenous VAR model are shown in Figure 7. In Figures 7a) and c) the household consumption growth responds more to the monetary policy tightening shocks compared to the monetary policy loosening shocks. This indicates that household consumption reacts asymmetrically to the monetary policy loosening and tightening shocks. This is consistent with earlier findings from the counterfactual VAR model. The findings are robust to using two measures of household wealth.

I calculate the effect of the wealth channel in consumption using equation (3) as a difference between impulse responses in the endogenous model and the exogenous model given the same policy shock. Figures 7b) and d) show that large changes in the household consumption attributed to wealth channel are associated with the monetary policy tightening compared to the monetary policy loosening shocks.

I use equation (4) to calculate the percentage change in consumption that is attributed to the wealth channel due to both monetary policy shocks. In Table

[9] The VAR models are shown in the Appendix

5, the percentage attributed to the wealth channel is higher under the monetary policy tightening shock compared to that due to the loosening shock. Based on the differing percentages, I conclude that the asymmetric reaction of household consumption to monetary policy shocks is explained by the role of the household net financial wealth. In addition, this finding is robust to using household net worth.

4.3.2.2 Determining the influence of the wealth channel in consumption fluctuations from the variance decompositions in the Endogenous-Exogenous VAR model

I apply the forecast error variance decomposition (FEVD) technique to determine whether the sizes of the fluctuations in the household consumption growth due to the monetary policy tightening shocks differ to those induced by the monetary policy loosening shocks. This enables me to quantify the percentage of changes in the consumption fluctuations that are attributable to the wealth channel due to both shocks using equation (4). Figure 8a) shows the fluctuations in the household consumption captured via the variance decomposition approach. The fluctuations in the consumption changes are bigger to the monetary policy tightening shocks, when the wealth channel is endogenous than when it is exogenous in the model. The wealth channel effect is bigger when allowing for its feedback effects on consumption.

I capture the effect of the wealth channel in the fluctuations in the household consumption as a gap between the fluctuations in the endogenous and exogenous models to same policy shock using equation (4). Figure 8b) shows the gaps that capture the size of amplifications of consumption fluctuations by the household net financial wealth. The large consumption fluctuations are attributed to the wealth channel under the monetary policy tightening shock compared to that due to the loosening shock.

I use equation (5) to calculate the percentage changes in the consumption fluctuations that can be attributed to the wealth channel using information in Figure 8. In Table 5, the percentage of the fluctuations in the consumption changes attributed to the wealth changes is much bigger to the monetary policy tightening shocks compared to the loosening shocks. This is additional evidence from a different technique, indicating that the household net financial wealth explains the asymmetry in the consumption growth dynamics. The finding is robust to using household net worth.

5 Conclusions and policy implications

This paper explored whether household financial wealth explains the asymmetric response of consumption to monetary policy shocks in South Africa. This is motivated by Ndou et al (2019) findings which indicate that in absolute terms, the decline in household consumption due to the monetary policy tightening shocks exceeds the increase in the household consumption following a monetary policy loosening shock of the same magnitude. Using a counterfactual vector

autoregression (VAR) approach, I find that the percentage of fluctuations in the consumption changes attributed to the wealth changes is much bigger to the monetary policy tightening shocks compared to the loosening shocks. The household net financial wealth channel propagates the changes in the household consumption more to the monetary policy tightening shocks than to the monetary policy loosening shocks. I conclude that the household net financial wealth explains the asymmetric response of the household consumption to the monetary policy shocks in South Africa. The finding of an asymmetric household consumption reaction implies that monetary policy tightening will slow down economic growth more than the loosening shock can stimulate it.

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Table 1 Percentages of consumption changes attributed to the wealth channels in the baseline model

Horizons ahead	Household financial assets	Household liabilities	Household net financial assets	Household net worth
4	22,0	19,6	19,2	7,1
8	37,8	30,4	27,2	24,3
12	40,4	35,8	27,7	27,0
15	40,7	37,9	27,5	27,3
20	40,6	39,5	27,4	27,4
25	40,5	40,0	27,3	27,3
30	40,5	40,2	27,3	27,3
35	40,5	40,2	27,3	27,3

Table 2 Percentages of consumption changes attributed to the wealth channel in the baseline model

Horizons ahead	Household net financial wealth due to MP tightening shock	Household net financial wealth due to MP loosening shock	Household net worth due to MP tightening shock	Household net worth due to MP loosening shock
4	7,2	29,4	9,0	29,8
9	36,9	33,9	37,8	36,3
10	36,9	32,5	38,9	31,6
15	38,4	31,5	40,7	38,7
20	38,4	31,6	40,6	38,7
25	38,4	31,6	40,5	38,7
30	38,4	31,6	40,5	38,7

Table 3 Percentages of the consumption changes attributed to the wealth channel

Horizons ahead	Household net financial wealth due to MP tightening shock	Household net financial wealth due to MP loosening shock	Household net worth due to MP tightening shock	Household net worth due to MP loosening shock
4	14,9	28,2	15,4	30,3
6	25,7	26,3	27,4	30,4
7	27,2	24,7	29,4	30,1
9	29,0	21,8	31,7	28,5
10	29,3	20,6	32,0	27,7
15	29,2	18,8	31,8	26,3
20	28,9	18,8	31,4	26,4
25	28,8	18,8	31,2	26,4
30	28,8	18,8	31,2	26,4

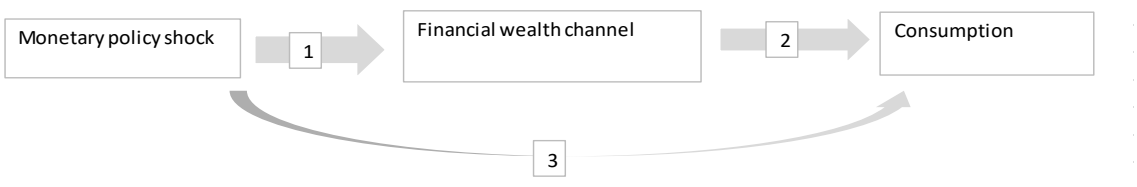
Table 4 Percentage of consumption changes attributed to the wealth channel in the Endogenous-Exogenous VAR model

Horizons ahead	Household net financial wealth due to MP tightening shock	Household net financial wealth due to MP loosening shock	Household net worth due to MP tightening shock	Household net worth due to MP loosening shock
2	18,3	15,7	20,2	6,3
5	36,4	29,9	33,5	25,5
10	46,7	28,0	40,7	23,0
15	50,6	27,8	43,7	22,5
20	51,6	28,1	44,6	22,5
23	51,8	28,3	44,8	22,7

Table 5 Percentage of consumption changes attributed to the wealth channel in the Endogenous-Exogenous VAR model using FEVD

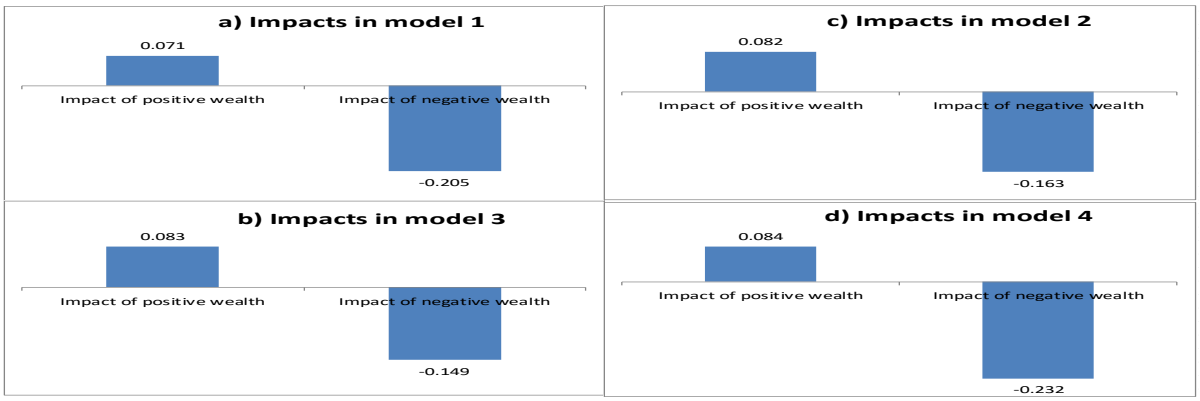
Horizons ahead	Household net financial wealth to MP tightening shock	Household net financial wealth to MP loosening shock	Household net worth to MP tightening shock	Household net worth to MP loosening shock
2	21,9	20,4	19,2	17,9
5	43,6	20,8	38,2	17,1
10	50,2	20,0	43,2	16,3
15	51,2	19,8	44,1	16,2
20	51,2	19,7	44,2	16,1
23	51,2	19,7	44,2	16,1

Figure 1. The monetary transmission mechanism



Source: Authors' drawing

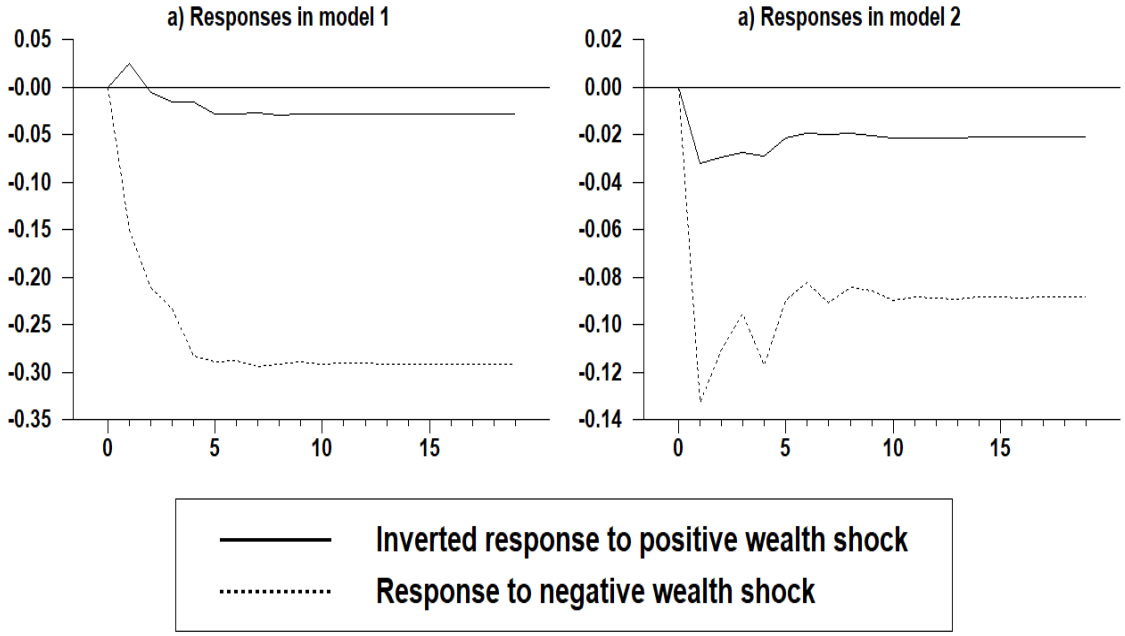
Figure 2: The impact of positive and negative wealth effects on household consumption



Source: Authors' calculations

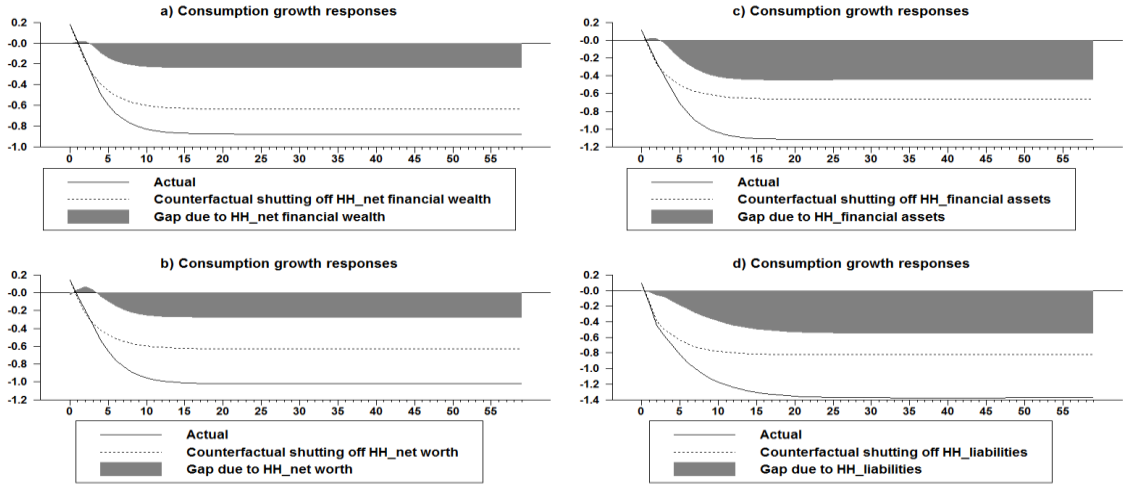
Note: Model 1 includes a constant, positive wealth changes, negative wealth changes, household disposable income growth, first and second lags of household consumption growth, the repo rate changes, and household debt growth. Model 2 includes a constant, positive wealth changes, negative wealth changes, household disposable income growth, the first lag of the household consumption growth, the repo rate change and the household debt growth. Model 3 includes positive wealth changes, negative wealth changes, household disposable income growth, the first lag of the household consumption growth, the repo rate change, and the household debt growth. Model 4 includes positive wealth changes, negative wealth changes, the household disposable income growth, three lags of the household consumption growth and the repo rate changes.

Figure 3: Cumulative household consumption responses to household wealth shocks



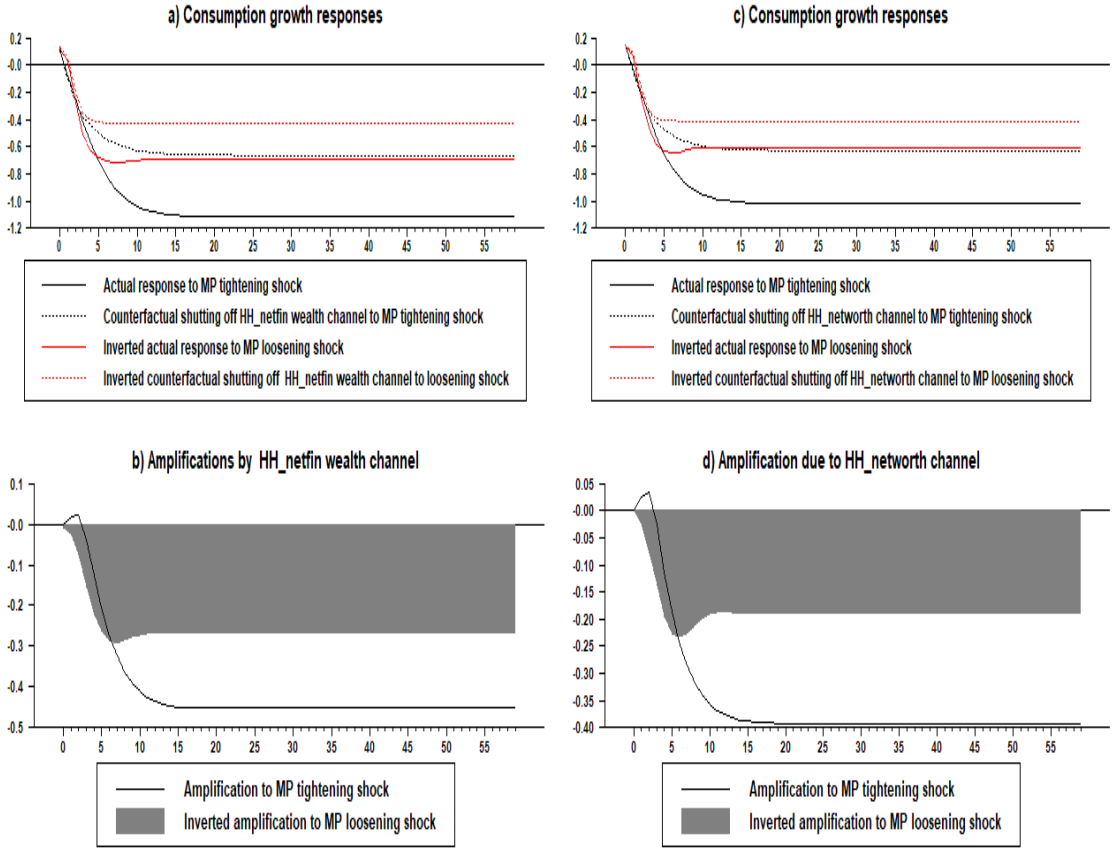
Source: Authors' calculations

Figure 4: Cumulative responses to the monetary policy rate tightening and the role of the wealth channel



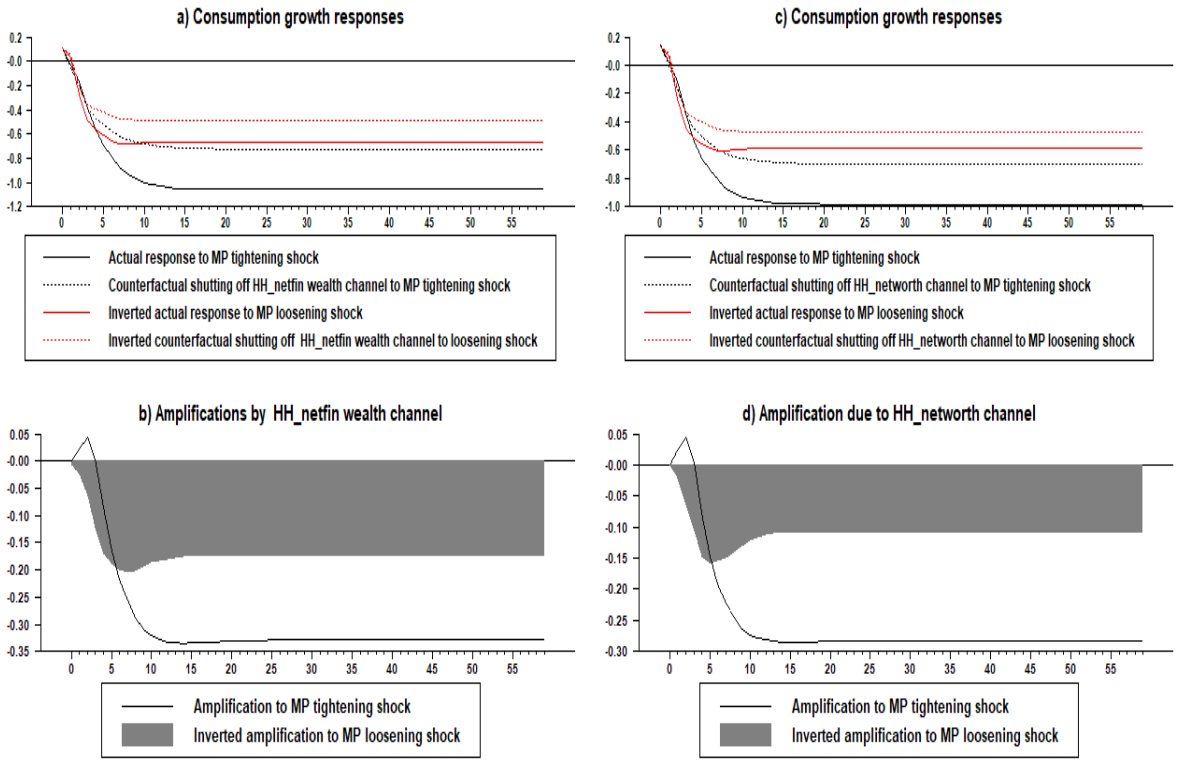
Note: HH_netfin denote household net financial wealth. HH_networth denotes household net worth, HH__financial denotes household financial assets. HH__liabilities denotes household financial assets.

Figure 5: Cumulative responses to the monetary policy rate tightening and loosening shocks and the role of household wealth channels



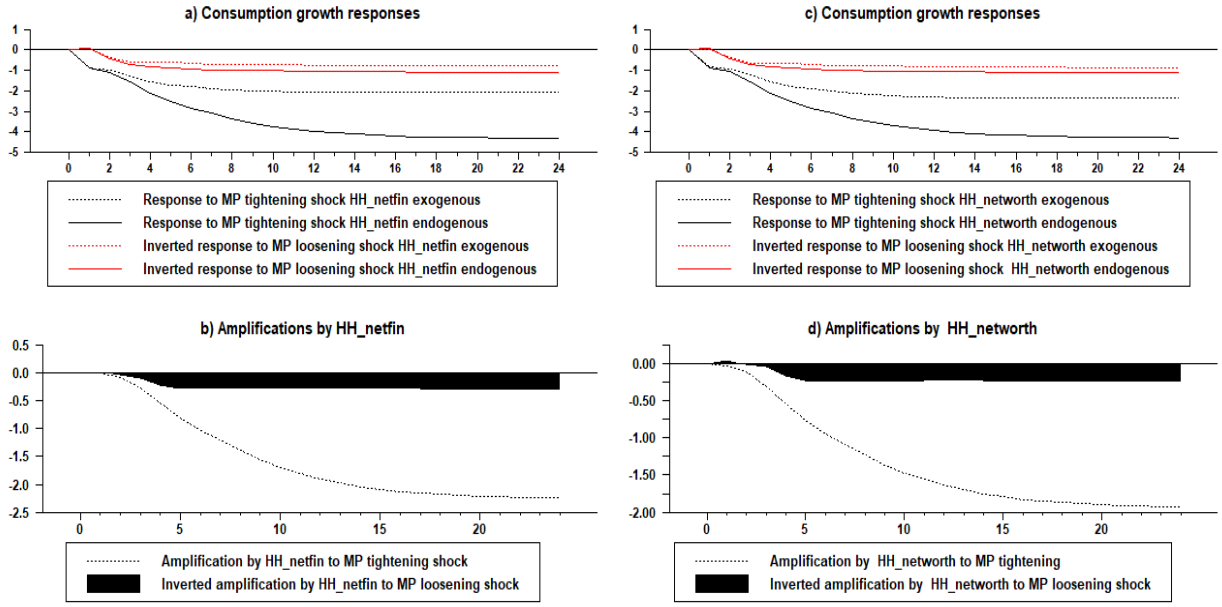
Note. HH_netfin denote household net financial wealth. HH_networth denotes household net worth

Figure 6: Cumulative responses to the monetary policy tightening and loosening shocks and the role of the wealth channel



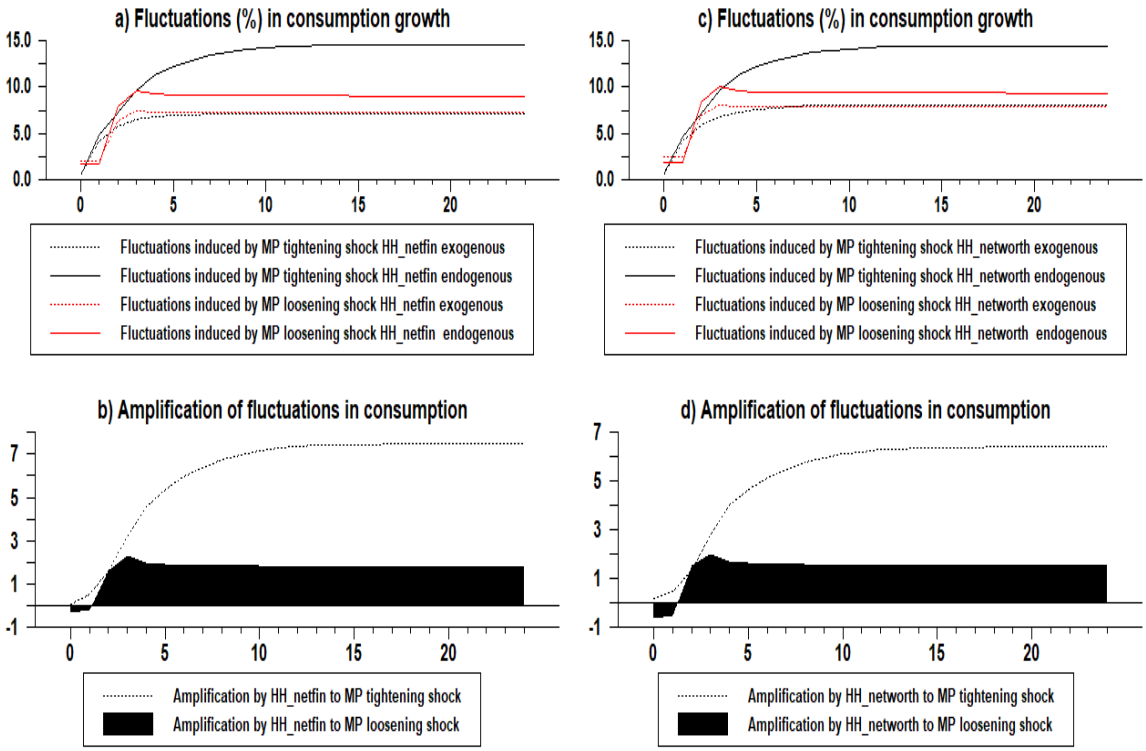
Source: Authors' calculations
Note: The HH_netfin denotes the household net financial wealth. The HH_networth denotes the household net worth

Figure 7 Cumulative responses to the monetary policy tightening and the loosening shocks and the role of household wealth



Source: Authors' calculations
Note. The HH_netfin denotes household net financial wealth. The HH_networth denotes household net worth

Figure 8: The proportion of fluctuations induced by the policy shocks and the role of the household wealth channels



Note: The HH_netfin denotes the household net financial wealth. The HH_networth denotes the household net worth

Appendix Endogenous –Exogenous VAR specification

Below I show the general specification of the VAR model to distinguish the endogenous variables from the exogenous variables. I refrain from getting deeper into the mathematics as the purpose is to distinguish between the endogenous variables from exogenous variables.

$$Y_t = \mu + B_1 Y_{t-1} + B_2 Y_{t-2} + CX_t + \varepsilon_t \quad (4.1)$$

This can be expressed in compact form as in

$$A(L)Y_t = \mu + CX_t + \varepsilon_t \ (4.2)$$

1 VAR model with household wealth as an endogenous variable

Y_t denotes a vector of endogenous variables used in the model (4.1) and (4.2). The channel is household net financial wealth growth.

$$Y_t = \begin{bmatrix} Monetary\ policy \\ Wealth \\ Consumption \end{bmatrix} (4.1.1)$$

$$X_t = [Crisis\_dummy] \ (4.1.2)$$

X_t denotes a vector of exogenous variables, which include the South African recession period in 2009

2 Specification of VAR model with household wealth as an exogenous variable

Y_t denotes a vector of endogenous variables used in the model (4.1) and (4.2)

$$Y_t = \begin{bmatrix} Monetary\ policy \\ consumption \end{bmatrix} (4.2.1)$$

$$X_t = \begin{bmatrix} Crisis\ dummy \\ Wealth_t \\ Wealth_{t-1} \end{bmatrix} (4.2.2)$$

X_t denotes a vector of exogenous variables in the model (4.1) and (4.2). These are the crisis dummy and household wealth