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journal homepage: www.elsevier.com/locate/qrefThe bank lending channel of monetary policy transmission in South Africa[☆]Ekaterina Pirozhkova^{a,b}, Nicola Viegi^{c,d}*^a EM Normandie Business School, Métis Lab, 9 Rue Claude Bloch, 14000 Caen, France^b South African Reserve Bank, South Africa^c University of Pretoria, Department of Economics, Private bag X20, Hatfield 0028, South Africa^d Economic Research Southern Africa, South Africa

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ABSTRACT

This paper studies the bank lending channel of monetary policy in South Africa. We measure credit supply with homeloan data from banks and nonbanks and we use monetary shocks via high-frequency asset price reactions to policy announcements in a proxy-SVAR model. We find that the bank lending channel is operative, as banks reduce the supply of homeloans after monetary tightening, negatively impacting the housing market. In addition, we show that the deposit channel underpins the bank lending channel's effectiveness. After a monetary tightening, banks widen the deposits spread and the volume of deposits shrinks, as expected. Since retail deposits are vital stable funding for banks, this mechanism drives the lending channel.

1. Introduction

Bernanke and Blinder (1988, 1992) seminal work gave rise to a large literature analyzing how monetary policy affects the real economy through credit conditions. A key aspect, the bank lending channel, focuses on how policy impacts banks' ability or willingness to lend. This channel received renewed attention after the global financial crisis highlighted the need for more realistic models of financial intermediaries (Woodford, 2010).¹

This paper evaluates the effectiveness of the bank lending channel in South Africa, an emerging economy with a well-developed financial market and highly concentrated banking sector (Falkena et al., 2004; Rapapali & Simbanegavi, 2020). Using high-frequency identification of monetary policy shocks, we find that monetary tightening depresses output, reduces prices, in a traditional way. Also, bank deposits fall, consistent with the deposit channel of monetary policy (Drechsler et al., 2017), loan issuance falls, and lending rates increase. Crucially, contractionary policy shocks change the sectoral composition of homeloan supply, increasing the share of homeloans issued by nonbanks. Finally, these changes in homeloan composition affect the housing market with real economic implications reinforcing the contractionary effect of monetary policy.

We contribute to the empirical literature on the bank lending channel in emerging markets. While evidence from advanced economies is robust (Altunbas et al., 2010; Jiménez et al., 2012; Stein & Kashyap, 2000), emerging market findings are less conclusive (Olivero et al., 2011). Financial sector development strengthens the channel (Sanfilippo-Azofra et al., 2018), whereas banking sector competition weakens it (Amidu and Wolfe (2013)). However, whether the channel operates in specific emerging economies with unique financial characteristics remains an open question.

The empirical literature relies on the bank-loan level data or the loan application data to identify the credit supply-side effects,² as it allows to control for credit demand by making use of multiple lending relationships of borrowers. Where bank-level or loan-application data are unavailable (as in South Africa), identifying credit supply effects is challenging. We follow the approach of Iacoviello and Minetti (2008) and Ludvigson (1998) in using the composition of homeloans supply to control for effects on the supply side of credit and we extend their analysis by providing evidence on the effectiveness of the deposit channel that underlies the operation of the bank lending channel.

We use a unique data set on loans issued by nonbank credit providers. The data on the relative lending issuance by banks vs.

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¹ See, among others, Gambacorta and Marques-Ibanez (2011), Jiménez et al. (2014), Kashyap et al. (1993) and Stein and Kashyap (2000).

² See, among others, Abuka et al. (2019), Altunbas et al. (2010), Jiménez et al. (2012) and Stein and Kashyap (2000).

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nonbanks is informative due to different funding sources of bank and nonbank lending: banks rely on retail deposits, while nonbanks use wholesale funding by allocating debt securities. Crucially, these funding sources have different exposure to monetary policy, which induces distinct patterns of loan provision by banks vs. nonbanks following shifts in monetary policy. As a result, analyzing variations in the sectoral composition of loan supply induced by monetary policy allows us to gauge the effect of shifts in credit supply on the real economy.

We focus on housing loans because of the importance of housing finance in the balance sheets of banks and by the special role that the housing market and housing finance play in the transmission of monetary policy. In South Africa, mortgage loans take the biggest share – up to 35% – in asset portfolios of banks. In particular, banks are the dominant provider of homeloans, and a reduction in credit supply from banks could have a significant impact on housing purchase. Due to the collateral and wealth effects of house prices, there are spillovers from the housing market to consumer spending and to the borrowing capacity of households (Iacoviello & Neri, 2010). On the credit supply side, banks' willingness to lend is affected by house prices, as the latter determine the value of the loan collateral. Additionally, the relative illiquidity of mortgages might induce banks to reduce the share of homeloans on their balance sheets in anticipation of negative liquidity shocks (Iacoviello & Minetti, 2008). As a result, the contractionary effect of monetary tightening could be amplified when mortgage credit is large (Jordà et al., 2020). On that account, literature argues that housing market is particularly exposed to the credit channel, and therefore, is a better environment to capture the presence of the bank lending channel.³

We employ the conventional monetary policy factor extracted from high-frequency surprises in asset prices around the monetary policy announcements of the South African Reserve Bank (SARB) from Pirozhkova et al. (2024) to instrument for exogenous shifts in monetary policy in a medium-scale proxy-SVAR model and estimate responses of macroeconomic and financial variables at monthly frequency (see Mertens and Ravn (2013) and Stock and Watson (2012)). Importantly, our instrumental variable is informationally robust, as it is cleaned of the central bank information effects by regressing it on a measure of the SARB forecasts in line with Miranda-Agrippino and Ricco (2021).

Our contribution documents a significant shift in the composition of homeloans' provision following changes in monetary policy: the share of bank homeloans falls, while the share of mortgages issued by nonbanks increases. Furthermore, banks increase their deposit spread and their level of deposits falls. This provides evidence of the deposits channel of the monetary transmission, a result that is particularly interesting in the context of the high degree of concentration of the banking sector in South Africa. In fact, Drechsler et al. (2017) predicts that policy rate hikes increase the market power of banks, allowing them to increase deposit spreads in pursuit of profit maximization. Relatively low deposit rates induce deposit holders to withdraw their funds from banks, and the size of banks' balance sheets shrinks, forcing banks to reduce their loan portfolios. In the context of the deposits channel of monetary transmission, our study provides novel empirical results on its effectiveness in South Africa by using recent methodological advancements on the VAR model estimation and a unique dataset previously unavailable.

Another strand of literature that our work contributes to, examines the sectoral shifts in credit provision driven by monetary policy. Drechsler et al. (2019) and Leu and Robertson (2021) document the increase of mortgage origination by nonbanks induced by the tightening monetary policy of the Fed. Nelson et al. (2018) show the asset growth

³ Significant progress has been made in incorporating realistic features of the housing market into quantitative macroeconomic models used for monetary policy analysis — see, among others, Bluwstein et al. (2020), Garriga et al. (2017), Guerrieri and Iacoviello (2017) and Justiniano et al. (2015).

and securitization activity of shadow banks in a New Keynesian model featuring banks and shadow banking. Drechsler et al. (2019) and Xiao (2019) emphasize the role of securitization in this shift as providing the source of finance for credit origination outside of the banking sector. We show that in the context of an emerging economy, this mechanism could also be operative — given the floating interest rate on debt instruments issued, the deep financial market South Africa ensures access for nonbanks to market-based funding for effective securitization, allowing nonbanks to fund mortgage issuance in periods of tight monetary policy, and thereby, to increase their share in the market of housing finance. Additionally, in line with findings of Mian and Sufi (2022) for the U.S. economy, we demonstrate a significant role of lenders outside of the banking sector in driving housing prices in South Africa.

Our study advances understanding of monetary transmission in South Africa. Unlike prior work on the credit channel (Gumata et al., 2013; Loate & Viegi, 2021; Ludi & Ground, 2006), we use high-frequency identification for precise SVAR inference, providing novel evidence for both deposit and bank lending channels.

This paper is organized as follows. Section 2 provides contextual background on housing finance in South Africa. Section 3 discusses the data and empirical methodology, while Section 4 provides a discussion of the results. Section 5 concludes.

2. Housing finance in South Africa

To provide the context for our analysis, in this section we discuss the institutional features of the housing finance market and give further details on the bank and nonbank credit providers in South Africa.⁴

2.1. Housing finance market

The market of housing finance in South Africa is regulated by the National Credit Act and is highly standardized. Regardless of a type – bank or nonbank, – a mortgage provider engages in a standardized process of bond issuance that has to be registered by the National Deeds Registry of South Africa. In this context, “bond” does not refer to the debt market instrument; according to terminology of the Deeds Registries Act 47 of 1937, bond issuance refers to the process of a bank formally creating and approving a mortgage loan and instructing a property transfer attorney to register the mortgage bond over the property in the Deeds Office as security for that loan.

The high degree of mortgage standardization reduces the exposure of credit providers to liquidity risk and weakens the incentive to shift away to more liquid assets, potentially leading to decreased liquidity shock buffers. In context of the bank lending channel, this contributes to stability of the share of homeloans on the balance sheets of mortgage providers and reduces the sensitivity of this share to liquidity shocks (Iacoviello & Minetti, 2008).

Banks dominate on the market of homeloans provision in South Africa. Since 2004 their share of homeloans' issuance has consistently exceeded 90%, see Fig. 1. The share of banks in provision of mortgages has temporarily fallen in 2011, when new mortgage issuance by banks decreased, while nonbank issuance was showing a positive growth rate, see Fig. 2. Caution on the side of both borrowers and lenders restrained credit extension in the beginning of 2011, notwithstanding the low interest rate environment, as reported by the SARB (2011).⁵ Starting from 2011, the growth of bank mortgage issuance has been

⁴ We do not include the category of microloans in our analysis. This is because microloans, introduced as a part of 1994 Housing White Paper solutions and 2004 Financial Sector charter, are a type of financial product that is aimed at credit mobilization and housing environment stabilization for low-income population groups. Microloans are unsecured, short-term and small in size, what significantly differentiates them from typical long-term secured mortgages, which we focus on.



Fig. 1. The MIX — share of nonbanks in new homeloans issuance. Source: SARB, National Deeds Registry of South Africa.

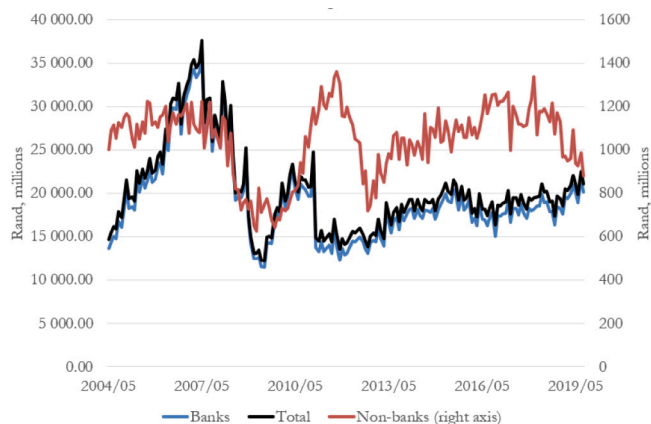


Fig. 2. New mortgage loans granted for residential dwellings and flats. Source: SARB, National Deeds Registry of South Africa.

low and has not reached the pre-2011 levels. The growth trend of new mortgages’ provision – negative in 2007–2008 and positive in 2013–2018, – generally coincide for banks and nonbanks (see Fig. 2), thereby reflecting their common exposure to changes in demand for housing finance.

2.2. The banking sector

The banking sector plays an important role in explaining the macroeconomic and financial performance of the South African economy⁶ and is characterized by several features. First, South African banks are

⁵ Caution on the side of banks has potentially emerged in response to announcement of regulatory changes for the banking sector. In particular, in October 2010 the SARB issued circular 3/2010 endorsing and giving notices to banks to prepare for implementation of Basel 2.5. In December 2010 the Basel III framework was published with introduction of the liquidity coverage ratio and the net stable funding ratio (BIS, 2010). Though the Basel III framework was scheduled to be introduced from 2013 until 2015, the announcement of planned changes has potentially contributed to a change in banks’ perception of risk and asset portfolios. The requirements of Basel III are shown to have induced a shift in bank assets from long-term loans towards shorter-term loans with the concurrent increase in the volume of liquid assets (Anthonyrajah & Malwandla, 2022).

⁶ Results of the forecast error variance decomposition in the vector autoregression (VAR) model indicate that bank sector shocks explain 15% of error variance in industrial production, 22% — in consumer prices, 20% — in house

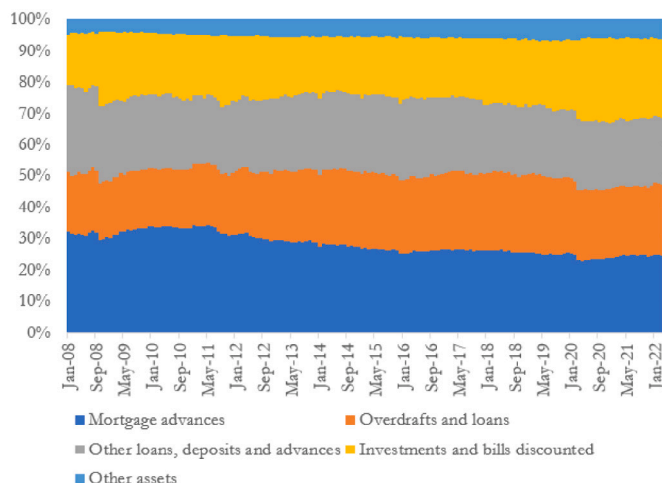


Fig. 3. Banks’ balance sheets assets structure. Note. ‘Mortgage advances’ include mortgage loans (KBP1109M), ‘Overdrafts and loans’ include overdrafts and loans (KBP1122M), ‘Other loans, deposits and advances’ include all other types of loans apart from mortgages and overdrafts (KBP1124M less KBP1122M less KBP1109M), ‘Other assets’ include non-financial assets of banks (KBP1130M), central bank money and gold (KBP1104M) and other assets (KBP1131M). Source: SARB, Quarterly Bulletin series with respective KBP codes. KBP stands for the data series code in the SARB’s Quarterly Bulletin Publication database.

primarily domestically-owned. Second, deposits are by far the most important source of bank liabilities. Third, real estate loans take the highest share in banks’ assets. Below we discuss the banking sector features in detail.

Mortgages are the largest loan category on the banks’ balance sheets in South Africa. Since the post-GFC period of 2010–2011 when the share of mortgages was in the range of 31–34%, their importance has gradually fallen to 23–25% in the period after 2020, see Fig. 3. Still, mortgages represent the most sizable loan category in banks’ asset portfolios during our sample period.

On the liabilities’ side, deposits are the main source of funding for banks. The share of total deposits in banks’ total liabilities and equity has been exceeding 70% consistently since 2000, see Fig. 4.⁷ The role of wholesale funding is small — debt securities issued by banks represent 5–7% of their liabilities.⁸

The banking system in South Africa is concentrated. The share of four biggest banks in the total volume of mortgage advances has been in the range of 87–93% since 2008, see Fig. 5. The share of mortgages issued by four biggest banks to households has been even higher — 92–97% (Fig. 6). The share of four biggest banks in the deposit market is also high — in the range of 82–82% (see Fig. 7). Evidence suggesting a high degree of market concentration is reported in Falkena et al. (2004) and Okeahalam (2002), while the strong market power of South African banks is documented in Rapapali and Simbanegavi (2020).

The deposits market concentration has a particular relevance in the context of the bank lending channel’s analysis, as it explains the sensitivity of the deposits spread to interest rate shifts in South Africa

prices and 25% — in nominal exchange rate at the 4-year horizon in South Africa, see Table II in Appendix A for details.

⁷ We plot the bank liabilities structure for the period starting from 2008, as data for the ‘Debt securities’ category, or the wholesale funding, is only available from 2008.

⁸ This can be seen as a moderate level as compared to other emerging economies. For example, in Chile the share of wholesale funding ranges from 17 to 20% of liabilities (Alegria et al., 2018).

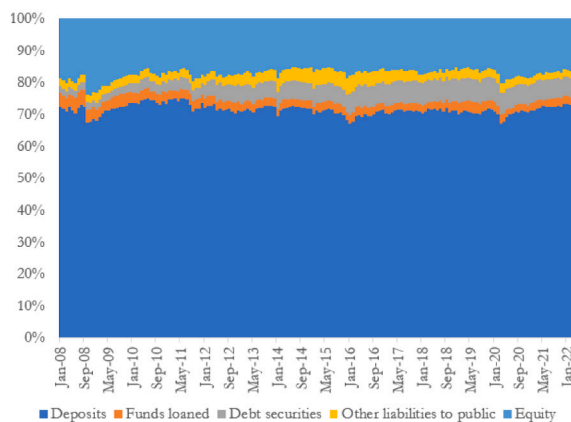


Fig. 4. Banks' balance sheets liabilities structure.
 Note. 'Deposits' are total deposits (KBP1077M), 'Loans' include loans received under repurchase agreements from SARB (KBP1500M), other domestic creditors (KBP1501M) and foreign creditors (KBP1514M), 'Debt securities' include debt securities issued by banks (KBP1082M), 'Other liabilities to public' include foreign currency funding from domestic and foreign sectors (KBP1080M and KBP1081M) and other liabilities to public (KBP1083M), 'Equity' includes capital and other liabilities (KBP1089M).
 Source: SARB, Quarterly Bulletin series with respective KBP codes.

translating into responsiveness of the level of deposits. In its turn, the latter accounts for changes in banks' liabilities as induced by shifts in the policy rate. According to the deposits channel of monetary policy, policy rate hikes increase the market power of banks, thus enabling them to raise deposit spreads in pursuit of profit maximization (Drechsler et al., 2017).⁹ Notably, depth and liquidity of the financial market in South Africa grant depositors flexibility in switching between liquidity instruments (BIS, 2020), and in particular, in substituting deposits with bonds in response to shifts in the interest rate, thereby providing the ground for the deposits channel of monetary policy to operate.¹⁰

Thereby, several factors underlie the effectiveness of the bank lending and the deposits channels in South Africa. First, this is the reliance of banks on deposits as their main source of funding. Second, this is the high concentration of the banking sector. Third, this is the developed bond market ensuring substitutability between liquidity instruments. In Section 4 we provide empirical evidence suggesting that the bank lending and deposits channels in South Africa are operative.

2.3. Nonbank credit providers

In contrast to banks, which are subject to stringent oversight, non-bank mortgage providers are not obliged to publish their financial statements and provide them to the South African Reserve Bank on a monthly basis. Thus, to outline characteristics of nonbanks' finances, we analyze the balance sheet data reports of the SA Home Loans Group,

⁹ As Drechsler et al. (2017) show, the effect of monetary policy on the supply of bank lending in the economy is explained by the deposits channel. Specifically, an increase of the interest rate makes cash more costly to hold, what increases the market power of banks as deposit providers. Banks widen deposits spread, what triggers outflow of deposits from the banking sector to bonds and other instruments, resulting in the shrinking size of the banks' balance sheets and in reduction of bank lending issuance.

¹⁰ South African bond market is dominated by government debt instruments denominated in domestic currency and is characterized by high turnover (Kapingura & Ikhide, 2015). The Johannesburg Stock Exchange Debt Market section operates and regulates the bond market in South Africa, see <https://www.jse.co.za/trade/debt-market/bonds>.

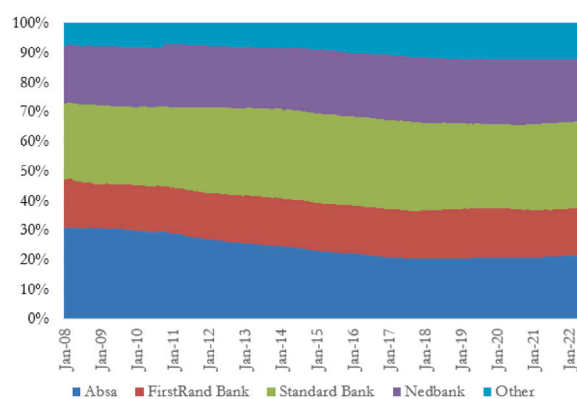


Fig. 5. Mortgage advances — bank volumes.
 Note. 'Mortgage advances' are line 150 series in BA900 forms of respective banks.
 Source: SARB.

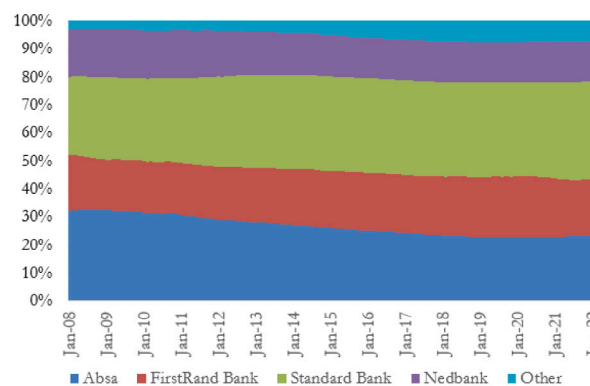


Fig. 6. Mortgage advances to household sector — bank volumes.
 Note. 'Mortgage advances to household sector' are line 157 series in BA900 forms of respective banks.
 Source: SARB.

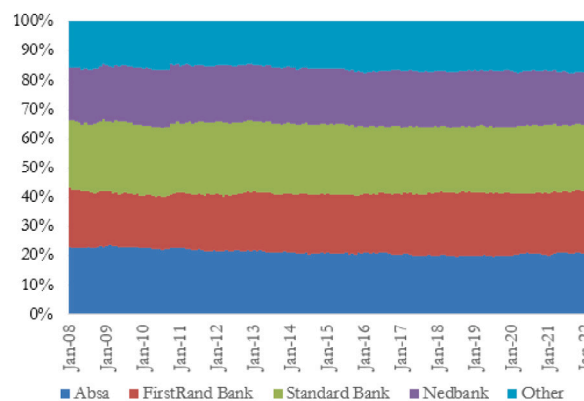


Fig. 7. Banks' market shares — total deposits.
 Note. 'Total deposits' is line 1 series in BA900 forms of respective banks.
 Source: SARB.

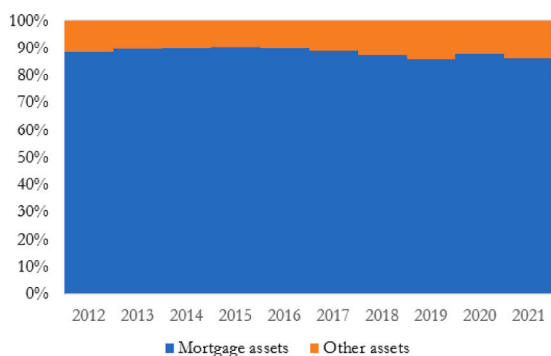


Fig. 8. SA Home Loans — assets.

Note. Data is available at annual frequency.

Source: SA Home Loans website <https://www.sahomeloans.com/>.

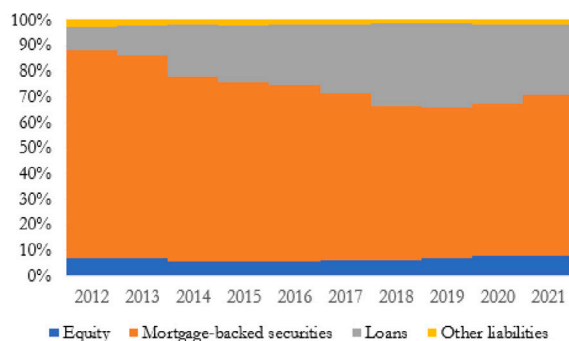


Fig. 9. SA Home Loans — liabilities.

Note. Data is available at annual frequency.

Source: SA Home Loans website <https://www.sahomeloans.com/>.

which dominates the housing finance market among credit providers outside of the banking sector by issuing 78.65% of homeloans to households among all nonbank financial intermediaries.¹¹

Mortgages is the most sizable asset on the SA Home Loans' balance sheet (see Fig. 8), reflecting that homeloan issuance is a primary activity of the company. Notably, the lending rate charged on mortgages by the SA Home Loans is floating. The structure of the SA Home Loans' funding sources stands in contrast with that of banks: the share of wholesale funding ranges between 60–80%, while the role of loans received that take 10–32% of liabilities, has been increasing over the last ten years (Fig. 9).

As of October 2023, the SA Home Loans is owned by the Standard Bank (50% ownership share), the Public Investment Corporation (25%) and the BHC Consortium (25%), what reveals its affiliation with the banking sector. In light of this equity-based affiliation, we examine the relationship between the lending behavior of the SA Home Loans Group and Standard Bank, with the aim of assessing the potential influence exerted by the latter on the former. In this exercise, we are constrained by unavailability of data on credit origination by SA Home Loans Group at frequency higher than annual, and therefore, resort to proxy it with the monthly aggregated data on mortgage issuance by nonbank credit providers. Consequently, we find no statistically significant evidence of an impact of Standard Bank on the SA Home Loan Group's lending issuance, see Table I in Appendix A.

¹¹ The data is sourced from the National Deeds Registry of South Africa as for September 2019.

Direct data on the credit risk of SA Home Loans' borrowers are not available. However, the company's website discloses information on borrowers' employment as part of transaction documentation. 83% of its borrowers are employed in the government sector, with major employers including the Department of Education, Department of Health, South African Police Service, Department of Defense and Military Veterans, Provincial Government and Legislature, Department of Justice and Correctional Services, Department of Social Development, Department of Public Works, regional municipalities, and the South African Revenue Service. Mortgage lending to government sector employees may reduce the portfolio's credit risk by ensuring greater stability of borrowers' incomes.

2.3.1. SA home loans group securitization process

Given our focus on the difference in funding sources of banks and nonbanks, in this section we outline characteristics of the securitization process of the SA Home Loans Group.¹²

SA Home Loans originates homeloans and sells them to special purpose vehicles (SPV) comprising the SA Home Loans Group (for example, Amber House Fund 2), which fund the purchase by issuing rated, tranches, secured notes under an Asset-Backed Note Program. Cash flows from the mortgage pool pay interest – as a rule, a floating interest rate, – and principal to note holders according to a pre-defined setup supported by credit enhancements (reserve fund, liquidity facility, start-up loan, subordinated interest).

In the securitization programs employed by SA Home Loans, the issuance of asset-backed securities is facilitated by the prior establishment of a program framework that defines the legal, operational, and economic parameters of all future note issuance. Within this framework, the SPV obtains regulatory and exchange approvals, as well as credit ratings, for a maximum aggregate nominal amount of securities (the “program limit”). This amount is deliberately set at a scale sufficient to accommodate multiple tranches, potentially issued over an extended period, without the need to repeat the full approval process for each individual issuance. The program documentation, which includes the Program Memorandum and ancillary agreements, specifies the classes of notes, their ranking, the form of security, and the mechanics of the cash flow. These provisions are binding across all future tranches issued under the program, ensuring that each new series or class of notes conforms to pre-agreed legal and structural standards.

When a funding need arises, for example, to refinance maturing obligations, the issuer can launch a new tranche by preparing an Applicable Pricing Supplement. This document, substantially shorter than the original program documentation, records tranche-specific parameters such as principal amount, coupon, issue date, expected maturity, and applicable ratings. Because the underlying legal structure, security arrangements, and contractual relationships are already in place, the issuance process becomes procedurally efficient: the tranche can be marketed, priced, and settled within a compressed time frame, often within days.

This pre-arranged structure thus serves both to reduce transaction costs and to enable timely access to capital markets, with the objective to preserve the legal integrity and credit profile of the securitization as a whole.

Crucially, the capacity to issue further tranches under an established securitization program is, by design, operationally independent of contemporaneous monetary policy decisions made by the South African Reserve Bank. Once the program approvals and structural arrangements are in place, the SPV's authority to bring new notes to market is not contingent on changes in monetary policy. Given the floating nature of interest rate payments on allocated notes, the cost of funding for

¹² The content of this section is based on the legal material, which SA Home Loans Group has provided on its website <https://www.sahomeloans.com/investors>.

the issuer adjusts to reflect market pricing in the new interest rate environment.¹³

To illustrate, we detected two large-size tranches issued by the SA Home Loans' SPVs in the aftermath of short-term interest rate increases by the South African Reserve Bank:

- The issue by Thekwini Fund 13 (RF) on 10th of March 2016 after repurchase rate has been decided to increase by the SARB on the 28th of January 2016 by 50 b.p.
- The issue by Thekwini Fund 18 (RF) on 30th of September 2022 after the repurchase rate has been decided to increase by the SARB on the 22nd of September 2016 by 75 b.p.

Potentially, the depth of the financial market in South Africa and the floating nature of interest rates on issued notes' tranches and mortgages could explain the independence of the SPV's capital market allocations and episodes of monetary tightening.

3. Empirical methodology

In the absence of the bank-loan level data, extracting causal relationships from the aggregated data for the bank lending channel of monetary policy analysis is challenging. Our approach to address this challenge combines three components: the use of data on non-bank credit provision, high-frequency identification of monetary policy shocks, and Bayesian estimation of vector autoregression models allowing to handle large data sets.

3.1. Data

Our dataset contains macroeconomic and financial variables for South Africa over the sample period 2004M5–2019M8.¹⁴ The inflation targeting regime as implemented by the South African Reserve Bank starting from 2000M1, applies to the whole duration of the sample. The frequency of the dataset to estimate the VAR models is monthly, and the end of month values are used for variables with daily data frequency. Most of data series comes from the SARB and are publicly available. The nonbank credit volumes data collected by the National Deeds Registry of South Africa are supplied by the Lightstone Property — a private agency specialized in providing valuations.¹⁵

The macroeconomic and financial indicators used in the dataset allow us to capture the macro-financial linkages characterizing the response to a monetary policy shock in the economy. The set of variables employed in the models is discussed in Section 3.2. Details of the dataset are provided in Table I of Appendix A.

3.2. Empirical models

We analyze the transmission of monetary policy shocks in the South African economy using two VAR models and adopt the Bayesian approach for their estimation.

The first model is used to study the propagation of monetary policy tightening in a medium-scale SVAR framework with standard macroeconomic priors incorporating macroeconomic and financial indicators at monthly frequency. The endogenous variables in the first model include macroeconomic indicators conventionally accounted by a monetary VAR — the manufacturing production index, the CPI and the 3-month JIBAR (interbank) rate. We also include in this model the deposits spread, the banks' interest rate on mortgage loans, and a rich set of bank balance sheet variables — the volume of total bank deposits,

the volume of long-term bank deposits, banks' wholesale funding, and the volume of mortgages issued by banks. This enables us to trace the transmission of monetary policy shocks to balance sheets of banks, and thereby, to detect the presence of the deposits and the credit channels of the monetary policy transmission. The variables characterizing the homeloan supply outside of the banking sector — the volume of mortgages issued by nonbanks and the MIX variable (outlined in the paragraph below), — are also included, as their responses allow us to analyze shifts in the composition of credit supply following monetary policy shocks. Additionally, the house price index and the JSE stock market index are included to control for the asset price channel, which plays an important role in shaping changes in the banks' and borrowers' balance sheet values. By incorporating the nominal exchange rate variable we take into account the external effects of monetary policy shocks that are important in the case of South Africa being a small open emerging economy. The model includes a constant term and 12 lags of the endogenous variables.

Following Iacoviello and Minetti (2008), we construct the so-called MIX variable that measures the share of nonbank credit in the overall supply of homeloans, thereby, reflecting the sectoral composition of credit supply:

$$\text{MIX}_t = \frac{\text{NonbankLoans}_t}{\text{BankLoans}_t + \text{NonbankLoans}_t} * 100\%, \quad (1)$$

where NonbankLoans_t is the value of homeloans issued by nonbanks in period t , and BankLoans_t is the value of homeloans issued by banks during the same period. The share of nonbank housing loans ranges between 3% and 10% in our sample with the mean value of 5.4%, see Fig. 1. This share has been moderately stable over time, pointing to a relative constancy of the nonbank credit providers' market share and, potentially, indicating the viability of their business model in the context of competition for profitable lending opportunities with the banking sector that dominates the market.

The second VAR model is used to analyze the transmission of shifts in the credit supply, which are induced by the monetary policy shock, on the housing market. This model includes the manufacturing production index, the CPI, the MIX variable and a set of disaggregated house price indices — a house price index for free-standing houses, a price index for 3-bedroom flats and a price index for 2-bedroom flats. We use disaggregated house prices, because, first, this allows to avoid reduced data precision inherent to the aggregation process. Second, using disaggregated house price indices enables to compare the effects for the different house market segments. Similarly to the first model, the second model includes 12 lags of the endogenous variables and a constant term.

The VAR models outlined are estimated with Bayesian techniques, what enables us to address the issue of overfitting associated with the use of a large number of variables in the model. As suggested by Banbura et al. (2010), the dummy observations are used for implementing the natural conjugate Normal-Inverse Wishart prior, allowing us to relax the assumption of fixed covariance matrix inherent to the Minnesota prior. The sum-of-coefficients prior is adopted for addressing the issue of the unit root in some variables that is implemented by supplying the dummy initial observation (Doan et al., 1983). The standard macro Normal-Inverse Wishart priors are employed, and the appropriate amount of shrinkage is automatically inferred by selecting the tightness of the prior distribution according to the hierarchical BVAR approach of Giannone et al. (2015). Gibbs sampler is used to sample from the posterior distribution and to construct confidence bands. To establish stability of the VAR models, we ensure that posterior estimates of eigenvalues' absolute values of the VAR companion matrices are below unity (Hamilton, 1994; Lütkepohl, 2005).

¹³ The 3-month JIBAR interbank rate is used as a reference interest rate for calculating the interest rate payments by the SA Home Loans SPV funds.

¹⁴ The sample period is limited by availability of nonbank credit issuance data.

¹⁵ <https://www.lightstoneproperty.co.za/>.

3.3. Identification of monetary policy shocks

To analyze the transmission and effects of changes in monetary policy, we identify exogenous monetary policy shocks as unanticipated by market participants and orthogonal to the systematic response of monetary policy to macroeconomic conditions (Miranda-Agrippino & Ricco, 2021). To implement this, we use conventional monetary policy instrumental variable extracted from high-frequency surprises in asset prices around monetary policy announcements of the South African Reserve Bank from Pirozhkova et al. (2024) as an external instrument for monetary policy shocks in a proxy-SVAR model. Acknowledging the importance of separating the pure effects of monetary policy from the informational channel (see Jarczyński and Karadi (2020) and Nakamura and Steinsson (2018)), our external instrument is cleaned from the central bank information effects by regressing the instrument on a measure of the SARB forecasts as suggested by Miranda-Agrippino and Ricco (2021). Monetary policy shock identification is obtained on the sample that spans the length of the instrument.

3.4. Identification of loan supply effects

To isolate the effect of the bank lending channel we use data on mortgage loans issued by banks and nonbank credit institutions.¹⁶ While banks and nonbanks have common exposure to demand-side effects of unexpected shifts in monetary policy associated with households' variations in demand for homeloans, they fund their lending activity differently – banks rely mainly on reservable retail deposits, while nonbanks use wholesale market instruments – debt securities and loans (see Sections 2.2 and 2.3 for details of the comparison for South Africa). Hence, the bank lending channel of the monetary policy transmission could be identified, as the sensitivity of bank and nonbank sources of funding to unexpected shifts in monetary policy is different.

The reduced share of banks in the total volume of issued homeloans as induced by monetary contraction indicates that shrinking funding sources of banks constrain their loan provision by more than what is the case for nonbanks, and therefore, the bank lending channel of monetary policy could be seen as effective when changes in the bank loan supply brought about by monetary policy shifts induce real effects in the economy.

Thus, detecting operativeness of the bank lending channel involves two steps. First, it requires testing whether the composition of the homeloan supply is affected by monetary policy shocks. In our context, at this step we aim to detect if exogenous changes in monetary policy induce a significant effect on the composition of homeloan supply, or the MIX variable. Second, we test whether variations in the composition of the homeloan supply induced by monetary policy shifts have implications for the housing market, and if that is the case, the bank lending channel is viewed as operative (Iacoviello & Minetti, 2008; Ludvigson, 1998).

Importantly, we identify unexpected shifts in monetary policy to evaluate the direct causal effect of interest rate hikes on mortgage provision. Drechsler et al. (2017) address the identification the causal effect using cross-sectional data, exploiting geographic variation in the market power of banks induced by difference in the concentration of local deposit markets. In the absence of the cross-section data of the case of South Africa, we resort to identifying the exogenous monetary policy shifts for establishing causality as outlined in the previous subsection.

We employ the external instrument approach in the second VAR model to identify the credit supply shock induced by monetary policy. To implement this, we do not include the short-term interest rate in the second model following Iacoviello and Minetti (2008) and Ludvigson

(1998) — this allows the innovations in the MIX to encompass variations due to shifts in monetary policy and the response of house prices to the shock in MIX to be seen as induced by monetary policy shock. Importantly, the changes in MIX induced by monetary policy shocks are primarily being tested for significance using the first VAR model with exogenous monetary policy shifts identified using the external instrument. We use the conventional monetary policy factor from Pirozhkova et al. (2024) as an external instrument to identify the change in the composition of the credit supply driven by the monetary policy shock and exploit the positive correlation between the external instrument and the composition of the credit supply that implies its relevance as an instrument in our context. The absence of a short-term interest rate in the model ensures the exogeneity of the instrument condition. Thereby, the analysis of the house prices' impulse responses to the shock in composition of credit supply due to monetary policy in the second model allows us to gauge the effectiveness of the bank lending channel. Under this identification, the significant negative effect of a MIX shock on house prices implies that a decreased share of homeloan issuance by banks vs. nonbanks induced by monetary tightening reduces house purchases in the economy.

Our identification scheme is different from the one employed by Iacoviello and Minetti (2008) and Ludvigson (1998) — these studies resort to recursive restrictions to pin down the shock in composition of the credit supply, potentially, due to unavailability of the proxy-SVAR methodology for the exogenous disturbance identification at the time. Due to this difference in identification approaches of the credit supply shock, we show the robustness of our results by performing the analysis of impulse response functions in the second model using the recursive restrictions identification scheme as originally proposed by Iacoviello and Minetti (2008) and Ludvigson (1998) (see Section 4.3 for details).

4. The bank lending channel of monetary policy transmission in South Africa

To analyze the bank lending channel of the monetary transmission, we first examine the responses to the monetary policy shock of macroeconomic and financial variables, giving a particular attention to propagation of the shock to the balance sheets of banks. After that we look at the supply-side effects induced by shifts in the monetary policy on housing market.

4.1. The transmission of monetary policy

The role that monetary policy plays for credit conditions in the economy could be seen in the effects it induces on the volumes of credit provided, on the price of credit or the lending rate, and on the macroeconomic environment.

For the ease of reading the impulse responses charts in the first VAR model we present four outputs from estimating the effect of the monetary tightening shock: first, the baseline output with the key variables responses allowing to establish the transmission of the shift in the policy (Fig. 10), second, the specification with an extended set of variables that include spreads with the Postbank investment interest rate (Figure I in the Appendix A), third, the specification with an extended set of variables that include the deposit rate and the nonbank securities wholesale funding (Figure II in Appendix A), and fourth, the specification with an extended set of variables that include the total mortgage issuance (Figure III in Appendix A). The need to run the last model specification separately stems also from the multicollinearity issue that arises when the total mortgage issuance variable is included in the model with the bank mortgage issuance and the nonbank mortgage issuance variables contemporaneously.

Evidence from the first VAR model indicates that macroeconomic effects of monetary policy tightening shocks are contractionary. CPI and manufacturing production fall with the effect on consumer prices being especially persistent, see Fig. 10. Credit values are affected by

¹⁶ This approach of the bank lending channel identification was introduced in Kashyap et al. (1993) and employed in Iacoviello and Minetti (2008) and Ludvigson (1998).

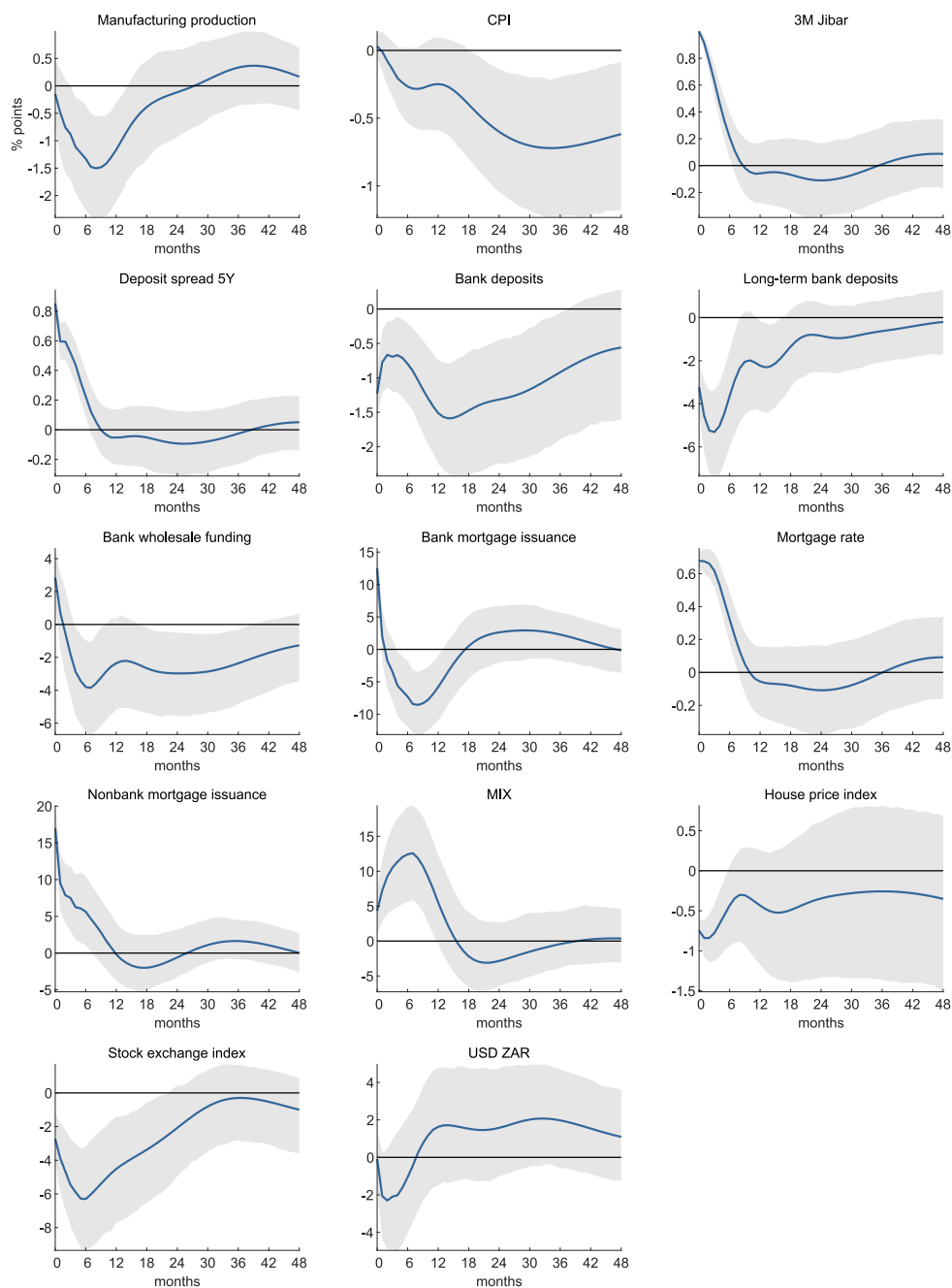


Fig. 10. VAR impulse response functions to monetary tightening shock.

Notes. 14-variable BVAR(12). Monetary policy shock is identified using a conventional monetary policy factor for South Africa from Pirozhkova et al. (2024), see Section 3.3 for details. The shock is normalized to induce a 100 basis point increase in the 3M JIBAR (interbank) rate. The sample is 2004M5–2019M8. Shaded areas are 90% posterior coverage bands.

the monetary policy shock significantly. Interest rate on bank mortgage loans jumps on impact and stays elevated for 10 months after the shock, making it more costly for borrowers to fund their homeloan purchases (panel ‘Mortgage rate’ on Fig. 10). The volume of mortgages issued by banks falls by 9 pp, and this reduction is persistent — loan issuance stays subdued for 18 months after the shock (panel ‘Bank mortgage issuance’ on Fig. 10).¹⁷ The total issuance of homeloans by banks and

¹⁷ The immediate positive response of bank mortgages to the monetary tightening shock is consistent with banks increasing mortgage issuance for benefiting from a temporarily elevated interest rate margin. The latter arises due a widened gap between an increased loan rate on mortgages and a relatively

nonbanks follows a similar pattern and falls by 8 pp (panel ‘Total mortgage issuance’ on Figure III in the Appendix A).¹⁸ Thus, despite

low level of interest rate on fixed deposits attracted by banks previously that were not allocated to assets yet. Newly attracted deposits are not allocated to mortgages instantaneously due to lengthy evaluation of mortgage applications, internal risk and liquidity management procedures’ implementation and other operational factors, what creates a transient opportunity for banks to benefit from an increased interest rate margin in case of an unexpected monetary tightening that banks potentially seek to exploit.

¹⁸ We estimate the effect of monetary tightening on the total homeloan issuance in a separate VAR model. This is done to avoid the singularity issue

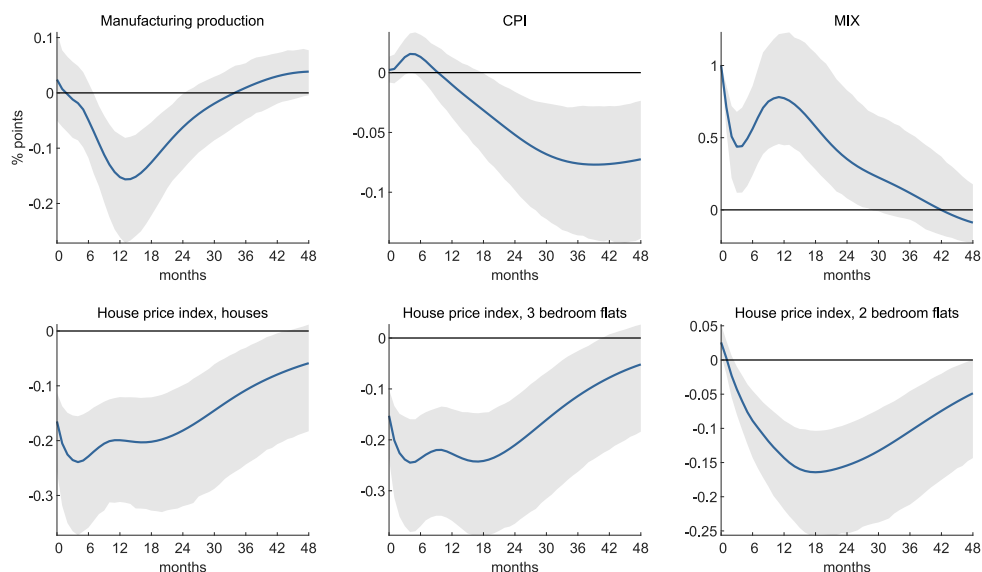


Fig. 11. VAR impulse response functions to MIX shock.

Notes. 6-variable BVAR(12). MIX shock is identified using a conventional monetary policy factor for South Africa from Pirozhkova et al. (2024), see Section 3.3 for details. The shock is normalized to induce a 1 percentage point increase in the MIX variable, i.e. the increase in the share of nonbanks in homeloan supply induced by monetary policy contraction. The sample is 2004M5–2019M8. Shaded areas are 90% posterior coverage bands.

the increase in the nonbank credit issuance and the increased share of nonbanks in the total issuance as measured by the MIX variable (panels ‘Nonbank mortgage issuance’ and ‘MIX’ on Fig. 10), the overall mortgage provision falls significantly following the monetary tightening shock. The constrained access of borrowers to credit reinforces the contractionary response of aggregate demand and prices to monetary tightening.

What underlies the reduced lending activity of banks? To answer this, we start by noticing that the deposits spread – the difference between the short-term interest rate and the deposit rate, – jumps on impact following a monetary policy tightening shock (panel ‘Spread-Deposit5YLT’ on Fig. 10).¹⁹ An increase of the interest rate makes cash a more expensive source of liquidity as compared to deposits, thereby making demand for deposits more inelastic. This change in elasticity increases bank market power, and banks widen their deposit spreads optimally. As seen on the panel ‘Deposit rate’ on Figure II in Appendix A, banks increase the deposit rate not as much as the short-term rate hikes, implying that deposit rate is kept relatively low as compared to the short-term interest rate. This finding is consistent with the implications of theoretical model in Drechsler et al. (2017), which demonstrates that the increase of deposits spread in response to monetary tightening is optimal for banks’ profit maximization, until the elasticity of demand for bank deposits reaches the level -1 , at which point a further increase becomes unprofitable.

that arises when bank, nonbank and total mortgages are included in the same VAR, as these variables are essentially collinear.

¹⁹ The panel ‘SpreadDeposit5YLT’ in Fig. 10 reflects the spread on deposits with maturity 5 years and longer. In the baseline setup, we show the response of the deposit spread on fixed deposits with maturity of 5 years and longer, as long-term deposits serve as the most relevant funding source for the long-term mortgage lending. Qualitatively the same result – a significantly positive response, – is found for spreads on deposits of all maturities that the data are available for – notice deposits 1 to 32 days, 32 to 91 days, 91 to 185 days, 1 year, 1 to 3 years, and 3 to 5 years maturity fixed deposits (results are available upon request). No weighted average deposit rate data are available for our sample period, 2004M5–2019M8.

Increased deposits spread makes deposits a more costly liquidity instrument compared to alternatives. We support this by showing that alternative liquidity instruments become more attractive for deposit holders than bank deposits after monetary tightening. In particular, we make use of the data on the investment rate that serves as a readily available alternative for retail deposit holders – an interest rate on the Postbank investment accounts,²⁰ and compute the spreads between the Postbank investment rate and the rate on retail bank deposits for a range for maturities. As shown on Figure I in Appendix A, these spreads with the Postbank investment rate feature positive response to monetary tightening for all the deposit rate maturities, suggesting that bank deposits become less attractive instrument for deposit holders than another investment option after the short-term rate hike. This result is particularly relevant in the context of finding in Sanfilippo-Azofra et al. (2018) demonstrating the effectiveness of the bank lending channel in the positive deposits spread environment, where diverting deposits to alternative liquidity instruments is attractive for deposit holders.

Thereby, depositors substitute deposits with the alternative instruments, what drives a persistent negative response of bank deposits to monetary tightening as seen on panels ‘Bank deposits’ and ‘Long-term bank deposits’ on Fig. 10. Banks offset the fall in deposits by increasing the wholesale funding (panel ‘WholesaleBanks’ in Fig. 10) in order to fund profitable lending operations, but this offset is only partial. This outlined shift in liabilities’ of the banks’ balance sheets is consistent with findings of Drechsler et al. (2019) analyzing the response of bank deposits spreads and of the volume of bank deposits upon the increase in the short-term interest rate and demonstrating the strong negative effect of Fed tightening on the bank deposit volumes.

Our result of increased deposits spread and reduction in the volume of bank deposits driven by the monetary tightening could be seen as the

²⁰ The bond market instruments might not be readily available for retail deposit holders due to relatively high lump-sum amount required for the initial investment, which is not the case for the Postbank investment accounts offering saving instruments with a low threshold of R 40, which is an approximate equivalent of USD 2.26, see <https://www.postbank.co.za/> for details.

evidence of the deposits channel of monetary policy being operative. To the best of our knowledge, this is the first empirical evidence of the deposits channel effectiveness in the context of an emerging market economy. Notably, our finding is consistent with a high degree of concentration of the banking sector in South Africa that underlies the deposit channel effectiveness (see Section 2.2 for details).

4.2. Credit supply effects of monetary policy shifts

In this section we analyze the housing market effects of changes in the composition of supply of homeloans driven by monetary tightening to evaluate the effectiveness of the bank lending channel.

To begin with, the evidence from our first VAR model indicates that unlike banks, nonbank mortgage providers increase their issuance of homeloans in response to monetary policy tightening, see panel ‘Nonbank mortgage issuance’ in Fig. 10. This finding is in line with the empirical results of Drechsler et al. (2019) and Leu and Robertson (2021) showing that in the US, after monetary tightening, the reduction in bank mortgages is partially offset by the rise in nonbank mortgages. It also mimics the theoretical finding of Nelson et al. (2018) in the New Keynesian model incorporating banks and shadow banking. The expansion of nonbank lending could be seen as a result of their retained capacity to provide credit and to meet the demand for home loans that is not met by the banking sector, at least partly, due to the relative stability of nonbank funding sources, as compared to banks. We have already raised arguments to support this stability of funding condition in Section 2.3: first, referring to the pre-arranged nature of primary market allocation of debt securities by the SPV of the SA Home Loans Group, and second, referring to the examples of episodes of notes issues taking place in the aftermath of short-term rate hikes.

In addition to the considerations above, we run a larger VAR model, shown in Figure I and II in the Appendix A, to obtain the VAR evidence about the stability of nonbank funding sources. Specifically, we analyzed the response of the volume of interest-bearing securities on the balance sheets of nonbanks to the monetary tightening shock. It is worth mentioning that the volume of interest-bearing securities on the liabilities side of the balance sheets of nonbanks in the dataset available to us, exceeds the volume of mortgage-based securities, with the latter being of a particular interest for us given our focus on mortgage issuance and housing market. However, the data on mortgage-based securities issued by nonbank sector specifically is not available, and we use the volume of interest-based securities as its proxy to examine the effect of monetary tightening on the funding of nonbanks. Another data-related concern is that the aggregated data on the balance sheets of nonbank financial intermediaries in South Africa is only available at quarterly frequency and does not match the monthly frequency of the dataset used to estimate the VAR. We therefore resort to interpolating the quarterly volumes of interest-bearing securities to monthly series in order to include this variable in the VAR.²¹ The resulting impulse responses indicate an insignificant reaction of securities as a source of nonbank funding following a monetary policy shock (see panel ‘Nonbank wholesale funding, securities’ on Figure II in the Appendix A), thereby suggesting the absence of a decline in nonbank funding availability in the aftermath of tightening shocks. This stands in a sharp contrast with the significantly negative effect on bank deposits as a source of funding for banks and offers support to our premise of relative stability of nonbanks’ balance sheets.

For SA Home Loans, the origination of mortgages to government sector employees helps mitigate the credit risk of the loan portfolio, due to the stability of the borrowers’ income (see Section 2.3 for details). Supported by the relative stability of their funding sources, nonbanks increase mortgage issuance by 16 percentage points on impact, with

²¹ The details of the nonbank financial intermediaries data series included in the VAR could be found in Table I in the Appendix A.

the elevated level persisting for about 12 months. The shift in the composition of the supply of homeloans is captured by a persistent positive response of the MIX variable to a monetary policy shock, implying an increase in the share of homeloans issued by nonbanks versus banks (see ‘MIX’ panel on Fig. 10). Thus, monetary policy tightening brings about a significant and persistent shift in the supply of housing finance. Notably, our findings are in line with the effect of the Fed tightening documented in Drechsler et al. (2019) and Leu and Robertson (2021) — a sharp contraction of the bank mortgage lending and the increase in lending provision by nonbanks post-monetary policy shock brought about by sizeable reduction of banks’ deposits funding during monetary policy tightening cycles.

Finally, we empirically address the question whether changes in the composition of the homeloans supply have implications for the housing market. We employ the evidence from larger VAR model to show that the answer to this question is ‘yes’.

Price indices characterizing different segments of the housing market are significantly affected by shifts in the composition of homeloan supply driven by monetary tightening as represented by impulse responses to the MIX shock shown on Fig. 11. A reduction in the share of bank-issued mortgages – equivalently, an increase in the MIX variable – leads to a significant decline in house price indices for free-standing houses, three-bedroom apartments and two-bedroom apartments; see the bottom raw panels in Fig. 11. The increase of the nonbank share in the total issuance of home loans by 1 percentage point causes house prices to drop by 0.16%–0.24% depending on the type of home. To contextualize, based on the impulse response estimates from Section 4.1 a standard short-term rate hike announced by the South African Reserve Bank of the size 25 b.p., would lead to a 3 percentage points increase of the nonbank share in the total issuance of homeloans, and such an increase would induce house prices to contract by 0.48%–0.72%. Notably, the effect of this magnitude would be exclusively due to bank lending channel.

The results of robustness checks employing the alternative model specification – the use of aggregated house price index instead of disaggregated house price indices, – and using the alternative identification of the MIX shock support our baseline results and are outlined in Section 4.3 below.

The demand for larger-size properties appears to be somewhat more sensitive to shifts in the composition of housing finance: house price indices for freestanding houses and larger flats exhibit a decline in response to the MIX shock of greater magnitude. However, the difference in responses between segments of property size is only marginal (see Fig. 11). This pattern may suggest a greater reliance on bank funding among borrowers purchasing larger properties, whereas households buying smaller properties are less affected.

In sum, our empirical results indicate that changes in the bank supply of homeloans induced by monetary policy shifts have real implications and affect house prices significantly. This result implies that the bank lending channel of monetary transmission in South Africa is operative.

4.3. Robustness checks

To establish the robustness of our results, we perform sensitivity and validity checks to confirm that our findings remain consistent across alternative specifications and assumptions.

1. To address the threat of incorrect identification of the credit supply shock employed in our baseline analysis, we use the alternative identification scheme using recursive restrictions as in Iacoviello and Minetti (2008) and Ludvigson (1998). In this check, the MIX variable capturing the composition of the credit supply is ordered after the manufacturing production and prices, and before the house price index in the second VAR model. The rationale for this timing assumption is that innovations in the composition of loan supply have no contemporaneous effect on consumer prices and aggregate demand, while

house prices are affected by shifts in the credit supply composition contemporaneously. This assumption is based on the observation that house prices are a fast-moving variable that is unconstrained to respond to housing finance conditions within a month. To address the threat of incorrect restrictions in this exercise, we also run a check for an alternative variables order, where the MIX variable is ordered the last. This alternative specification assumes that house prices are slow to respond to shifts in credit supply.

The resulting impulse responses are qualitatively similar to our baseline results (see Figures V and VI in Appendix A). Disaggregated house prices' response to the MIX shock is significantly negative, but of a smaller magnitude. This evidence indicates that our baseline result of the significant negative response of the housing demand to an increase in the nonbanks' share of mortgage supply holds in a setup with the alternative identification of the credit supply shock.

2. To address the threat of omitting some house market segments from the analysis, when focusing on disaggregated house price indices in the baseline analysis, we resort to specification, which uses the aggregate house price index. In this exercise the house price index series is the same as the one used in our first VAR model estimation.

The response of aggregate house prices to an increase in the nonbanks' share of mortgage supply is qualitatively and quantitatively similar to our baseline results (see Figure IV in Appendix A), thereby corroborating their robustness.

5. Conclusion

Our study provides evidence on the effectiveness of the bank lending channel of monetary policy transmission in South Africa. Exogenous changes in monetary policy have significant implications for housing market via shifts in the composition of the homeloans supply. The deposits channel of monetary transmission is also operative — banks increase deposits spread, while deposits flow out of the banking system in response to monetary tightening. As deposits are the main funding source for banks' lending operations, the effective deposits channel provides foundation for the bank lending channel to operate, such that monetary policy shock has real effects via the financial channel.

Our results imply that a relevant macro-financial framework for monetary policy analysis should incorporate a banking sector featuring banks' market power characteristics and balance sheets variables that propagate and amplify monetary policy shocks' effects on real economy.^{22,23}

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary material related to this article can be found online at <https://doi.org/10.1016/j.qref.2025.102041>.

²² For examples of such modeling frameworks, see Diamond and Rajan (2005), Diamond and Rajan (2011), Bruche and Suarez (2010), Ferrante (2019) and Iacoviello (2015), among others.

²³ During the preparation of this work the author(s) used Writefull in Overleaf in order to check grammar and help readability. After using this tool/service, the author(s) reviewed and edited the content as needed and take full responsibility for the content of the publication.

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