South Africa’s 2003–2013 credit boom and bust: Lessons for macroprudential policy

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ABSTRACT

We evaluate South African financial stability policy from 2003 to 2013 – the country’s most significant credit boom and bust cycle. This cycle overlapped with both rising bank capital adequacy ratios and the global financial crisis of 2007/8. We use a dynamic stochastic general equilibrium model to identify South African Reserve Bank (SARB) interventions and run counterfactual policy scenarios. We document two instances of policy inaction. Our counterfactual scenarios suggest that, with the benefit of hindsight, the SARB took the correct steps to raise capital requirements during the credit boom, but could have persisted with raising capital requirements for longer (past 2004), and could have adopted a looser policy stance after the global financial crisis to mitigate the credit bust. Our findings reaffirm the importance of counter-cyclical action, the usefulness of bank capital as a buffer against unexpected shocks to build financial sector resilience, and the need for independent but close coordination between monetary and macroprudential policy. In addition, because of structural differences between household and firm credit, the SARB should consider buttressing the uniform countercyclical capital buffer with sector-specific capital requirements.

KEYWORDS

Macroprudential policy; monetary policy; central bank; bank history; credit cycle

Introduction

A global economic boom in the early 2000s was abruptly ended by the global financial crisis of 2007/8, one of the most serious financial crises in modern history. The subsequent sustained global downturn was the most significant since the Great Depression of the 1930s.1 Despite a significant boom and bust credit cycle, South Africa did not experience a single bank failure and the financial system remained sound. Even so, the global financial crisis exposed the lack of a system-wide (‘macroprudential’)2 approach to promote financial stability in South Africa (Hollander and van Lill 2019).

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1There are a number of excellent summaries of the global financial crisis and its consequences (see e.g. Gorton and Metrick 2012). For perspectives of the crisis in an historical context, see Reinhart and Rogoff (2008, 2009, 2014).

2As the portmanteau implies, macroprudential policy refers to policy measures, typically bank prudential measures, that the central bank can use to limit systemic financial instability and its associated macroeconomic costs (Flannery 1995). For an overview of the origins of the term ‘macroprudential’ see Clement (2010), while for comprehensive literature © 2021 The Author(s). Co-published by Unisa Press and Informa UK Limited, trading as Taylor & Francis

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We examine South Africa’s 2003–2013 credit boom and bust episode to evaluate the South African Reserve Bank’s (SARB) financial stability policy stance – what they did right and, with the benefit of hindsight, what they could have done to mitigate the procyclicality of the financial cycle. An important aspect of the post-crisis regulatory reforms (known as Basel III) that we focus on here are bank capital requirements, which is the primary instrument the SARB adopted to stabilize financial imbalances.

First, we provide a narrative account of the pre-crisis credit boom, in which the South African banking supervisor (which was housed in the SARB) became increasingly concerned with accelerating credit growth following the small banking crisis of 2002/3. In doing so, we identify interventions of the de facto macroprudential authority (the SARB) in the pre-crisis credit boom period. Second, we document the SARB’s post-crisis regulatory reforms to shed light on the macroprudential policy decisions and developments in response to the global financial crisis. To identify the impact of the SARB’s policy actions on the economy, we estimate a dynamic stochastic general equilibrium (DSGE) model over the 2003–2013 credit boom and bust cycle.

We document two instances of policy inaction that provide lessons for countercyclical macroprudential policy going forward. First, it is clear that the SARB recognized that credit extension was excessive from 2006 to 2010. This suggests that by its own analysis, the tighter macroprudential policy stance that we document in 2003/4 did not curb credit extension sufficiently in the final build-up to the global financial crisis. With hindsight, macroprudential policy could have been tighter. Second, private sector credit conditions remained excessively tight from 2010 to 2012. We argue that the second policy inaction bias was to not reduce capital requirements following the 2007/8 crisis.

Drawing from these experiences, we reaffirm the central tenets of Basel III macroprudential policy: (1) the importance of bank capital as a buffer against unexpected shocks (i.e. the role of bank capital in building financial sector resilience); (2) the appropriateness of counter-cyclical macroprudential policy, especially when credit growth is excessively weak and therefore constrains economic growth; and (3) the need for independent but close coordination between monetary policy and macroprudential policy. In addition, because of structural differences between household and firm credit, the SARB should consider buttressing the uniform countercyclical capital buffer with sector-specific interventions.

Our approach takes into account the well-established link between credit growth and financial crises. This link arises because a period of excessive credit growth often creates real economic imbalances and over-leveraged banks which unwind during a crisis with significant externalities. Eichengreen and Mitchener (2004), for example, characterize the string of bank failures around the Great Depression as a ‘credit boom gone wrong’. Using a long run historical dataset for 14 countries over the years 1870–2008, Schularick and Taylor (2012, 1058) find that credit growth is a powerful predictor of financial crises. They caution that ‘policymakers ignore credit at their peril’. In a study of 36 advanced and

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3In public policy, inaction bias is the tendency to favour ‘doing nothing’ (policy inaction) over ‘doing something’ (policy action) (Howitt and Wintrobe 1995; McConnell and ‘t Hart 2019).
emerging market economies, Drehmann, Borio, and Tsatsaronis (2012), show that over a three-year horizon, a credit gap of over 10% (i.e. where the ratio of credit to GDP is 10% higher than its long-run average) predicts 67% of crises. Similarly, Gourinchas and Obstfeld (2012) describe a domestic credit boom as a ‘smoking gun’ that consistently predicts bank failures and financial crises, both in advanced and emerging economies.4

As highlighted in Figure 1 South Africa has experienced a number of credit boom and bust cycles since 1970.5 Despite this, Laeven and Valencia (2013, 2020) find that South Africa has not experienced a single systemic banking crisis over their entire sample period (1970–2017). Instead, all of these credit cycles coincide with non-banking or external financial crises – the 1973 oil crisis, the 1984/5 South African currency and external debt crises, the sovereign debt restructuring in the late 1980s, the 2008 global financial crisis, and the 2015 rapid exchange rate depreciation (classified by Schularick and Taylor (2012) as a currency crisis).

For the most significant credit cycle – the 2003–2013 cycle – a number of explanations have been proposed for South Africa’s financial system resilience including: supervisory lessons learnt during the 2002/3 small banking crisis, a budget surplus leading into the crisis, a credible monetary policy framework, and a sound bank regulatory framework (International Monetary Fund 2008; Gilbert, Calitz, and Du Plessis 2009; Manuel 2009; National Treasury 2011; Kganyago 2012; Hollander and van Lill 2019; Havemann 2020). Given the remarkably strong link between credit cycles, financial crises, and recessions together with the regularity of adverse unintended consequences of policy and the regulatory environment (Calomiris 2010; Schularick and Taylor 2012), we document and estimate the impact of SARB policy interventions on the 2003 to 2013 cycle. That is, we focus on the fundamental forces behind credit booms and busts through the interaction between financial regulation (capital adequacy requirements), monetary policy, and bank leverage.

**The historical context**

**Global economic conditions**

The global financial crisis of 2007/8 ended a long, apparently benign global expansion, the most significant four-year global expansion since the early 1970s (International Monetary Fund 2006). Accompanying the economic upswing was a sustained rise in credit extension and asset prices – the inherent weaknesses in national financial regulatory frameworks contributed to excessive credit growth and the emergence of a series of complex financial regulatory instruments (Gorton 2008; Taylor 2009). This sustained, and unchecked, upswing in global credit conditions led to banks becoming increasingly over-leveraged (Borio 2014), similar to how previous crises had played out (Calomiris 2010; Laeven and Valencia 2020). Inevitably asset prices started declining and defaults

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4Together with externalities that arise along a time-dimension are cross-sectional externalities (Hollander and van Lill 2019). For example, systemic risk can arise through contagion because of the interconnected nature of interbank funding (Georg 2013; Havemann 2020).

5See Farrell and Kemp (2020) for a comparison of identifying approaches. Notably, using data in log levels, their model-based approach and turning-point analysis do not consider the cycles in the 1970s and late 1990s. Figure A1 (in the Appendix) compares percentage changes of the SARB’s financial and credit cycles with business cycle downward phases.
increased. Notably, a now well-established literature finds that Basel II regulatory requirements were unintentionally procyclical by design (ECB 2009; Repullo and Suarez 2013).

This lack of focus on system-wide risk may have led to US, and by extension global, monetary policy being too loose in the period leading up to the crisis (Taylor 2009). Moreover, there is evidence of an asymmetry in how inflation targeting was applied in practice. During periods of low inflation, central banks were less inclined to raise rates even with evidence of an asset price bubble – as Issing (2011, 6) notes: ‘policy forbearance vis-à-vis dis-inflationary forces fuels financial exuberance and financial exuberance in turn creates financial imbalances.’ Such loose monetary policy most likely created credit bubbles (Rajan 2006; Borio and Zhu 2012) and encouraged an increased risk appetite or ‘search for yield’ (see also Diamond and Rajan 2009).

The effects of the asset price collapse challenged the prevailing intellectual orthodoxy of the time, the ‘Bernanke-Gertler consensus’, that ‘inflation-targeting central banks need not respond to asset prices, except insofar as they affect the inflation forecast’ (Bernanke and Gertler 2001, 253). Most importantly, the view at the time was that monetary policy should not be adjusted ex ante to dampen (or ‘lean’ against) perceived asset-price bubbles.

In retrospect, this lack of concern about asset price growth and increased leverage created significant risks (Borio 2014; Eichengreen 2017). This credit-fuelled boom created the impression of a strong economic expansion, but it masked unhealthy global imbalances. These imbalances not only included large current account deficits/

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6Taylor’s critique is notable in that he shows that the Federal Reserve kept interest rates artificially low, even within a strict rules-based inflation-targeting framework. The implication is that the Federal Reserve misunderstood the nature of the pre-crisis boom – believing that potential growth was structurally higher. Indeed, Federal Reserve Chair Alan Greenspan appeared to think that technological progress had structurally accelerated economic growth.

7The way this intellectual consensus was executed in practice is perhaps best summarized by the approach of Alan Greenspan, the Chairman of the Federal Reserve between 1987 and 2006. The ‘Greenspan Standard’ (Blinder and Reis 2005) became known as the ‘mop up after strategy’ or ‘clean, don’t lean’: asset-price bubbles should be allowed to burst, and after they had burst, monetary policy should be used to protect the system from the fallout (‘clean’).
surpluses (or, equivalently, net capital inflows/outflows), but also rising financial imbalances (Dorrucci and McKay 2011). Most notably, ‘excess financial elasticity’ led to a rapid increase in cross-border gross financial flows and the build-up of unsustainable credit and asset price booms (Borio and Disyatat 2011).8

From a financial regulatory perspective, Eichengreen (2017) draws a parallel with the ‘New Era’ – the long boom of the 1920s, which preceded the stock market collapse of 1929 and the subsequent Great Depression. The two boom periods, 80 years apart, had a number of common features. In particular, during both, the strong economy and low interest rates encouraged increased risk-taking, and politically well-connected and profitable banks discouraged any attempt at tightening of financial regulation, despite concerns about rising asset prices and risks. In a survey of the history of banking crises, Calomiris (2010) argues that ‘risk-inviting microeconomic rules of the banking game established by governments [the policy environment] have been the key necessary condition for producing banking distress’. Such risk-inviting policy environments are typically attributable to bank entry restrictions, subsidies (e.g. deposit insurance), prudential regulatory failures, and the regulatory response to crises. The global financial crisis and subsequent Great Recession revealed these fissures in the international financial and monetary system (Dorrucci and McKay 2011) and led to sweeping financial regulation and supervision reforms across the globe (Borio, Farag, and Tarashev 2020; World Bank 2020).

**South Africa’s pre-crisis credit boom**

Similar to the rest of the world, during the boom of 2003–2008, South Africa experienced strong economic growth and low inflation. The economic growth was mainly consumption led, and was supported by a substantial increase in credit extension (see Figure 2). As highlighted in Table 1, in the six years before 2009, output expanded by 4.5% a year on average, and consumer price inflation remained within the 3 to 6% target range. Credit growth accelerated to average 19.2% a year. There was also evidence of some credit market heterogeneity between 2000 and 2005 (see Figure 3). Corporate credit growth was relatively volatile, while household credit showed signs of a relatively strong recovery after the small bank crisis in 2002/3. In the slow recovery after the global financial crisis, it is apparent that corporate credit shrunk more rapidly than household credit. We explore these credit market dynamics and the role that prudential regulation played over the credit cycle in some detail below.

Indeed, the South African banking supervisor (which was housed in the SARB) became increasingly concerned with accelerating credit growth at the onset of the pre-crisis credit boom.9 Changes to required capital adequacy (CA) levels can be linked to three separate instances of regulatory intervention, with the dates indicated in Figure 4.

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8Borio and Disyatat (2011, 24) define financial elasticity to be ‘the degree to which [national] monetary and financial regimes constrain the credit creation process, and the availability of external funding more generally’. This ‘excess elasticity’ view therefore stands in contrast to the ‘excess savings’ view that focuses on current account (or, equivalently, net capital flow) imbalances. The important implication here for financial stability, which motivates a role for a globally unified macroprudential framework, is ‘how to address the “excess elasticity” of the overall system, not “excess saving” in some jurisdictions’ (ibid).

9The authors conducted a series of interviews with the Banking Registrar of the time (Errol Kruger), staff of the banking supervisory team, and senior bank compliance and treasury teams from FirstRand, Nedbank, and Standard Bank. Mr
The first instance (1) was Bank Supervision Circular 8/2003, issued on 22 April 2003, which made a number of changes to the quality of capital, which had the overall implication of raising the quantity of capital held. In particular, the treatment of preference shares was altered, which narrowed the definition of regulatory capital.

Kruger highlighted how he considered the build-up of credit to be a concern. Bank compliance officials noted that there were also many informal discussions during on-site inspections where the Registrar and banking regulation team discussed risks. See also press reports referring to the period, e.g. Hogg (2016).
Figure 3. Credit market data for households and non-financial corporations. Notes: The earliest (red) vertical line represents the start of the credit boom. The three latest (green) vertical lines correspond to the three identified macroprudential policy interventions in 2003/4 (see Figure 7).

Figure 4. Repo rate and capital adequacy (%). Notes: In the years leading up to the global financial crisis, the monetary policy committee reduced the repo rate (upper panel). At the same time, capital adequacy increased in part due to three circulars from the Registrar of Banks (lower panel). Capital adequacy levels subsequently declined marginally as credit growth accelerated, in part due to the procyclicality of capital adequacy requirements. Overall, capital adequacy levels rose 1 percentage point over the period.
The second instance (2) was Bank Supervision Circular 1/2004, issued on 20 February 2004, which set out the consultation on the implementation of Basel II. This circular made it clear that banks would have to increase capital ahead of the full implementation of Basel II on 1 January 2007. Moreover, this circular highlighted that capital levels would be within the Registrar’s discretion.\(^\text{10}\)

The third instance, (3) on 13 December 2004, Circular 19/2004 made changes to calculations of quality of capital. The effective date was January 2006. The changes included the revised definitions that were required in terms of Basel II and clarified that at least 60% of the minimum required capital adequacy ratio had to consist of primary share capital, without any reliance on hybrid debt instruments.

The overall effect of these circulars was that overall capital adequacy levels rose from 11.96% in March 2003 to 13.67% in March 2005, i.e. by a cumulative 171 basis points (bps). This exogenous imposition of an increased capital adequacy requirement provides a unique opportunity to test the impact on the broader economy.\(^\text{11}\)

These interventions were aimed at specific parts of the regulatory system, but formed part of a broader trend towards higher capital adequacy requirements, and a long increase in tier 1 capital adequacy over a number of years. As highlighted in Figure 5, the sustained rise in tier 1 capital adequacy ratio from approximately 6.5% in 1994 to 13% was not entirely due to regulatory intervention. A series of other shocks led to rising capitalization. For example, the small bank crisis of 2002/3 led to a consolidation of banks leading to larger better capitalized banks, while the post global financial crisis period led to significant ‘voluntary’ capital accumulation as banks increased capital adequacy levels.\(^\text{12}\) From an econometric perspective, it is important to establish that the regulatory action is weakly exogenous before proceeding. The purpose of our econometric analysis in this paper is to identify this regulatory (exogenous) component to validate our finding that the SARB indeed tightened bank regulation during the pre-crisis credit boom.\(^\text{13}\)

### Methodology

**The model**

We use a dynamic stochastic general equilibrium (DSGE) model to identify the impact of the SARB’s policy actions on the economy. The model that we use is based on Hollander and Liu (2016a) and Hollander and van Lill (2020), which are an extension of Gerali et al. (2010) and Hollander and Liu (2016b).\(^\text{14}\) Standard new-Keynesian DSGE features appear in

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\(^{10}\)A detailed discussion of these changes can be found from page 26 onwards of the Circular.

\(^{11}\)For a detailed discussion of the endogeneity problem inherent in work of this kind, and for relevant weak exogeneity tests, see Havemann (2019).

\(^{12}\)As highlighted in the following section, even this voluntary increase in bank capital was explicitly encouraged by the SARB.

\(^{13}\)In the model described below, banks target a non-binding capital adequacy ratio that is subject to ‘regulatory shocks’ to a target capital adequacy ratio. These regulatory shocks may be anticipated or may be due to precautionary measures taken by the banks themselves. Therefore, it is highly likely that regulatory changes will occur with both leads and lags. Our general equilibrium framework attempts to identify these regulatory requirement shocks related to tier 1 capital adequacy ratio.

\(^{14}\)Since our model is a log-linear representation of the economy, we cannot examine asymmetrical dynamics. See Angelini, Neri, and Panetta (2014) for important caveats to keep in mind when nonlinear effects are not accounted for during crises.
the model to help match observed empirical dynamics: habit formation in consumption, physical investment adjustment costs, and sticky price- and wage-setting. The model environment comprises of households, wholesale and retail firms, labour unions, and banks. This framework also includes a non-trivial financial sector structure that is well-suited for identifying the effects of macroprudential policy in South Africa.

In this model, households have access to savings as well as credit. Their savings portfolio is allocated between deposits and equity securities. The price of equity is determined by their demand for equity investment, and their borrowing is constrained by their wage income and equity holdings (which are a proxy for creditworthiness). The household budget constraint requires that their wage income, gross returns on deposits, capital gains (or losses), dividends, and new loans cover current consumption, new savings and the repayment of previous loans. Entrepreneurs manage the production of goods by wholesale firms. They finance production activities with equity and credit, and use household labour and physical capital as inputs in the production process. Retail firms receive these wholesale goods, differentiate them in a monopolistically competitive market, and sell them at a markup over marginal cost. But because only a fraction of firms can reset their prices in a given period, nominal rigidities (sticky prices) arise (Calvo 1983). Similarly, unions aggregate labour supply and introduce Calvo-type sticky wages. This standard feature of new-Keynesian DSGE models introduces a role for monetary policy to minimize inflation and output instability. Specifically, the monetary authority follows the conventional Taylor-type monetary policy reaction function (Orphanides 2003). Finally, since both banks and firms issue equity, the value of equity influences credit spreads through both the financial accelerator channel (demand-side of credit) and the

Figure 5. Capital adequacy ratios. Notes: Tier 1 capital consists primarily of shareholders’ equity (common stock) and retained earnings. From a regulator’s point of view, tier 1 capital is the core measure of a bank’s financial strength. Figure A2 in the appendix shows that non-tier 1 capital holdings have been maintained at a round 3% since 2001.
bank capital channel (supply-side of credit) (Hollander and Liu 2016a, 2016b). This equity price channel reflects the market-based nature of South Africa’s financial system.

In line with South Africa’s concentrated banking system, banks operate within a monopolistically competitive market, are predominantly deposit-financed, and supply the majority of household and corporate credit (Hollander and van Lill 2019). We model this environment as follows. A bank consists of two branches. The first (wholesale) branch manages the bank’s capital adequacy requirements by minimizing the difference between their current capital adequacy ratio and the target requirement ratio (as per Basel regulations). We assume that this target ratio is exogenous, time-varying, and fully-determined by the macroprudential authority. The adjustment costs associated with managing the CA ratio is passed on to long-term interest rates. The first branch collects deposits from households and transfers these funds to the second branch. The second (retail) branch sells differentiated loans to households and entrepreneurs at their individual markups over the cost of funding (the rate of return on deposits and the cost associated with bank capital management). The second branch faces a cost to adjusting interest rates on their loans which allows for incomplete pass-through of interest rate changes due to monetary policy or macroprudential policy, for example.

Importantly, bank capital provides a source of funding to supply credit (i.e. to acquire assets on its balance sheet) and it serves as a buffer against insolvency. Banks accumulate capital through valuation changes and retained earnings on the interest rate margin between retail loans and deposits. Furthermore, since banks tend to actively adjust the level and composition of their assets and debt, rather than equity, to manage their capital adequacy positions, bank capital accumulation is persistent (Hollander 2017). In the model, the bank capital accumulation equation is as follows:

\[ K^B = (1 - \delta^B)K_{t-1}^B + \varphi_\psi(\Delta Q^\psi)\Psi^B + \Pi_{t-1}^B, \]

where \( K^B \) is tier 1 bank capital and \( \delta^B \) is the bank capital depreciation rate, capturing management costs for banks. We estimate this value to be 0.09. Retained earnings (\( \Pi_{t-1}^B \)) are previous period bank profits net of dividend payments. \( \Delta Q^\psi \) is the equity price change and \( \Psi^B \) is the stock of common equity. \( \varphi_\psi \) measures the pass-through effect of equity price changes to bank capital.

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15Figure 5 shows that banks voluntarily hold a precautionary capital buffer over-and-above the minimum total capital requirement. In fact, Figure A2 shows that the difference between the total CA ratio and the tier 1 CA ratio has been remarkably stable since 2001. We therefore assume that the macroprudential authority has full control over the tier 1 CA requirement, which means that we assume that this buffer is time invariant. We also abstract from measuring the extent to which Basel regulations have procyclical effects (Republo and Suarez 2013; Angelini, Neri, and Panetta 2014). The reason for this is that preliminary estimations suggest that the endogenous (cyclical) response of the target CA ratio is small in terms of magnitude (−0.007) and ambiguous with respect to its sign: [−0.0541, 0.0402]. Furthermore, it is clear that the SARB is more in favour of macroprudential policy discretion than a rule: ‘Note that instruments for macroprudential policy should not be applied mechanistically, but should be subject to judgement’ (SARB, Financial Stability Review, March 2015). It is therefore a reasonable assumption to specify the reaction function of the target CA ratio (\( \tau_t \)) as an exogenous AR(1) process: \( \tau_t = \ln(\tau_t) = \rho, \ln(\tau_{t-1}) + \epsilon_{\tau t} \), where \( \epsilon_{\tau t} \) is an i.i.d. shock to the target CA ratio.

16The model assumes that bank capital valuation changes are linked to its common equity shares (i.e. the extent of mark-to-market accounting and/or equity issuance by banks). It does not assume that the value of capital on a bank’s balance sheet (book value) is its market value. It assumes some degree of pass-through from changes in market value to the value of tier 1 equity capital as a way to model observed dynamics between leverage, credit spreads, and equity (stock) prices.
price changes on total bank capital (i.e. the extent of mark-to-market accounting and/or equity issuance by banks; we estimate this value to be 0.18).

This banking sector specification is particularly useful because it provides a theoretical rationale for the observed relationship between the aggregate bank capital adequacy ratio of South African deposit-taking institutions and the retail (term) spread. Figure 6 shows, over the period 1995 to 2018, that the term spread is strongly positively correlated with the tier 1 CA ratio (0.57). That said, the link between the two observed series is not obvious since it is well-known that both the term spread (which captures, in part, risk and expectations about monetary policy over the term structure of interest rates) and the capital adequacy ratio (which captures, in part, the degree of bank risk-taking and prudential regulation) is strongly correlated with the business cycle. In addition to business cycle forces, macroprudential policy can affect CA ratios on the margin as well.\(^\text{17}\) This requires a robust identification approach.

In this model, the term spread between the long-term rate, \(R^L\), and the short-term rate, \(R\), (which is under the control of the monetary authority) has a direct link to deviations of the observed capital adequacy ratio from the macroprudential authority’s required target. This relationship is derived from the profit-optimising behaviour of the wholesale bank, represented in the following form:

\[
R^L - R = -F(CA - \tau) + c, \tag{2}
\]

where \(CA = K^B/L\) is the tier 1 CA ratio, \(\tau\) the regulatory requirement, \(c\) the long-run (steady-state) spread, and \(F(\cdot)\) is a quadratic function that captures the pecuniary externality of deviations from bank capital requirements. Eq. 2 thus implies that deviations of the observed CA ratio from the macroprudential authority’s required target drives a wedge between the long-term lending rate and the short-term funding rate. For example, in aggregate, if the macroprudential authority raises capital requirements the banking sector becomes under-capitalized which widens the spread between long- and short-term rates, reflecting both heightened banking sector risk and the need for banks to raise their retained earnings to accumulate more capital. At the same time, banks will tend to reduce their credit extension to lower the extent to which they have become over-leveraged. Alternatively, in a financial crisis, spreads widen to the extent that bank capital falls less than bank risk-weighted assets (a fall in \(K^B/L\)). In response to either heightened risk of default (by both banks and borrowers) or interventions from the macroprudential authority, banks will attempt to retain or raise their precautionary capital buffers (a rise in \(\tau\)). As a result, banks accumulate larger capital buffers and the observed CA ratio converges toward the target ratio. We can therefore observe rising CA ratios and widening spreads. It is important to note here that \(R^L\) is the ‘benchmark rate’ for retail banks, who have market power over the long-term retail interest rate they set for households and firms. Furthermore, the effectiveness of the monetary policy transmission mechanism through the interest rate channel can be either mitigated or exacerbated to the extent that CA ratios rise or fall below the target ratio (Hollander and Liu 2016a). This presents a policy coordination problem that we turn to below.

\(^\text{17}\)Note that we are less concerned about the rising trend of the capital adequacy ratio in our analysis than about fluctuations that arise over the business cycle. We therefore linearly detrend the logarithm of the observed CA series in order to bring the data to the model (see e.g. Pfeifer 2020).
Clearly, the mechanisms at play here are highly complex and involve the interaction of demand-side, supply-side, and regulatory factors. To improve the identification of macro-prudential policy, we deviate from the model specification in Hollander and van Lill (2020) in two ways. First, following Angelini, Neri, and Panetta (2014), we allow for different risk-weights \( v_H, v_F \) on household and firm credit in the CA ratio to account for the Basel (risk-sensitive) regulation of capital:

\[
CA = \frac{K^8}{\omega_H L^H + \omega_F L^F},
\]

where \( L^H \) and \( L^F \) are loans (credit) to households and firms. We estimate \( \omega_H \) and \( \omega_F \) to be slightly higher (0.69 and 0.55) than their average shares of total credit (0.52 and 0.48). An important reason for this specification is to better match the observed sector-specific credit data to the observed aggregate CA ratio. Second, we allow for capital adequacy regulatory requirements to directly influence the exogenous interest rate mark-ups that banks set on retail loan rates. We estimate this effect to be approximately one-third for both households and firms. This feature attempts to better identify the link between sector-specific interest rate spreads, aggregate bank capital management, and sector-specific credit supply.

Finally, in order to identify fluctuations in the data used to estimate the model we include thirteen exogenous auto-regressive shock processes. The five shocks to the non-financial sector are a technology shock to output, a retail price-setting markup shock, a wage-setting markup shock, an investment shock, and an exogenous spending shock to the aggregate resource constraint. The six shocks to the financial sector are as follows. On the supply side of credit, we have two retail loan rate mark-up shocks to

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Figure 6. Correlation between linearly detrended tier 1 bank capital adequacy ratio for South African deposit-taking institutions and interest rate (term) spread. Notes: The term spread is the difference between the 10-year treasury bond rate and three-month treasury bill rate (quarterly rates).
household loans and firm loans. On the demand side of the credit market, we have loan-to-value ratio shocks to household loans and firm loans. For household savings, we include shocks to the demand for deposits and equity holdings. Lastly, we identify exogenous policy interventions for the monetary authority and the macroprudential authority through the short-term (policy) rate reaction function and the target CA ratio, respectively.

Data and estimation

We estimate the model with South African data using Bayesian methods (An and Schorfheide 2007). Our sample period covers the pre-crisis credit boom in the 2000s, the global financial crisis, and the subsequent recovery period: 1995Q1–2017Q2. Our observable variables are gross domestic product (output), wages, investment, inflation, total household credit, total nonfinancial corporate (firm) credit, 3-month treasury bill yield (short-term interest rate), 10-year Treasury bond yield (long-term interest rate), and the aggregate capital adequacy ratio for deposit-taking banks. Table 2 summarizes these variables and their data transformations before estimation. Since we lack data for the individual retail interest rates for households and firms, we assume that deviations of these rates are anchored to the long-term government rate ($R_L$ in the above model description).

To create a baseline scenario (i.e. the path that the economy actually followed), the estimated model generates 13 shock processes. We are then able to rerun the model using these identified shock processes to provide counterfactual analyses. These results serve to substantiate our critique of the historical credit boom and bust episode in South Africa; from which we highlighted important lessons for macroprudential policy.

Results

The key identification problem, as noted above, regards the exogenous interventions of the macroprudential authority (the SARB) in the pre-crisis credit boom period. Figure 7 plots this shock process as percentage deviations around a zero (steady-state) mean. The vertical red line represents the start of the credit boom (see e.g. Figures 1 and 3), and the vertical green lines correspond to the peaks of the three identified bank prudential interventions in 2003Q2, 2004Q1, and 2004Q4 (see Figure 4).

First, we note that the model does a remarkably good job at identifying the three interventions by the SARB to raise bank capital in the early years of the credit boom. It is also

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18The model is implemented in Dynare, a MATLAB pre-processor which allows for the Bayesian estimation of DSGE models. The estimation procedure uses the Metropolis-Hastings Markov-Chain Monte Carlo algorithm. We set the number of draws to 100,000 (with a burn-in of 0.5) and include three chains. We set the scale parameter for the jumping distribution to achieve an acceptance rate of approximately 25%. This value ensures that the tails of the posterior mode are identified.

19The benchmark rate at which private banks lend out to the public is the prime lending (predominant) rate; historically, the spread between the prime rate and the repo rate has not changed much (currently, 350 basis points). In addition, the prime rate and the predominant mortgage rate for households are essentially the same over the entire sample. Typically, banks quote rates to households and firms at a premium or discount over this benchmark, and since the largest proportion of credit is longer term, we benchmark retail rates to the long-term Treasury bond rate. At a quarterly frequency, the repo rate and the 91-day Treasury bill are also very similar. As a result, we can exploit the empirical relationship between the term spread and the CA ratio, whilst anchoring long term retail rates to the term risk (term premium) present in government rates.

20That is, in steady-state, macroprudential policy does not actively require banks to change their capital holdings.
clear that this tighter regulatory stance was preceded by a fairly large (2.5%) reduction in bank capital requirements which coincided with the onset of the credit boom. This reversal of the policy stance appears to have indeed been necessary. Second, the tightening of credit conditions was reversed in the final years leading up to the global financial crisis, which suggests that the SARB had not identified the downside risk of the build-up of excessive credit. Third, in the aftermath of the global financial crisis and given the banking sectors’ foresight (justified by the Basel regulatory reforms and directives of the SARB, discussed in the following section), bank capital requirements tightened significantly up to 2012.

Table 2. Observable variables and data transformations.

| Variable | Description | Source |
|----------|-------------|--------|
| $\Delta \ln (Y_t) = y_t$ | Gross domestic product | |
| $\Delta \ln (V_t) = v_t$ | Gross fixed capital formation | |
| $\Delta \ln (W_t) = w_t$ | ULC in the non-agric sectors | |
| $\Delta \ln (P_t) = \pi_t$ | CPI inflation | |
| $\Delta \ln (L_t^H) = l_t^H$ | Total household credit | SARB |
| $\Delta \ln (L_t^F) = l_t^F$ | Total corporate credit | |
| $\ln (R_t) = r_t$ | 3-month Treasury bill yield | |
| $\ln (R_t^L) = r_t^L$ | 10-year Treasury bond yield | |
| $\ln (C_A_t) = c_A_t$ | Tier 1 capital adequacy ratio | |

Notes: All quantity variables are converted to real per capita terms using GDP deflator and working-age population data, respectively. ULC = unit labour costs. CPI = consumer price index (all items). *=The log of the capital adequacy ratio is linearly detrended before estimation.

Figure 7. Identified capital adequacy requirement shocks. Notes: This figure presents actual versus counterfactual macroprudential policy shocks for the pre-crisis credit boom and post-crisis economic slump. The earliest (red) vertical represents the start of the credit boom (see Figure 3). The three latest (green) vertical lines correspond to the peaks of the three identified macroprudential policy interventions in 2003/4 (see Figure 4).
Given the above result, we provide quantitative answers to our two counterfactual questions: (1) what would have happened if the SARB had done nothing in the years leading up to the global financial crisis? (2) what would have happened if the SARB had relaxed bank capital requirements in the years following the global financial crisis?

Both of these counterfactual questions map to a lower capital adequacy ratio than that which was historically observed. Specifically, we evaluate the two scenarios separately by assuming, first, that the increases in bank capital requirements from 2002 to 2009 did not occur, and, second, that the tighter capital requirements from 2009 to 2012 also did not occur (indicated by the green dashed line and the red dotted line in Figure 7, respectively). In each case, outside of the identified periods, the required capital adequacy ratio returns to the actual baseline path.

The counterfactual capital adequacy ratios are presented in Figure 8. We can clearly see that our counterfactual scenarios generate significantly lower levels of capital requirements in both the pre-crisis credit boom and post-crisis economic slump. Next, we evaluate the effect of each of these scenarios on credit and output. Four variables are presented in Figure 9: (a) total loans, (b) loans to households, (c) loans to firms, and (d) output.

The results indicate a non-negligible and differentiated effect of changing capital adequacy requirements on the economy. As expected, the overall effect of lower capital
adequacy requirements is to stimulate credit extension and output. This works through the bank lending channel. It is also clear that there is a larger positive effect on loans to firms relative to loans to households, across the entire sample (i.e. both before and after the global financial crisis).

With the benefit of hindsight, our counterfactual results show that the SARB, leading up to the crisis, took the correct steps to raise capital requirements, but should have persisted with raising capital requirements for longer (past 2004), and possibly have considered additional sector-specific tools for household credit – which appears less responsive to the countercyclical capital buffer. Our model suggests that a more sustained countercyclical macroprudential policy stance could have dampened credit extension further during the pre-crisis credit boom and mitigated the credit crunch after the global financial crisis.

Specifically, the impact of the regulatory interventions on aggregate loans and output are relatively small in the years leading into the crisis due to the reversal of the SARB’s identified regulatory actions (see Figure 7) and the differentiated impact of the interventions on sector-specific credit (while the impact of an increase in

**Figure 9.** Results of counterfactual analysis.
regulatory capital requirements is negative for both household and firm credit extension, it is far more persistent for firm credit. In fact, there appears to be some substitutability between household and firm credit (corroborated by both the observed data in Figure 3 and the impulse responses in Figure 10 which shows that the response of household credit to a capital requirement shock turns positive after five quarters). This observation suggests that the countercyclical capital buffer may not be a sufficient macroprudential policy instrument to mitigate the build-up of financial imbalances and therefore systemic risk.

Furthermore, in results not shown here, we observe that supply- and demand-side credit shocks lead to varying degrees of substitutability in these two credit sectors as well. It is therefore evident that this is a structural characteristic of the data which is not only due to monetary and macroprudential policy. This is a notable result that warrants further investigation, especially for the effectiveness of policy: if the SARB intends to lean against the credit cycle, they should consider buttressing the countercyclical capital buffer with sector-specific interventions.

For the post-crisis period, we identify tighter bank capital regulatory requirements. In part, this could be attributed to policy inaction bias (a decision to not implement countercyclical policy) and the observation that the SARB requested banks to hold higher capital. Since Basel III regulations were only published internationally in 2010, at the same time that the SARB’s extended mandate to include financial stability was announced, our post-crisis policy counterfactual provides a clear lesson for the benefits of implementing the countercyclical capital buffer. We find evidence that such a dynamic buffer (i.e. higher capital requirements in the boom and lower capital requirements in the bust) is an appropriate policy response to mitigate the credit cycle. The countercyclical capital buffer is one of the key additions of Basel III for macroprudential policymaking.
Lessons from the period

Lessons for macroprudential policy

The global financial crisis exposed fault lines in the international monetary and financial system which led to a package of reforms commonly known as Basel III. One of these fault lines was the lack of a system-wide (macroprudential) approach that aims to promote financial stability and mitigate systemic risk. An important aspect of these post-crisis regulatory reforms that we focus on here is the countercyclical capital buffer.21 South Africa implemented these reforms in 2013, with certain aspects to be phased in until 2019 (see Directive 5 of 2013). The intention of this transitional arrangement was to prevent excessive tightening of the regulatory environment and to allow banks time to meet the new higher regulatory standards. Notably, from 2013, the SARB started to publish its macroprudential policy ‘stance’ in preparation for the implementation of the countercyclical capital buffer framework (Financial Stability Review, March 2013).22 In this framework, the leading indicator for the ‘activation’ of the countercyclical capital buffer was determined to be the credit-to-GDP gap.23

For the purposes of our analysis, we highlight the following excerpt from the SARB’s March 2013 Financial Stability Review (FSR):

After the strong warning signal produced by the [private-sector] credit-to-GDP gap for a countercyclical capital buffer add-on for the 2006–2010 period,24 the gap has been below zero since the final quarter of 2010. Given this counter-cyclical capital buffer methodology, the results displayed … suggest that there is no reason to consider the application of a countercyclical capital buffer for banks in South Africa at present.

Here, it is important to recognize, firstly, that the SARB considers the activation of the countercyclical capital buffer asymmetrically since the capital position of banks was above the total minimum requirement. The countercyclical capital buffer was 0% and could not (in the view of the SARB) be set at a negative level to reduce total capital. Secondly, credit conditions by sector (notably, households and non-financial corporations) and by asset class provided mixed signals (see e.g. FSR, November 2019).25

Regarding the first point, it is unclear whether reducing the countercyclical capital buffer requirement below 0% would in fact provide the incentive for banks to relax

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21See the September 2011 issue of the SARB’s Financial Stability Review for a discussion of the countercyclical capital buffer framework.

22According to the phase-in arrangements for the minimum requirements of Basel III, the SARB intended to phase in the countercyclical capital framework for banks in South Africa from 2016 (Financial Stability Review, March 2015). The SARB publishes all biannual Financial Stability Reviews on their website at: https://www.resbank.co.za/en/home/publications/review/financial-stability-review

23It is important to note that the SARB explicitly prefers policy discretion over a rules-based approach for macroprudential policy: the credit-to-GDP gap and various other indicators are meant to guide policy decisions (Financial Stability Review, March 2015). The reasons for this ‘guided-discretion’ approach are clearly warranted, most notably because of the complexities in identifying sources of financial imbalances (systemic risk) and in implementing policy, as well as the lack of understanding surrounding the unintended consequences of policy interventions (see e.g. Hollander and van Lill 2019).

24‘This could be interpreted as an indication of excessive credit growth on a system-wide basis in the domestic economy in the period leading up to the global financial crisis.’

25Although household and corporate credit growth declined for a number of years, the credit-to-GDP gap for corporate credit remained negative from 2010 to 2016 whereas the household credit-to-GDP gap only turned sharply negative from 2014 (FSR, November 2019, Figure 43). Regarding asset classes, the mortgage (credit-to-GDP) gap began its persistent decline from 2009 but only turned negative in 2013 (FSR, November 2019, Figure 44). By this time, the negative credit-to-GDP gaps of most other measures had either closed or stabilised close to their neutral levels.
credit supply conditions. And if a negative countercyclical capital buffer does not fall within the remit of macroprudential policy, an alternative mechanism (such as the ‘positive neutral rate’ countercyclical capital buffer\textsuperscript{26}) should be in place to allow for countercyclical (symmetrical) macroprudential policy instrument as the countercyclical capital buffer is intended to provide:

The countercyclical capital buffer could be implemented during periods of excessive credit growth in the financial system and released when credit is constrained. This mechanism enables the banking sector to run down the built-up buffer in order to absorb losses and maintain the flow of credit during periods of economic stress in order to attenuate the worst side-effects of downturns on the banking system and the real economy. (FSR, March 2013)

The second point brings to light the difficulty that the SARB faces for when and where to ‘activate’ countercyclical macroprudential policy (FSR, November 2019, 35–44). That is, this activation has both a time dimension and a cross-sectional dimension (Hollander and van Lill 2019). In addition to the issue of leads and lags with implementing policy decisions, the time dimension speaks to coordination between monetary policy and macro-prudential policy over the cycle (the extensive margin). In contrast, the cross-sectional dimension speaks to policy coordination between macroprudential instruments (the intensive margin). Our analysis does not explicitly deal with alternative macroprudential policy instruments, but our results show some degree of substitution between credit supply to households and firms as well as a differential impact on each from the uniform countercyclical capital buffer.\textsuperscript{27} We conclude that the activation of the countercyclical capital buffer should be buttressed by sector-specific measures on credit supply or even credit demand (such as a loan-to-value ratio) if the countercyclical capital buffer is observed to be relatively ineffective in some sectors.

Furthermore, some practitioners view the primary purpose of higher capital requirements to be resilience, with mitigation of the financial cycle as a secondary benefit (ESRB 2018). The SARB emphasizes both resilience and the normal functioning of the financial system during times of distress. In fact, from the Office of the Registrar of Banks, point 2.8 from Guidance Note 9/2012 issued in terms of section 6(5) of the, then, Banks Act (1990) states:

Banks should maintain an additional discretionary capital buffer above the specified minimum requirements… to ensure that the execution of internal business objectives or the occurrence of adverse external environmental factors do not prevent banks from operating above the relevant minima.

\textsuperscript{26}The positive neutral rate approach requires a positive countercyclical capital buffer during ‘normal’ periods of the financial cycle – the so-called ‘neutral zone of the financial cycle’ (Couaillier, Idier, and Scalone 2019). In other words, the financial cycle, whether measured by an index or a single indicator, does not need to be excessive to justify a positive buffer. Currently, the Czech Republic, Lithuania and the United Kingdom implement this strategy with either a 1\% or a 2\% positive neutral buffer. The aim of this positive buffer is to allow for a reduction in capital requirements in the event of an unexpected or imported crisis such as the global financial crisis. A zero per cent buffer would ‘provide no leeway and could not be used as an economic policy lever… this strategy allows it to adjust the countercyclical capital buffer both up and down’ (ESRB 2020).

\textsuperscript{27}There are numerous other instruments available for macroprudential policy (e.g. loan-to-value ratio, liquidity coverage ratio, leverage ratio, sector-specific countercyclical capital buffer, etc.), but knowledge about their effectiveness and unintended consequences is still in its infancy (Hollander and van Lill 2019).
In addition, point 2.7 from the same note imposes strict oversight in the event that deposit-taking banks fail to hold sufficient levels of capital:

Commencing 1 January 2016, if a bank’s capital-adequacy ratios fall below the levels set out in Annexure A (South African minima including the countercyclical buffer, the conservation buffer and the [higher loss absorbency] requirement for [domestic systemically important banks]), in the absence of other remedial actions acceptable to the Registrar to improve the bank’s capital-adequacy ratios, capital conservation ratios will be imposed that will limit discretionary payments such as dividend distributions.

Such requirements corroborate the sustained precautionary rise in capital adequacy ratios observed after the global financial crisis (see Figure 5); it also highlights the SARB’s emphasis on strengthening the resilience of deposit-taking banks (in order to limit credit constraints during crises) above that of leaning against excessive lending during the upswing of the financial cycle. These de facto and de jure measures warrant some caution in the event of unexpected or imported crises that drag aggregate demand below its potential because of overly tight credit extension to the private sector. Currently, it is not clear how the SARB intends to use the countercyclical capital buffer framework to relax credit conditions in times of distress by targeting bank capital. Indeed, the SARB has proceeded with prudence, but if the countercyclical capital buffer is an asymmetrical tool an alternative approach that is binding for either the supply-side or demand-side of credit should be considered.

**Lessons for policy coordination**

The results here support a conclusion that, by allowing capital adequacy ratios to increase post crisis, the SARB counteracted a significant monetary policy stimulus and dampened the economic recovery. Our results align with the views in Loewald, Faulkner, and Makrelov (2020, 12), who note that:

A case could be made that in the immediate post crisis period expansionary monetary policy was undermined by the introduction of tougher financial regulations. Higher capital is expected to improve banks monitoring of borrowers, reduce moral hazard, and moderate the appeal of risky assets. Yet, the transition to higher capital ratios can have negative short-run effects, and undermine the effectiveness of monetary policy.

This highlights the need to consider how the two different tools interact. Monetary policy and macroprudential policy can be complements in certain situations, substitutes in others, and even sometimes in conflict (Portes 2014). Beau et al. (2014) and Sinclair and Farrell (2017) provide a simple, but effective, mechanism to understand the interaction between the monetary policy tool and a macroprudential policy tool such as the countercyclical capital buffer (see Table 3). Financial stability is assessed as the degree of imbalance in financial markets, using a standard metric such as the credit-to-GDP ratio complemented by an analysis of financial market conditions.

This framework can be extended to consider the sequencing of policy decisions and the degree of coordination (du Plessis and du Rand 2011; Cecchetti and Kohler 2014). That is, policies can be set independently, in a coordinated way, or as Stackelberg-type

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28For a similar characterization along five areas of coordination, see Gersbach (2014).
29For a discussion on the difficulties with various measures, see Havemann (2013) or Farrell (2016).
For example, the Stackelberg-type game appears to describe the 2003–2008 experience outlined above best. The banking supervisor responded to interest-rate decisions. The initial ‘play’ of interest rate reductions was taken to stimulate credit. The regulator observed this ‘play’ and ‘outcome’ and responded by raising system-wide capital adequacy levels.

Portes (2014) also notes that the institutional arrangements in the central bank should be set up in such a way as to ensure a coordinated rather than a conflictual approach. A coordinated approach is particularly relevant where the central bank has both a financial stability and inflation-targeting mandate, and has two committees with overlapping membership jointly determining a strategy for macroprudential policy and monetary policy – as is the case with the SARB. The current arrangement in the SARB views macroprudential policy as subordinate to and supportive of monetary policy (Hollander and van Lill 2019). Furthermore, monetary policy committee statements released by the SARB typically just emphasize the potential impact of financial system developments on inflation. One alternative approach is to adjust the monetary authorities’ decision-making process to include financial stability outcomes as well.

Finally, the type and magnitude of economic impacts also matters. That is, monetary policy and macroprudential policy influence the economy through different transmission mechanisms and, possibly, by varying degrees. To illustrate this briefly, we extend our analysis of the South African experience to present a comparison of the impact of the two tools via impulse response functions based on the historical data, in Figures 10 and 11.

First, it is clear that contractionary shocks to each policy instrument reduce output and inflation, but the transmission mechanisms of each policy are markedly different. As expected, monetary policy has a clearly stronger effect on aggregate demand (the output gap and inflation) and a more muted influence on financial variables. In contrast, macroprudential policy has a much stronger effect on bank and borrower balance sheets and interest rate spreads. The impulse response functions also corroborate our earlier findings of differentiated impacts on household and firm credit. On one hand, monetary policy appears to have a negligible impact on loans to firms. On the other hand, macroprudential policy has a more persistent impact on loans to firms. In both cases, there appears to be some degree of substitutability in credit supply to these two sectors.

| Table 3. Interaction between macroprudential and monetary policy. |
|---------------------------------------------------------------|
| **Expected inflation**                                        |
| Over target | Near target | Under target |
|----------------|-------------|--------------|
| Financial exuberance | Complement | Independent | Conflict |
| No imbalance | Independent | Independent | Independent |
| Financial deflation | Conflict | Independent | Complement |

Source: Beau et al. 2014.

30 Stackelberg is where one policymaker sets the policy without considering the impact on the other. Then the second policymaker sets his or her policy, taking the first decision as given. One further extension to consider is a Cournot Nash equilibrium, where the two decision makers are aware of each other’s best play, have nearly equally matched power, and play accordingly. The outcome is a standard Nash equilibrium.

31 For example, there is now well-established theoretical and empirical evidence pointing to a ‘risk-taking channel’ of monetary policy whereby the policy rate influences banks’ profitability (‘search for yield’) and measurement of risk (Gambacorta 2009; Altunbas, Gambacorta, and Marques-Ibanez 2014; Dell’Ariccia, Laeven, and Marquez 2014; Chen et al. 2017; Dell’Ariccia, Laeven, and Suarez 2017).
order to compare the relative magnitude of each shock, we normalize the effect of each policy shock (67 basis points for the policy rate and 12 basis points for the CA ratio) to be equivalent to an annualized 1 percentage point policy rate increase. We estimate that an increase in the monetary policy rate has an economy-wide effect on output and aggregate credit of $-0.34$ and $-0.45\%$, respectively. For macroprudential policy, the capital adequacy ratio requirement reduces output and credit by $-0.54$ and $-1.39\%$, respectively.32

It is therefore important to note here that when considering changes to policy, macroprudential policy is potentially far more distortionary. That is, it can have significant negative externalities if the activation of policy is improperly timed or targeted. These results corroborate the findings of Angelini, Neri, and Panetta (2014), in which the authors find that the countercyclical capital buffer should only be used as a complement to monetary policy objectives or to explicitly respond to system-wide or sector-specific financial shocks. That is, it is not an efficient tool for general macroeconomic stabilization or an appropriate substitute for monetary policy.

**Conclusion**

South Africa weathered the 2007/8 global financial crisis well, not least due to its strong financial regulatory framework. We estimate the effect on financial stability and the broader economy of the SARB requiring banks to hold additional capital in the lead up to the crisis. The results suggest that such buffers are useful to lean against credit cycles. We also show that using a macroprudential policy tool, such as the countercyclical capital buffer, plays an important complementary role to monetary policy. The implementation of macroprudential policy, however, comes with important caveats and precautions.

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32The cumulative impact of each normalised shock on output and credit are as follows: $-3.52$ and $-2.51\%$, respectively, for monetary policy; and, $-2.25$ and $-3.53\%$, respectively, for macroprudential policy.
The results and experience show that the two tools have different transmission mechanisms and different outcomes, and therefore they should have different objectives. The new macroprudential policy tools aim at financial system resilience and the efficient functioning of the financial system (in, for example, the provision of credit to the private sector), which maps to the central bank’s financial stability objective. This policy lever stands in contrast to the traditional and well-understood monetary policy tool, which maps to the central bank’s price stability objective.

On the transmission mechanism, contractionary shocks to each policy instrument reduces output and inflation. Relative to macroprudential policy, the historical experience for South Africa shows that monetary policy has a stronger effect on aggregate demand (the output gap and inflation) and a smaller effect on financial variables. Both shocks have differentiated effects on credit extension to households and firms, to which we highlight a more-nuanced (sector-specific) role for macroprudential policy.

We use these empirical insights overlaid with the experience of South Africa before and after the 2007/8 global financial crisis to evaluate the SARB’s policy stance over the period. Our results suggest that the SARB correctly ‘leaned’ against strong credit growth in the years before the crisis. That said, from 2003 through to 2008, credit growth still averaged 19.2% a year. We document that the SARB may have still underestimated the sheer scale of the credit surge and the potential downside risk it posed for economic growth. In the years following the crisis, the SARB tightened macroprudential policy. Capital adequacy requirements were implicitly raised through the implementation of successive regulatory reforms as part of the Basel III package. Our results support the view of Loewald, Faulkner, and Makrelov (2020) that the SARB could have considered counter-cyclical action to better coordinate with monetary policy.

The effects of the 2007/8 global financial crisis have proven remarkably persistent. So too is the fundamental lesson – a central bank can never take financial stability for granted.

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Appendix

Figure A1. South African financial cycle. Source: SARB. Notes: The financial and credit cycles are measured using frequency-based filters (y/y % changes). A turning point in the cycle is reached when the growth cycle reaches zero. See Farrell and Kemp (2020) for a comparison of identifying approaches.

Figure A2. Difference between total CA ratio and tier 1 CA ratio. Source: SARB. Notes: Tier 1 capital consists primarily of shareholders’ equity (common stock) and retained earnings. From a regulator’s point of view, tier 1 capital is the core measure of a bank’s financial strength. The figure shows that non-tier 1 capital holdings have been maintained at a round 3% since 2001.