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Regulation and Bank Lending in South Africa: A Narrative Index Approach

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ABSTRACT

The extension of affordable credit is a key component of financial inclusion but it could reduce the stability of the financial sector. Prudential policies, on the other hand, are designed to mitigate financial sector risk. Thus, policies aimed at the extension of credit and prudential regulations may be in opposition. This study estimates and contrasts the impact of these potentially contradictory regulations on the bank lending volumes of South Africa's largest banks. We find that announcements of prudential regulation are associated with an increase in secured lending, while the implementation of prudential regulation is associated with an increase in unsecured lending. Despite tighter implementation of prudential reforms, we observe an increase in unsecured lending that is driven by unsecured lending to corporates. Our results also indicate the contractionary effects of prudential regulation on mortgage lending. Furthermore, the estimated effects of efforts aimed at extending credit to households have no impact on bank lending to households but increase secured lending to corporates. The two regulatory approaches overlap with regard to lending to corporates.

JEL Classification: G01, G18, G28, G32, G38

1 | Introduction

The extension of affordable credit is a key component of financial inclusion.[1] As a consequence of South Africa's apartheid history, levels of financial inclusion were significantly low at the dawn of the country's democracy (Hawkins 2004). Increasing levels of financial inclusion have thus been a government imperative post-1994 and have been pursued through various financial sector regulatory reforms. A key outcome pursued by these reforms has been the increase of affordable credit to households through various finance regulations. However, research indicates that increasing credit extension may reduce financial stability (García and José 2016). Conversely, prudential policies (both micro and macro in nature) are intended to achieve stability in the finance sector, ultimately lowering lending to meet increased bank capital requirements.[2] The different objectives of credit expanding finance reforms and prudential policies may thus offset one another.

In this paper, we first estimate the realised impacts of separate regulatory developments related to prudential policy and credit extension to determine whether these initiatives meet their intended goals.[3] Second, we consider whether these two regulatory approaches are contradictory, using a panel data approach to estimate the impact of different regulatory developments on 3-month changes in bank lending volumes.

To measure regulatory developments, we develop narrative indices that comprehensively measure all developments relevant to our study. This approach is consistent with various studies that consider the effect of prudential reforms on lending volumes (Eickmeier, Kolb, and Prieto 2018; Richter, Schularick,

and Shim 2019; Budnik and Rünstler 2020; Rojas, Vegh, and Vuletin 2022; Fernández-Gallardo Romero and Lloyd 2023). However, the paper extends this type of analysis by considering the impact of financial regulations that are geared to greater credit extension as well. It also presents a dataset comprising public and confidential bank data related to the four largest banks in South Africa, allowing us to analyse how the largest banks in South Africa respond to the two potentially opposing regulations.

Our analysis differs from existing literature in the following respects. First, we consider the impact of regulatory developments on lending volumes using narrative methods. Second, we measure bank responses in disaggregated customer segments, as opposed to assessing changes in aggregate lending. This approach allows us to measure whether bank responses vary across different customer segments. Third, the analysis considers separate models for each of the narrative indices, allowing us to estimate heterogeneity in bank responses in the face of different regulations. This approach allows us to infer whether these two regulatory approaches are aligned with their objectives and consistent/contradictory with each other.

We find that announcements of prudential regulation are associated with an increase in secured lending. This effect is pronounced on secured lending to households relative to secured lending to corporates. When we consider implementation effects, we find that the implementation of prudential regulation is associated with an increase in unsecured lending. This effect is more pronounced on unsecured lending to corporates relative to unsecured lending to households.[4] We further observe that announcements and implementation of prudential regulation are associated with a decline in mortgage lending.[5] In so far as reducing the risks associated with mortgage lending and rebalancing loan portfolios towards to more prudent ones, such as secured lending (non-mortgage secured lending), our results suggest that prudential regulations are working as intended to achieve financial sector stability.

We estimate that efforts at increasing credit extension to households have no statistically significant impact on the growth of credit to households. Instead, we find that these regulatory developments positively impacted on the growth of secured lending to corporates. Rather than these two regulatory approaches offsetting one another, the estimated impacts of, largely, household credit extension initiatives overlap with those estimated for prudential policy with respect to their impacts on secured credit to corporates.[6]

The paper is structured as follows. First, we provide a comprehensive review of the literature, showing how banks have responded to prudential and financial regulation intended for greater credit extension. Second, we describe the construction of the narrative indices. Third, we describe the data and methodology. Fourth, we discuss the results and thereafter conclude.

2 | Literature Review

This paper covers and contributes to various strands of the literature, including the response of banks to prudential reforms and efforts aimed at credit extension. Our construction of narrative indices on prudential and financial reforms is informed by literature on narrative methods of identification.

2.1 | Prudential Regulatory Developments

The objectives of prudential reforms are well documented and continue to expand, with further reforms being introduced to create resilient banking systems.[7] The ongoing debate about the implications of the reforms, particularly on the lending behaviour of banks, provides further insight into the costs and benefits of reforms intended to make banking systems more resilient.

Work on the costs or unintended consequences of prudential reforms dominates the debate. Noss and Toffano (2016) note that tightened prudential capital requirements can cause banks' costs of funding to rise and, in turn, prompt banks to pass these increases on to borrowers in the form of high interest on loans and/or reductions in extended credit. Deli and Hasan (2017) show that higher capital requirements lead banks to reduce their risk-weighted assets, implying a downward shift in lending to meet capital requirements. Noss and Toffano (2016) use a vector autoregressive (VAR) model to estimate the effect of changes in banks' capital requirements on lending in the United Kingdom and find that tighter capital requirements are associated with a reduction in lending, with the effect on corporate lending more pronounced than on household lending.

Aiyar, Calomiris and Wieladek (2016) studied the interaction of capital requirements and monetary policy and the response to these policies by UK banks. They found that banks reduce lending in response to tighter capital reforms and monetary policy. They also exploit the heterogeneity of banks by differentiating between small and big banks, finding that large banks only react to tighter capital requirements, while small banks react to both policies. Deli and Hasan (2017) analysed the effect of prudential reforms on banks in 125 countries, finding weak negative effects of capital stringency on loan growth, especially for well-capitalised banks. Mirzaei and Samet (2022) found similar results for banks in 91 countries, where small, less-capitalised and less-liquid banks loaned less in response to stringent capital requirements than well-capitalised and highly liquid banks. Angelini et al. (2015) studied the impact of capital requirements on national output using various dynamic stochastic general equilibrium models. They found that a one percentage point increase in the capital ratio translates to a 0.09% loss in output relative to the level that would have prevailed without capital tightening.

Work on the potential effect of prudential reforms in emerging markets is limited, but Fang et al. (2022) investigated the impact of rising capital requirements on lending in Peru. They used bank-level lending data and bank-specific capital buffers and found that higher capital requirements are associated with lower credit extension. However, the effects vary according to economic conditions and bank characteristics, where less-capitalised, less-liquid and less-profitable banks react more to tighter capital requirements. The effects are also more pronounced during economic downturns. In the case of South

Africa, Maredza (2016) investigated the impact of increased bank requirements and, in particular, those introduced under Basel II on the cost of intermediation. Results from a panel of 10 banks show that tighter capital requirements increase the cost of intermediation, with the net interest margin serving as a proxy for the cost of intermediation. Gumata and Ndou (2017) assessed the impact of Basel III in the form of liquidity coverage ratio and net stable funding ratios on credit growth. Their decomposition exercise shows that Basel III contributed to the contraction in credit after the global financial crisis. Most recently, and similar to this paper, Sibande and Milne (2024) used data from the big four banks to study the effect of Basel III capital requirements on the supply of bank credit in South Africa. They found weaker evidence of the impact of capital requirements on the supply of bank lending. Makrelov and Pillay (2024), using data on big and small banks, examined how decisions around the size of excess capital as well as monetary and financial stability actions affect sectoral lending in South Africa. Their findings indicate that holding additional capital affects banks' lending, especially for small banks.

This paper contributes to work that analyses the impact of Basel-related regulations in emerging countries (and in South Africa in particular) by constructing a narrative account of prudential policies. This provides historical documentation of major developments in prudential regulation.

2.2 | Developments in Financial Regulation

It is broadly accepted that financial inclusion is key to development. Greater access to credit, savings accounts and transactional services enables individuals to store money safely, make and receive payments and invest for the future (Demirgüç-Kunt et al. 2021). Empirical studies have also shown that greater levels of financial inclusion are associated with lower levels of poverty. Mahalika, Matsebula and Yu (2023) estimate such a relationship for South Africa through the regression of poverty levels on a derived measure of financial exclusion. On a macro level, studies have associated financial inclusion with greater economic growth, employment and lower inequality (Demirgüç-Kunt and Singer 2017). Ozili (2021) recognises financial inclusion as a strategy that could be used to achieve the United Nations' sustainable development goals.[8]

The creation of or changes in financial regulation has been used to increase support greater credit extension to achieve greater levels of financial inclusion in various jurisdictions, with different degrees of success. Chen and Divanbeigi (2019) found that close to two of three national regulatory and supervisory entities in the world further financial inclusion by, among other measures, increasing consumer protection and financial literacy to ease entry, and supporting the creation of non-traditional financial service providers. They found that a supportive regulatory environment enables the growth of service providers and the provision of products that meet the needs of various customers, thereby furthering financial inclusion. While governments have pursued a wide array of regulatory changes to enhance inclusion, this study focuses on greater access to and use of affordable credit products. Relevant financial sector regulatory efforts include the creation of inclusive financial institutes, credit databases, newly designed financial products, the promotion of technology as a method to deliver financial products, lending regulations and the provision of subsidised funding (Yoshino and Morgan 2016). A number of these developments overlap with efforts initiated by South African authorities that are considered in this study. Further discussion is provided below of empirical analyses of these types of regulatory developments and their effect on credit extension.

Regulations that lead to credit databases, which include relevant credit-related information on individuals and firms, reduce the level of asymmetry between lenders and borrowers. Banking markets are characterised by informational asymmetries, where a lender may not know the creditworthiness of a potential borrower. In such instances, banks may choose to ration credit (Stiglitz and Weiss 1981). This imbalance in information may also have an impact on banks' ability to enter credit markets. Dell'Ariccia, Friedman and Marquez (1999) show that when a potential entrant bank is unable to differentiate good from bad borrowers, that bank is likely to be deterred from entering the market. Dell'Ariccia (2001) suggests that this barrier to entry is lessened when banks are able to gain proprietary information about borrowers over time. However, gaining such information provides banks with market power over clients, where older creditworthy clients are charged higher rates.[9] Martinez Peria and Singh (2014) estimated the impact of credit-information-sharing systems on bank lending to firms. The credit information schemes they considered included credit bureaus and public credit registries that capture information on borrowers, thus decreasing the informational asymmetry that characterises credit markets. They found that following the introduction of a credit bureau, firms had greater access to finance, lower interest rates, longer maturity terms and more working capital.

National authorities also use consumer protection mechanisms to support greater credit extension. These are usefully summarised, by Yoshino and Morgan (2016), as the creation of agencies that regulate credit extension. Consumer protection initiatives implemented by these agencies include the provision of guidelines to be followed when conducting affordability assessments and providing consumers with information on legal recourse following fraud. Yoshino and Morgan (2016) write that consumer protection increases consumer trust in financial services thus supporting usage.

In South Africa, the National Credit Act (NCA) of 2006 led to a host of changes in credit market regulation, including provisions to increase disclosure of the costs of credit to protect credit customers from reckless lending, the regulation of interest rates and the creation of national credit institutions such as the National Credit Regulator (Goodwin-Groen and Kelly-Louw 2003). Chipeta and Mbululu (2012) studied the effect of the announcement and implementation of the NCA on the growth of credit extension in South Africa. Using regression analysis, the authors found the NCA to be associated with greater loan growth in credit cards, overdrafts and other conventional loans, as well as total credit to the private sector. De Wet, Botha and Booyens (2015) assessed the impact of the NCA on levels of over-indebtedness and found no evidence of its effect in South Africa. According to Makhaya and Nhundu's (2016) qualitative analysis of Capitec's entry into the banking industry, the NCA provided certainty in

unsecured lending that enabled Capitec to provide larger loan amounts over extended periods of time. This is significant, as Capitec's growth in the banking industry is underpinned by its growth in the low-income market (Makhaya and Nhundu 2016).

Other initiatives, such as interest rate caps applied to bank lending volumes, have also been implemented by regulatory authorities to support the provision of affordable credit. Yoshino and Morgan (2016) report that such interest rate caps are applied in Bangladesh, India, Indonesia and Thailand. Interest rate caps presumably support credit extension by artificially lowering the cost of lending for customers, who would otherwise have been charged interest rates above the specified caps. However, this type of regulation can adversely restrict credit supply (Yoshino and Morgan 2016). Barua, Kathuria and Malik (2016) found that allowing banks to price risk without constraint allows them to view inclusion efforts as viable in the long term.

A number of changes have been made to the regulations accompanying the NCA since its inception. While research into the impact of the NCA on bank lending is limited, none of the changes to the NCA has been subject to empirical study. Furthermore, the country's financial ministry has developed a national policy framework aimed at increasing the level of financial inclusion in South Africa. One of its priorities is the increased usage of credit by households for asset acquisition and investments, as opposed to consumption. No empirical research has assessed the impact of this suite of regulatory developments on credit extension outcomes in South Africa.

2.3 | Methods of Identification

In this paper, we use narrative methods to identify bank responses to prudential regulatory reforms. As outlined earlier, evidence of the response of bank lending to macroprudential reforms is based on the assumption that an increase in aggregate regulatory capital represents a negative credit supply shock and will have a negative effect on credit extension (Noss and Toffano 2016). As such, our narrative accounts of prudential reforms implicitly proxy for credit supply shocks. Ramey (2016) describes the narrative method of identification as the construction of a time series from historical documents to identify the reason and/or quantities associated with a particular change in a variable. The construction of narrative accounts is particularly intended to isolate the shocks or effects of a policy intervention (Angelopoulou 2007). By constructing a narrative series of prudential reforms, we aim to address challenges relating to the identification of prudential reforms and their impact.

The identification strategy has historically been used to identify monetary and fiscal shocks.[10] However, the approach has increasingly been used to analyse and identify capital reforms. For instance, Budnik and Rünstler (2020) analysed the dynamic effects of prudential policies in the United States by constructing a set of policy measures related to capital requirements following the Basel III accords. The narrative instruments take a value of −1 and 1 in the case of tightening and easing of capital requirements respectively, and 0 otherwise. Their results show that tightening capital requirements induces a persistent decline in corporate credit. They further find that the impact of a change in capital requirements is concentrated more on corporate credit than household credit. Eickmeier, Kolb and Prieto (2018) also assessed the dynamic effects of bank capital regulation in the United States, using the narrative approach to construct an exogenous capital regulation index that captures exogenous changes in bank capital regulation. Their results show persistent declines in corporate and investment loans and real estate loans following changes in the capital regulation index. Recent works by Richter, Schularick and Shim (2019); Rojas, Vegh and Vuletin (2022); and Fernández-Gallardo Romero and Lloyd (2023) have used this approach to identify the effects of specific or individual policies under Basel prudential regulations.

This paper thus supplements the growing empirical literature that applies narrative methods of identification to examine bank responses to prudential regulatory reforms. It considers the entirety of Basel-related prudential regulations and not individual or specific regulations, providing a robust documentation of prudential reforms. As previously described, existing work has analysed the effect of both the easing and tightening of prudential regulations. In the construction of this narrative series, however, we found no evidence of regulatory easing, and so only the tightening of prudential regulations has been captured.

3 | Narrative Indicators

3.1 | Prudential Reforms

This section describes the actions and events used to construct a set of prudential measures or indicators introduced following the Basel II and III agreements and accords. The indicators represent credit supply shocks, following Noss and Toffano (2016) and Deli and Hasan (2017), among others. The construction is based on historical documents that record the actions and events that have led to the implementation of prudential regulations. We consulted circulars issued by the South African Reserve Bank (SARB) to commercial banks in South Africa, annual reports of commercial banks and the SARB as well as the risk and capital management reports of commercial banks. We only consulted reports from the big four commercial banks in South Africa, as they account for over 90% of banking industry assets.[11] We also consulted documents published and issued by the Basel Committee on Bank Supervision (BCBS) that contain communications between the BCBS and the SARB about the implementation of Basel regulations.[12]

To sift the information in the documents, we identified the actions and events that are most important in the construction of our narrative indicators. For the set of prudential indicators that proxy for credit shocks, the criteria imposed were such that: (i) actions and events are specific in their intentions, and (ii) actions and events might imply a change in bank behaviour with respect to the adjustment of capital buffers and/or the attachment of greater risk weights to certain lending products or lending markets. From this, we were able to build a series of two narrative dummy indicators. The first indicator captures announcements and communications of prudential regulations intended to be implemented, which we call '*Draft*'. *Draft* = 1 on dates when there is an announcement of regulations intended to be implemented. The second indicator

is '*Implementation*'. For this indicator, *Implementation* = 1 on dates when a regulation is implemented. For dates when *Draft* and *Implementation* were not observed they are equal to 0. Where possible, we also tracked the actions and events from the date they were communicated and/or announced, issued or published (*Draft*) until the date they were introduced or implemented (*Implementation*).

It is hoped that the decomposition of the actions and events can help identify anticipation effects following the drafting of regulation not yet implemented. For instance, Eickmeier, Kolb and Prieto (2018) used a narrative index of bank regulatory capital in the United States to analyse the macroeconomic effects of a tightening in bank capital requirements. They found that bank assets (loans) and industrial production fall 6 months before new rules come into effect. These anticipation effects are captured by the banks' actions between the date a regulation is first proposed and the date the final rule is communicated. Anticipation effects are thus based on the notion that banks have information on proposed regulations and when they will be implemented and can act before those regulations are implemented — for instance, by taking advantage of less stringent requirements on credit extension before tighter requirements are introduced. The documents we used to construct our narrative indicators contained details that enabled us to exploit such anticipation effects.

Importantly, we do not identify the impact of individual regulations and requirements under the Basel Accords but consider the Basel regulations in their entirety. For instance, different Basel regulations (such as capital and liquidity requirements) target different instruments, but the Basel regulations as a whole are aimed at creating resilient and robust banking systems through higher bank capital requirements (Cohen and Scatigna 2016; Cerutti et al. 2017).

For example, we categorise the implementation of Basel II on 1 January 2008 as an implementation indicator. We categorise as a *Draft* indicator the directive 1/2009 (1 of 2009) issued by the SARB on 4 February 2009, which announced the approach banks should follow when applying capital floors: 'Modelled capital should not be below 80% of the capital requirements under Basel I to ensure capital levels do not fall below prudent level'.

Following Basel II, banks are allowed to use internal models to determine risk weights and, in turn, capital levels. However, capital floors ensured capital requirements did not fall below a certain percentage of banks' capital requirements under the Basel I framework (BCBS 2006). This, in essence, implies greater risk weight to riskier credit products. For instance, Imbierowicz, Kragh and Rangvid (2018) show that Danish banks reduce their lending on loans with higher risk weights in response to higher capital requirements, including approaches to capital floors. A further example of a *Draft* indicator tracked until implementation is from 31 July 2009, when the BCBS announced 'measures to strengthen the 1996 rules governing trading book capital and to enhance the three pillars of the Basel II framework (Basel 2.5)'. This was intended to introduce higher capital requirements to capture the credit risk of complex trading activities, promote the build-up of capital buffers that could be drawn down in periods of stress and strengthen the quality of bank capital (BCBS 2009). On 8 October 2010, the SARB endorsed the BCBS communication and gave notice to banks to prepare for the implementation of the framework. Basel 2.5 was eventually implemented on 1 January 2012. A detailed account and timeline of the indicators can be found in Appendix 4 of our online appendix.

3.2 | Finance Regulation Reforms for Increased Credit Extension

The finance regulations that we consider in this paper relate to the implementation of the NCA of 2005, the wholesale restructuring of financial sector regulation in South Africa and the drafting of a national framework for financial inclusion. These developments were selected because they relate to a series of regulatory reforms intended to increase the extension of credit to households in South Africa. Accordingly, we capture and review regulatory developments intended to facilitate greater access to credit products and/or reduce their cost. These developments are summarised in the variable *FinReg*, which is recorded as 1 following the presentation of publicly available draft or final finance regulations and as *FinReg* = 0 otherwise. The type of regulatory developments we captured within *FinReg* are described below. A detailed review of each of these regulations is provided in Appendix 4 of our online appendix.

The first type of development we consider is related to the national credit regulations, which are issued by the Minister of Trade and Industry (South Africa 2006) and relate to the application of the NCA. Over time, the Department of Trade and Industry has issued government notices inviting public comment on proposed amendments to these regulations and, after consultation, final regulations are published in the Government Gazette. The Ministry has put forth notices and final regulations related to: (i) Debt Counselling Regulations (2012), (ii) removal of adverse consumer credit information and information relating to paid-up judgements (2013, 2014a), (iii) various changes in credit regulation (2014b, 2015a) and (iv) limitations on fees and interest rates (2015b, 2015c). Roestoff et al. (2009) suggest that debt-counselling regulations could help over-indebted consumers restructure their debt, which directly relates to the affordability of credit products. Applicable regulations from 2013 and 2014 relate to government efforts to remove adverse credit information from credit bureaus to increase consumer access to credit products.

The second type of development relates to the restructuring of financial regulation in South Africa. The Financial Sector Regulation Act of 2017 set up two authorities: the Prudential Authority, which sits within the SARB, and the Financial Sector Conduct Authority (FSCA). These institutions have different mandates, but both promote financial inclusion (Presidency 2017). The FSCA indicates, in their *Financial Inclusion Strategy*, that the financial sector could increase financial inclusion of marginalised groups by, among other things, easing broader access to credit (Financial Sector Conduct Authority 2021).

The draft of the Conduct of Financial Institutions Bill proposes the consolidation of a number of financial sector laws to better regulate the conduct of institutions that provide financial services and products. According to the bill, the FSCA will provide

standards for firms regarding the provision of financial products and services, relating to, inter alia, charging structures, pricing methodologies, financial product features and the identification of appropriate and inappropriate target markets. This enhanced regulation will further financial inclusion (South Africa. National Treasury 2018), as improved regulation will provide consumers with greater security, which is necessary to increase the use of different financial sector products.

The final development we consider is the drafting of a South Africa's national policy framework for financial inclusion. National Treasury (South Africa. National Treasury 2023) reports that financial inclusion in the country is high. Ninety-seven percent of South African adults use some financial product from formal financial services providers (South Africa. National Treasury 2023). This is driven by factors such as the high rate of bank account ownership, financial services infrastructure and improved customer literacy (South Africa. National Treasury 2023). The National Treasury also notes that while household access to credit is unsecured and primarily for consumption. One of the priorities of the national inclusion framework is the promotion of credit for acquisition and investment (South Africa. National Treasury 2023). In this article, we consider the development of an earlier draft of this financial inclusion policy that was provided publicly for comment in 2020 (South Africa. National Treasury 2020).

4 | Data and Methodology

Our dataset is collected from various sources. The primary data of interest in our analysis are bank lending volumes and rates, which are supplemented by bank- and market-related variables that serve as controls.[13] Below, we describe how we measure bank lending volumes and rates in those segments. We also describe the bank- and market-specific controls we use in our analysis.

Across all the bank-specific data collected, we restrict our focus to four banks: Absa, First National Bank, Nedbank and Standard Bank. These banks account for the bulk of banking assets in the industry and have continuous bank lending data, enabling our panel data analysis.[14]

4.1 | Bank Lending Data

We capture bank responses in the following customer-product segments: (i) non-financial corporate unsecured lending, (ii) household unsecured lending, (iii) total unsecured lending, (iv) commercial mortgages to corporates and households, (v) residential mortgages to households, (vi) total mortgage lending, (vii) leasing and instalment sales to corporates, (viii) leasing and instalment sales to households, and (ix) total leasing and instalment sales. The disaggregation allows us to measure important differences in bank responses in the different customer-product segments. This approach is consistent with Sibande and Milne (2024).

Bank lending data are obtained from banks' monthly disclosure of assets and liabilities to the Registrar of the SARB (BA900 data). These data are publicly available and are reported as prescribed by a 'BA900' form in the Banks Act.[15] We aggregate all bank assets relevant to the customer-product segments described above.[16] For instance, a bank's unsecured household lending volumes are estimated as the sum of that bank's household credit card and overdraft debt, as well as other household loans and advances. Further details on the individual bank assets that comprise the various customer-product segments are set out in Appendix 2 of our online appendix.

Figure 1 provides a summary of the evolution of lending to different categories we describe above and is lending data provided to the SARB, aggregated across all banks.[17] Total mortgages account for the majority of all loan categories, followed by unsecured lending and total leasing and instalments thereafter. Absa, First National Bank, Nedbank and Standard Bank account for the majority of total loans issued to the public. The reader is referred to Pirozhkova and Viegi (2024); as well as Casu, Vhiaramonte and Cucinelli (2024) for important context on the structure and trends in bank lending in SA.

4.2 | Methodology

We use a panel data approach to estimate the impact of the different regulatory developments on three-month changes in bank lending volumes. Our analysis covers January 2009 to February 2020. We estimate using robust standard errors clustered at bank level (see Zeileis 2004) to ensure estimates are robust to heteroskedasticity and serial correlation. The clustering also ensures that the model recognises that the banks are from the same population (see Fang et al. 2022).

The 3-month change in lending is calculated as the log difference in lending at t and $t-3$.[18] The log differences are then multiplied by 100. This approach is consistent with Aiyar, Calomiris, and Wieladek (2016), Deli and Hasan (2017), Fang et al. (2022) and Mirzaei and Samet (2022).

$$\Delta log\left(Lending^{c}_{b,t}\right) \times 100 = \beta_1 Index^{i}_{t} + \tau^{c}_{b} + \lambda^{c}_{t} + \beta' \Omega^{c} + \epsilon^{c}_{b,t} \quad (1)$$

In this formulation, $b \in [FNB, Absa, Nedbank, StandardBank]$, t is the time period, c is the credit category and $i \in [Draft_t, Implementation_t, FinReg_t]$. Therefore, $\Delta Lending^{c}_{b,t}$ is the bank-level 3-month growth in lending. Ω^{c} is a matrix of controls that includes the change in return on assets, the change in total capital adequacy ratios measured at bank level, as well as the change in the repo rate. τ^{c}_{b} captures the bank fixed effect, λ^{c}_{t} are the monthly time fixed effects and $\epsilon^{c}_{b,t}$ are the error terms.

5 | Results

5.1 | Responses to Regulation

Table 1 shows results from the estimation of Equation 1, where the dependent variable is the log difference in lending volumes between t and $t-3$, also clustered at bank level.[19]

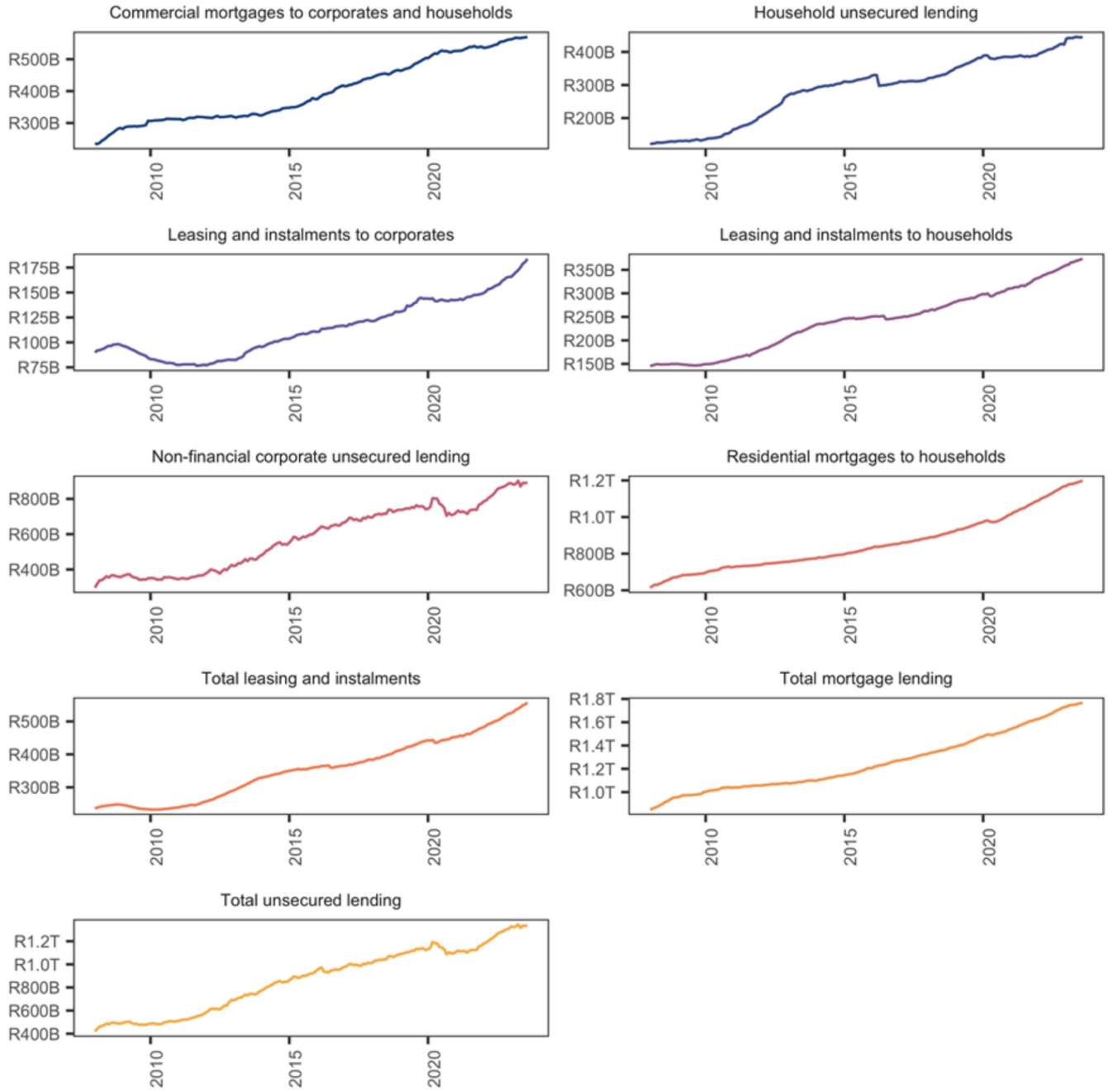

FIGURE 1 | Total aggregated bank lending. [Color figure can be viewed at wileyonlinelibrary.com]

We find that announcements of prudential regulation, captured by the draft indicator, is associated with a 2% increase in secured lending growth and less than a 1% decline in mortgage lending growth. The signs of the coefficients are consistent and significant for secured lending to both corporates and households, as well as for mortgage lending to corporates and households. However, lending to households has a stronger reaction than lending to corporates, except for mortgage lending. For instance, changes in secured lending growth to households increase by approximately 3% while growth in secured lending to corporates increase by 0.8%, following announcements of prudential regulation. Similarly and surprisingly, unsecured lending to households increases by approximately 1% while unsecured lending to corporates increases by 0.3% (albeit insignificant).

When we consider implementation effects, Table 1 shows that the implementation of prudential regulation is associated with a 2% increase in total unsecured lending and 0.6% decline in mortgage lending growth. When we compare implementation effects between corporates and households, we find that unsecured lending to corporates increase by 2.9%, while the effect on household unsecured lending is insignificant. Similarly, mortgage and unsecured lending to corporates fall by 1.4% and 1.6%, respectively, while the response of households is insignificant.

TABLE 1 | Prudential regulations and lending volumes (3 months) results with controls.

	Total			Corporates			Households		
	Unsecured	**Secured**	**Mortgages**	**Unsecured**	**Secured**	**Mortgages**	**Unsecured**	**Secured**	**Mortgages**
Draft model									
Draft index	0.601	2.204**	−0.188***	0.362	0.876**	−0.414*	1.025**	3.078**	−0.150*
Change in repo rate	0.314	−0.426	−0.066	0.333	0.764	−0.155	0.193	−1.244	−0.058
Change in return on assets	0.674	3.637*	−1.711*	0.660	1.756	−2.204	0.843	4.375***	−1.299**
Change in total capital adequacy ratio	−0.101	−0.188	−0.086*	−0.416	0.241	−0.319	0.431*	−0.451	−0.060
Implementation model									
Implementation index	2.15***	0.28	−0.61**	2.89***	1.63**	−1.47**	0.44	−0.74	−0.23
Change in repo rate	0.52*	−0.40	−0.12	0.60	0.92	−0.29**	0.23	−1.31	−0.08
Change in return on assets	0.64	3.88*	−1.70**	0.56	1.78	−2.18	0.94	4.77**	−1.31**
Change in total capital adequacy ratio	−0.12	−0.26	−0.08*	−0.43	0.21	−0.30	0.40	−0.55	−0.05
Num. obs.	580	580	580	580	580	580	580	580	580
Bank fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Monthly fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*$p < 0.1$, **$p < 0.05$, ***$p < 0.01$.

The observation that emerges from Table 1 is that secured lending responds more to announcements of prudential regulation relative to unsecured lending. On the contrary, unsecured lending responds more relative to secured lending when we consider implementation effects. In addition, the reaction of corporate lending is stronger when we consider implementation effects relative to announcement effects. On the contrary, household lending responds more to announcement of prudential regulation relative to the implementation of regulation.

Table 2 shows lending volumes and indicates that financial regulations are associated with a 1.1% increase in lending volume growth to corporates in the secured segment. We do not find any statistically significant changes in the lending volume growth to other corporate lending categories, or in lending to households in its entirety.[20]

5.2 | Discussion

5.2.1 | Prudential Regulatory Changes

This analysis supplements existing work that examines the consequences of prudential regulation in emerging markets, similar to Sibande and Milne (2024) and Makrelov and Pillay (2024). However, our results are not directly comparable to other studies. We consider both the effects of announced regulations and the eventual implementation of the regulation.

It is plausible that following stringent prudential regulatory reforms, credit supply can increase, as observed from the results in Table 1. For instance, banks can reduce their relatively riskier loans by reducing unsecured lending (portfolio rebalancing channels). This rebalances their portfolios to more prudent ones, such as secured lending (Deli and Hasan 2017), because prudential reforms attach greater risk weights to certain loan portfolios, such as unsecured credit. For instance, in response to higher capital requirements, banks in Denmark retrenched more of their lending portfolio with higher risk weights (Imbierowicz, Kragh, and Rangvid 2018). Similarly, Cappelletti et al. (2019) find that banks classified as other systematically important institutions (O-SIIs), which face added capital requirements, reduce credit to households and financial sectors and shift their lending to less risky counterparts within the non-financial corporation sector. The four banks in our sample are classified as systematically important (SI) banks and face additional capital requirements.[21]

Results from Table 1 show that despite tighter implementation of prudential reforms, an increase in unsecured lending that is driven by corporate unsecured lending is observed. This suggests that banks continue to lend to higher-quality clients in both the secured and unsecured lending space (corporates at possibly relatively higher lending rates) despite the implementation of stringent regulatory measures. This however, is not the case for any lending to households as we observe insignificant effects following regulatory implementation.

When we consider the effect of announced prudential reforms, Table 1 shows similar evidence, where secured lending increases

TABLE 2 | Finance regulation and lending volumes (3 months) results with controls.

	Total			Corporates			Households		
	Unsecured	Secured	Mortgage	Unsecured	Secured	Mortgage	Unsecured	Secured	Mortgage
Finance regulation model									
Finance regulation index	−0.529	−0.066	−0.074	−0.583	1.137***	−0.189	−0.348	−0.778	−0.056
Change in repo rate	0.329	−0.424	−0.064	0.349	0.733	−0.150	0.202	−1.221	−0.057
Change in return on assets	0.803	3.900*	−1.724**	0.767	1.729	−2.231	1.001	4.819**	−1.310*
Change in total capital adequacy ratio	−0.123	−0.259	−0.080	−0.431	0.220	−0.306	0.396	−0.555	−0.055
Num. obs.	580	580	580	580	580	580	580	580	580
Bank fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Monthly fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*$p < 0.1$, **$p < 0.05$, ***$p < 0.01$.

relative to unsecured lending (rightward shift in the secured-loan supply curve) for corporates. These effects are stronger for household secured lending relative to corporate secured lending. We also find evidence of an increase in household unsecured lending during the pre-announcement stage, which is not the case for corporates. Conversely, Bridges et al. (2014) find that, on average, an increase in capital requirements reduces loan growth for commercial real estate (mortgages), other corporate and household secured lending, while unsecured lending is relatively weak.

Our results show that mortgage lending declines in all specifications. The results suggest that banks tighten down-payment requirements on mortgages following regulatory reforms, reducing the risk associated with mortgage lending. However, tighter deposit requirements on mortgages tightens access to mortgage credit, hence the decline in mortgage-lending volumes for all specifications in Table 1.

A paper by Anthonyrajah and Malwandla (2022) reports that banks have reduced their relative exposures to mortgages and increased their exposure to loan classes intended for consumption. It also notes that the introduction of the net stable funding ratio (NSFR), which forms part of Basel III, may lead to higher funding costs on retail mortgages relative to unsecured retail loans. These costs can be shifted to consumers through higher mortgage lending rates and/or the rationing of mortgage lending for a given lending rate (which shows up in our results).

Results from Table 1 also show that implementation effects are stronger than announcement effects for unsecured lending volumes and mortgages. These stronger implementation effects may reflect the endogenous reaction of banks to pre-announced regulatory actions, thereby influencing (overestimating) the effects of regulatory implementation. For instance, Fernández-Gallardo Romero and Lloyd (2023) and Fang et al. (2022) control for possible anticipation effects by distinguishing between prudential policies with and without implementation lags, as these can have different effects on macroeconomic variables. Fernández-Gallardo Romero and Lloyd (2023) use only announcement dates to identify the effects of prudential policies. They also identify prudential policies that have no implementation lags, which are captured by the announcement date. In the spirit of Mertens and Ravn (2012), they also identify prudential policies with implementation lags, which are defined as policies with significant delays (of at least 90 days) between the announcement and enforcement or implementation date. Policies with implementation lags could influence bank responses, as they would have significant time to endogenously react to the prudential regulations ahead of implementation.

A further challenge in this research and the construction of our prudential narrative indices is thus to disentangle and distinguish policies with and without implementation lags. Similar challenges arise when constructing leads and lags for our prudential narrative series to identify any lag effects and whether banks adjust their lending before actual implementation dates, as per Fang et al. (2022).

Despite these challenges, the construction of our narrative prudential indices and the use of data on bank lending contributes significantly to the growing empirical work analysing the effects of prudential policy in South Africa and emerging markets globally.

5.2.2 | Finance Regulatory Changes

After accounting for possible confounders, the results pertaining to reforms that could achieve greater credit extension indicate that these regulatory developments have not had an impact on credit extension to households. Instead, these developments are associated with greater a growth in lending to corporates for secured transactions.

A number of the regulatory developments were motivated by government intentions to improve access and lower the costs of financing for individuals and entities with limited access. These developments include the removal of adverse information at credit bureaus, reducing the periods that adverse information can be kept by those bureaus and providing guidance to facilitate debt restructuring in cases of risky and/or reckless lending. According to the National Credit Regulator (South Africa. National Credit Regulator 2014), some of these developments were intended to enable greater consumer access to affordable credit and to employment opportunities. The National Credit Regulator (South Africa. National Credit Regulator 2013) stated that negative credit information hinders access to affordable credit for individuals who have paid their debts and thus decided to remove adverse credit information relating to individuals who have paid their debts. However, our results suggest that these initiatives have not had the desired impact on South African households.

The increase in the informational asymmetry that the regulations introduce could have a factor in banks not altering their lending behaviour. Banks are financial intermediaries that collect deposits and issue loans, but they face default risk to extend loans (Freixas and Rochet 1997). To lessen this risk, banks rely on information about individuals and firms that can be sourced from credit bureaus or other institutions (Freixas and Rochet 1997). The regulatory developments we consider in this paper limit the amount of information available to banks and the periods that information can be retained.

Our secured lending category refers to all loans provided by banks that use an underlying customer asset as collateral should a borrower face bankruptcy, mitigating default risk (Freixas and Rochet 1997). Following the regulatory developments, secured lending volume growth to corporates increased. This development likely reflects banks' shift to safer credit categories. As the regulations we consider primarily affect secured and unsecured lending to households, it appears that banks do not shift from unsecured to secured lending within households. Instead, they appear to direct credit supply to corporate credit customers.

6 | Conclusion

This paper has examined the impact of regulation on the lending volumes of South Africa's largest banks. The regulations under consideration are prudential regulations intended to achieve

stability in the finance sector, as well as financial regulations intended to achieve greater credit extension to households. These two forms of regulations are potentially in conflict: one may limit credit supply to achieve stability, while the other necessarily intends to increase credit extension. We used narrative indices to comprehensively measure all regulatory developments relevant to our study.

The effects of these regulations on bank lending are estimated through panel models separated by the different types of regulations we consider. Our results show that announcements of prudential regulation are associated with an increase in secured lending. When we consider implementation effects, we find that the implementation of prudential regulation is associated with an increase in unsecured lending. This effect is more pronounced on unsecured lending to corporates relative to unsecured lending to households. We further observe that announcements and implementation of prudential regulation is associated with a decline in mortgage lending.

Our estimates around credit extension initiatives indicate that they did not have any impact on lending volumes to households. Instead, these credit focused initiatives increased the growth of secured lending to corporates.

The impact of these two notionally contradictory policies is consistent with respect to secured lending volume growth to corporates. Overall, our results indicate that prudential policy is working as intended to achieve financial sector stability, in so far as reducing the risks associated with mortgage lending and rebalancing loan portfolios towards other secured lending. However, credit extension–focused initiatives may not have met their objectives of increasing affordable credit to households.

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Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data used in this article are both public and privately distributed data from the South African Reserve Bank.

Endnotes

[1] Financial inclusion is a multi-faceted concept that relates to the ability of individuals and businesses to access affordable transaction, payment, saving, credit and insurance products (World Bank 2024). This paper focuses on the greater extension of credit.

[2] However, these outcomes may vary with the banking system. For example, a healthier banking system can sustain higher lending capacity, or regulatory pressure may prompt more risk-taking (see Merrino, Lesame, and Chondrogiannis 2024).

[3] For the purpose of this analysis, we distinguish between prudential and financial regulations aimed at credit extension. However, the paper's focus is broader and is primarily about bank regulation. The regulations included in the narrative indices are described in Appendix 4 of our online appendix.

[4] Secured lending consists of leasing and instalments while unsecured lending consists of overdrafts, loans and advances and credit cards.

[5] We evaluate mortgage lending separately as it is the largest loan category on banks' balance sheets. Pirozhkova and Viegi (2024) show that mortgages comprised 31%–34% of bank assets, post the global financial crisis (GFC) period.

[6] We note that these results are specific to bank lending to all borrowers, but non-bank financial institutions (NBFIs) also provide lending. Our analysis does not capture the impacts of initiatives aimed at increasing household credit usage on lending by NBFIs.

[7] See Kashyap and Stein (2004), Basel Committee on Banking Supervision (BCBS) (2006), Cohen and Scatigna (2016) and Cerutti et al. (2017), among others.

[8] More specifically, Yap, Lee and Liew (2023) conducted a cross-country analysis examining the relationship between seven Sustainable Development Goals (SDGs) and financial inclusion. They found statistical evidence indicating that greater financial inclusion is associated with SDGs 2 (ending hunger), 5 (reducing gender inequality) and 8 (promoting economic growth).

[9] Dell'Ariccia (2001) proposes that this is a function of their two-period model, noting that over extended periods, creditworthy customers may seek to switch credit providers in pursuit of lower interest rates. However, a lower proclivity to switching may affect this prediction.

[10] For instance, Romer and Romer (1989, 1997 and 2004) use the approach to identify new measures of monetary policy shocks. Romer and Romer (2010), Ramey (2011) and Ramey and Zubairy (2018) use the approach to identify fiscal or tax shocks.

[11] The big four banks are Standard Bank, Absa, Nedbank and FirstRand.

[12] The policy indicators capturing prudential reforms are not bank-specific. For instance, banks in our panel may, at their discretion, increase their capital buffers in addition to minimum requirements. However, the minimum prudential (predominantly capital requirement) reforms are applied uniformly across banks.

[13] Table A1, available in the online appendix, provides a summary of the data collected for this research.

[14] Capitec is a bank that is reported to have had a significant impact on unsecured lending to underserved households in South Africa (Makhaya and Nhundu 2016). We exclude Capitec primarily on account of missing lending data available from the SARB. We note that this exclusion may underestimate the growth of credit to low-income South Africans.

[15] See https://www.gov.za/sites/default/files/gcis_document/201605/40002gen297.pdf

[16] Table A2, available in the online appendix, provides a summary of our aggregation approach.

[17] Table A3, available in the online appendix, provides descriptive statistics of the variables we use in our empirical approach.

[18] A visual test of the correlations between the response variables and our narrative indices are provided in Figures A1, A2, A3 and A4 in the online appendix. There is a stronger co-movement between the narrative indicators and 3-month change in lending, because the 3-month growth rates are less volatile than the 1-month changes.

[19] Table A4, in the online appendix. Reports the results of regressing changes in lending volumes on the prudential reforms index without controls.

[20] Table A5, in the online appendix, reports the results of regressing changes in lending volumes on the finance regulation index without controls.

[21] The additional capital requirements for systematically important (SI) banks were set to be introduced following Basel III requirements. The implementation was set be done in a gradual manner from January 2016.

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Supporting Information

Additional supporting information can be found online in the Supporting Information section.