

Has Macroprudential Regulation Affected Marginal Borrowers? Evidence From South Africa

Serena Merrino¹  | Keagile Lesame² | Ilias Chondrogiannis¹

¹School of Slavonic and East European Studies, University College London, London, UK | ²Macroeconomic Policy Unit, National Treasury, Pretoria, South Africa

Correspondence: Serena Merrino (serena.merrino@ucl.ac.uk)

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ABSTRACT

Bank regulation aimed at strengthening the resilience of the financial system can also prompt adjustments in lending and borrowing decisions. This paper examines how South Africa's credit market has responded to macroprudential policy measures to evaluate whether financial stability objectives are achieved at the expense of an equitable credit allocation. Using firm-level tax data, banking sector time series and a comprehensive regulatory index, we find that Basel III reforms reduced lending to households, especially if poor, to the benefit of firms, especially if large. We also document that regulation triggers lenders' adverse selection by penalising more creditworthy enterprises.

JEL Classification: E44, E58, G21, C32, C33

1 | Introduction

In the aftermath of the global financial crisis (GFC), policymakers were tasked with tackling system-wide risks and incorporating macrofinancial stability into their regulatory approach. Against this backdrop, in 2009 the Basel Committee on Banking Supervision (2011) issued the first draft of the Basel III agreements, which was endorsed by its 28 members and phased in over a 6-year transition period starting in January 2013. The new regulatory framework augmented the existing bank-specific requirements and introduced macroprudential rules that are enforced horizontally across all depository institutions rather than at only one institution at a time. More specifically, macroprudential policy (MaPP) regulates aggregate levels of capital, assets and liquidity based on the economy's financial cycle and the systemic relevance of the banks (i.e., interconnectedness).

While reducing systemic risk is the policy's goal, results from large cross-country studies indicate that MaPP actions are associated with milder credit growth and procyclicality,¹ whose

excesses have too often anticipated banking crises (Schularick and Taylor 2012). These intermediate targets are achieved because, to insulate profits from regulatory pressure and higher funding costs, banks are compelled to change the size or composition of their balance sheet, including their loan portfolio.² In this regard, one concern that has emerged around the implementation of Basel III is whether, due to information asymmetries, changes in lending behaviour affect the allocation of credit across types of borrowers and loans in unintended ways, for example disproportionately rationing credit to borrowers with observable vulnerabilities (e.g., small- and medium-sized enterprises [SMEs] and low-income households).³ If bank regulation amplifies existing market frictions, vital parts of the productive sector could be systematically locked out of the credit market because of adverse selection, with negative effects on the real economy and possibly on the policy's overall effectiveness. Furthermore, regulatory restrictions focused on financial stability might clash with the government's distributional objectives, especially in emerging markets such as South Africa, where market segmentation and inequality are more prominent than elsewhere.

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Despite its global scale, MaPP was born out of necessity in the wake of the GFC, so its transmission mechanism and redistributive effects are not yet well understood. The aim of this paper is to produce evidence of the effects of these regulations on credit distribution in South Africa and to evaluate whether MaPP's financial stability objective is at the expense of an equitable and growth-enhancing credit allocation. Due to the absence of a credit registry in South Africa, a detailed micro-level analysis that accounts for relevant characteristics of borrowers is difficult. Yet, data availability allows us to explore the effects on credit allocation across types of borrowers (households versus non-financial firms [NFFs]), depending on their characteristics (size, location and creditworthiness of firms; households by income) and the loan class (short-term versus long-term debt). To take advantage of all available data, our empirical approach is twofold. First, we estimate impulse response functions (IRFs) by local projections (LPs) with quarterly data on total bank lending, distinguished by type of borrower, for the period 2010Q1–2023Q1 (BIS 2023b). We then use the same methodology on households' total borrowing, distinguished by income and loan class (National Credit Regulator 2023). Second, we estimate a fixed effects panel data model on firm borrowing, employing annual firm-level tax administrative data from the South African Revenue Service for the period 2010–2021 (National Treasury and UNU-WIDER 2023). In both cases, MaPP is measured by an index that captures policy actions related to six instruments, while the policy shock that determines IRFs is identified through the narrative method.

In conducting these estimations and examining their results, the paper relates to a relatively new strand of literature that sheds light on the impact of MaPP. More importantly, it aims to enrich the discussion about unintended distributional effects in macroeconomics, effectively exploring the existence of a trade-off between financial stability and inclusion. In the next section, we review relevant scholarship and initiate a discussion on MaPP and credit distribution, focusing on bank-based measures. Section 3 discusses stylised facts on South Africa's credit market and MaPP. Sections 4 and 5 present the methodology and the results, and Section 6 concludes.

2 | Bank Regulation and Credit Allocation

The way in which changes to regulatory capital and liquidity affect the distribution of credit across different types of agents depends on a variety of factors that characterise both lenders' and borrowers' behaviours. To the best of our knowledge, there exists no analytical framework that describes these structural relationships comprehensively; hence, our first aim is to review the existing literature to fill this gap.

2.1 | Adjustments in Lending Behaviour

The first aspect to explore is how tighter regulation alters the lenders' decision to supply credit. For example, capital-related measures (such as countercyclical buffers and the leverage ratio) require banks to hold higher levels and classes of equity based on the risk profile of their assets. If the Modigliani–Miller theory held, both equity and debt would become cheaper

because of the market's appreciation of a stronger bank funding structure (Gambacorta and Mistrulli 2004). In this case, or if banks stood above minimum requirements, regulatory reforms would be unlikely to have an impact on lending (Cohen and Scatigna 2014). However, further capitalisation could also result in higher costs of equity due to the favourable tax treatment of debt, the existence of deposit insurance and information asymmetry that leads to agency costs (Harimohan and Nelson 2014). The increased cost of bank fundraising could then induce bankers to rebalance their loan portfolio in an effort to shield their profits. Similarly, in response to higher liquidity standards, non-compliant banks could either shift to stable funding (by increasing the duration of liabilities or by issuing new equity) or adjust the composition of their loan portfolios towards shorter maturities and more liquid assets (such as government bonds), which could in turn reduce their net interest margin (King 2013).

Overall, reactions depend on each bank's trade-off between the marginal costs of better funding and the marginal cost of cutting back on lending, and it is not possible to establish a priori whether and how regulatory policy has affected the credit market. Nevertheless, there is agreement in the literature that macroprudential measures are effective in curbing excessive credit growth (Lim et al. 2011; Cerutti, Claessens, and Laeven 2017). In South Africa, Rapapali and Steenkamp (2020) and Diesel et al. (2022) show that bank funding costs have increased since the GFC, while Pillay and Makrelov (2024) show that South African banks' lending has been affected by excess capital holdings.

If the lending supply volume is a key variable in the adjustment of banks' balance sheets, the composition of the loan portfolio must be relevant too, as different products have different yields and risk profiles. Stiglitz and Weiss's (1981) theory of credit rationing is a useful starting point because it underpins the existence of adverse selection in banks' discriminatory lending decisions.⁴ In short, lenders subjectively evaluate loan applications based on the probability of repayment, the marginal cost of granting the loan and the collateral offered (Freel 2007; Baas and Schrooten 2006). Given information asymmetry, credit risk is inferred from the borrower's credit history, the expected returns of the project and the business experience of the firm. In addition, credit decisions are informed by a presumed level of risk, which is based on the borrower's observable characteristics (such as the sector, location, age and size of the firm). Not only do younger, smaller firms have higher financial constraints, but they are also perceived as riskier in general, and they often fail to produce financial statements that comply with a bank's requirements (Zambaldi et al. 2011). If regulatory pressure systematically jeopardises the risk assessment of marginal borrowers, it could lock a vital part of the productive sector out of the banks' credit market, but for reasons unrelated to the profitability of the business and the affordability of the loan. In this scenario, MaPP's trade-off between financial stability and inclusion is a double-edged sword.

Conversely, if more conservative lending standards were accompanied by a fair risk assessment of borrowers, banks would withhold loans from fundamentally riskier borrowers, engendering a

virtuous cycle whereby a lower probability and the conditional impact of a financial crisis eventually create more economic opportunities. For instance, legislation that hinders households from taking on excessive debt based on their objective ability to repay discourages financial recklessness. A much-contested example relates to using finance as a substitute for public support to low-income households to meet their consumption needs, which only results in spiralling indebtedness (James 2014). Similarly, to the extent that credit decisions ration out low-rated NFFs, a lower credit supply allegedly expedites Schumpeterian creative destruction, so it is effective in supporting stability.⁵ Ayyagari, Beck, and Martinez Peria (2018) find that in emerging economies, MaPP binds small and young firms relatively more, but, given that this effect is concentrated on the least credit-worthy firms, MaPP is consistent with its goal of reducing systemic risk. Kang et al. (2021) find a U-shaped policy effect on the debt distribution of firms in China: Bank regulation tightens credit more intensely for firms with high leverage, but only up to a threshold after which the policy effect declines. They also observe that, at the same level of firms' indebtedness, banks prefer state-owned firms and large firms and that borrower-based measures possibly shift bank lending from households to firms.

However, banks do not necessarily need to reduce lending volumes to absorb a regulatory shock. For example, banks can attempt to increase retained earnings by raising the spread and passing on funding costs to borrowers or by engaging in 'greater risk taking and shifting their portfolios toward higher-yielding loans by increasing the average maturity of their loans and their exposure to riskier firms, such as smaller firms or firms operating in industries with higher bankruptcy risk' (Duquerroy, Matray, and Saidi 2022, 3). Jiménez et al. (2015) perform a difference-in-difference analysis of Spain's credit registry data to estimate the impact of dynamic provisioning. Interestingly, they observe that after the policy shock, banks—especially if small—lend relatively more to risky firms, suggesting that higher requirements may increase bank risk-taking in search of a yield. Along the same lines, Dell'Ariccia and Marquez's (2004) theoretical framework, which focuses on contexts characterised by large information asymmetries, shows that 'when forced to curtail their loan portfolio, informed banks reduce lending to a greater extent in less captive sectors, and retain larger market shares in the more captive but more profitable sectors' (Dell'Ariccia and Marquez 2004, 186).

2.2 | The Decision to Borrow and Regulatory Arbitrage

Having shown how financial regulation matters for the supply of credit, we now look at how borrowers react to changes in banks' lending behaviour. A changed regulatory environment can depress borrowers' demand for credit through economic (such as a higher cost of borrowing) and non-economic factors (such as weaker financial literacy and networks), both of which tend to create higher barriers for the vulnerable—therefore worsening the distribution of credit.

However, lower access to bank loans may be accompanied by higher competition in the non-regulated banking sector, giving rise to regulatory arbitrage. In this vein, Cerutti, Claessens, and

Laeven (2017) reveal that MaPP is more effective in financially closed but developed economies because there is less opportunity to circumvent regulation by moving to foreign or informal lenders.⁶ In South Africa, Kemp (2017) and the International Monetary Fund (2022) note that non-bank financial institutions (NBFIs) have grown at a faster pace than banks and that the SARB's exclusively bank-based macroprudential toolkit raises the opportunity for cross-sector regulatory arbitrage, 'even by encouraging banks to operate in the shadow banking space' (Kemp 2017, 24). In this respect, it must also be noted that the South African capital account has become increasingly liberalised in recent times, which allows for the possibility of cross-border substitution too (SARB 2018). Moreover, according to Jiménez et al. (2015), regulatory arbitrage jeopardises the effectiveness of MaPP to halt credit booms in good times, when firms can more easily switch to alternative lenders. Instead, capital buffers mitigate the credit crunch in bad times, because better-equipped banks keep serving their existing clients.

One problem with regulatory arbitrage is that bank lending is usually more advantageous than services offered by other (i.e., microfinance) institutions. James (1987) shows that the announcement of a bank loan leads to a positive stock price response for the firm obtaining the loan. Given that SMEs tend to rely on debt finance relatively more than their larger counterparts, granting them access to affordable long-term and developmental finance as well as bills discounting tools and other commercial finance products is key to their ability to generate income. Ayyagari, Beck, and Martinez Peria (2018) argue that only borrower-based measures are associated with declines in SME growth and investments, presumably because bank-based restrictions allow firms to borrow elsewhere. Analogously, when low-income individuals have no access to funding (including from the government) for risk management, education or housing, they are refused the attainment of basic needs. Benefits stemming from a far-reaching and well-diversified distribution of financial resources are commonly associated with higher financial stability and lower inequality and poverty (Beck, Demirgüç-Kunt, and Levine 2007). By contrast, lower financial market participation inhibits monetary policy transmission and its countercyclical effectiveness (Mehrotra and Yetman 2015). Hence, if MaPP skews the credit distribution, pushing marginal borrowers out of the pool, it could paradoxically compromise financial stability itself. Finally, a further question relates to the timing of the policy's redistributive effects. Intuitively, MaPP may decrease financial inclusion in the short term only, while pro-inclusion effects may emerge over time from enhanced confidence in the system's ability to ensure financial service provision.⁷

3 | Lending and Bank Regulations in South Africa

3.1 | Credit Market Dynamics

Following the 1994 elections, the democratisation of South African society and the relatively loose monetary policy that followed sustained a rapid expansion in bank lending, particularly unsecured consumer loans. Over this period, similar to the rest of the world, the South African banking sector has expanded and become more globally connected, but in 2002, the default of