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Open banking and financial inclusion in South Africa

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Abstract

Access to information can minimise moral hazard and adverse selection issues, improving the effective demand for and use of financial services. Information sharing through the open banking model allows new entrants into the market, creating new opportunities for startups, fintechs and tech companies that aim to disrupt traditional finance models and increase financial inclusion. This study examines the effect of open banking on financial inclusion in South Africa, using individual-level survey data for 2023. Results from the propensity score matching technique show that open banking significantly reduces the number of unbanked individuals, improves bank transaction frequency and increases the use of credit, saving and insurance services. The effect is even greater when open banking platforms are targeted – in this case, towards credit – with spillover to the non-targeted savings product categories. However, the results also show that improperly targeted open banking could exacerbate banking exclusion. Overall, these findings provide evidence that open banking is an alternative way to increase participation in the financial sector beyond holding a bank account. Policymakers should design policies that enhance digital literacy and enforce sharing of credit information to improve the provision of financial products beyond traditional banks and non-bank financial institutions, while ensuring appropriate regulation mitigates risks related to consumer data.

JEL classification

E42, G5, G21, G28, O55

Key words

Open banking, application programming interface, financial inclusion, third-party providers

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1. Introduction

Digitalisation has become increasingly central in advancing the use of and access to financial services, driving the financial system to adapt to new shifts in technological transformation (Stefanelli and Manta 2022). As a result of global financial crises in recent decades, stiffer financial regulations and their associated costs have stifled technological innovation in traditional banking. Moreover, dominant firms in the market are slow to innovate – and even resistant – because they are not pressured by competition, they rely on outdated systems and they are unwilling to serve the most vulnerable population groups. These factors limit their adaptability. On the other hand, financial technology companies (fintechs) have championed a new wave of financial digitalisation (Demirgüç-Kunt et al. 2022; Alt, Beck and Smits 2018), leading to non-banking organisations and fintechs flooding financial markets, escalating competition (He, Huang and Zhou, 2023). This disruption has driven the financial sector to drastically reorganise itself, with a shift to a more platform-based[1] business model (Vives 2019). Companies have been forced to reconsider their business models and relationship with the market.

Open banking enables banks, with customer permission, to share data relating to transactions and accounts with third-party providers using application programming interfaces (APIs) (Dezem et al. 2024; Frei 2023). The Bank for International Settlements (2019) defines open banking as the sharing and leveraging of banks' customer-permissioned data with third-party developers and firms to build applications and provide services. These services improve transparency for account holders and create new opportunities for marketing and cross-selling products and services.[2] Open banking can be either a market- or regulator-driven process (Mutambik 2023; Fang and Zhu, 2023; Babina et al. 2025). The global adoption of open banking, which started in the United Kingdom (UK) in 2018, has increased, with 95 jurisdictions reported to have adopted some form of open banking (Cambridge Centre for Alternative Finance (CCAF) 2024), and the practice is picking up pace in many more countries (see

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1 A platform-based business model refers to a business or service model that facilitates interactions, transactions or value exchange between two or more interdependent groups – typically producers (or service providers) and consumers – through a digital or technological platform.

2 For more details see Bank for International Settlements (2019).

Plaitakis and Staschen 2020). Open banking offers data-driven solutions that align with current societal needs, advancing progress towards the Sustainable Development Goals through financial inclusion. International organisations like the World Bank Group have proposed the idea of developing open banking to enhance access to finance for people with relatively low incomes (Shirazi, Aysan and Nanaeva 2023), helping to integrate marginalised and excluded customers into established financial systems. However, open banking alone may be insufficient to promote demand for financial services or inclusive finance, as its effectiveness depends on the availability and uptake of mobile technologies.

Efforts to promote financial inclusion by fintechs and other financial sector stakeholders have been premised on the development of mobile technology, which does significantly more for financial inclusion in developing countries than traditional brick-and-mortar platforms (Aron 2017; Van der Boor, Oliveira and Veloso 2014). Given open banking's relative novelty in many economies, it may be useful for policymakers to understand the independent and joint effects of open banking and mobile technology on their efforts to promote financial inclusion. Several studies have sought to show the importance of digital finance for financial inclusion (Liu et al. 2022; Li, Li and Cheng 2021; Ozili 2018); the importance of enterprise digital transformation in accelerating economic and social development in today's economy (Li, Wu and Xiao 2020; Li, Rao and Wan 2022); and how the increased adoption of internet-enabled phones bolsters financial inclusion (Lashitew, van Tulder and Liasse 2019; Aron 2017; Van der Boor, Oliveira and Veloso 2014). However, these studies have not clarified how open banking affects financial inclusion in emerging economies like South Africa.

There are several motivations for this study. One is that the link between open banking and financial inclusion has not been examined in developing economies like South Africa. From the perspective of the theory of information sharing, personal or financial data can be exchanged between consumers, banks and third-party financial services providers (like fintech companies), typically through secure digital platforms (e.g. APIs). In the context of open banking, this data sharing is done with the customer's consent. It has been argued that formal information-sharing mechanisms aim to reduce information asymmetry, adverse selection and moral hazard in the financial market and improve how it functions (Stiglitz and Weiss 1981; Pagano and Jappelli 1993;

Jappelli and Pagano 2002). For instance, Iakimenko, Semenova and Zimin (2022) argue that access to borrowers' credit histories through information sharing enables banks to better evaluate applicants' creditworthiness, decide which loans to approve and determine what interest rates to charge (Kallberg and Udell 2003; Nakamura and Roszbach 2018). Thus, information sharing is the bridge between open banking and financial inclusion, enabling alternative financial providers to use rich, real-time consumer data to offer accessible, affordable and customised financial products, particularly to those excluded from traditional banking systems. However, this argument has not been tested empirically in developing or emerging economies like South Africa.

Previous research has investigated the role of open banking in intensifying competition and increasing entry (Babina et al. 2025) and facilitating credit within the financial sector (Fuster et al. 2019; Gopal and Schnabl 2022). But the direct effect of open banking on financial inclusion has not been empirically examined. Doing so will provide a basis for the regulation of information sharing in the financial market, promoting transparency, security and efficiency. The current lack of regulatory policy for open banking in South Africa creates some market uncertainty and makes incumbents reluctant to share customer information with other parties. This study not only examines how open banking could deepen financial inclusion in South Africa, but provides evidence to support the SARB in regulating the open-banking business model.

The link between open banking and mobile technology[3] in recent developments cannot be overemphasised. While mobile tech is expanding rapidly globally, open banking is still developing in South Africa (Chu 2018). This study attempts to provide new insights into how open banking and mobile technology can jointly affect financial inclusion in South Africa. Drawing on existing literature (Alliance for Financial Inclusion 2025; CCAF 2024; Consultative Group to Assist the Poor 2024; Organisation for Economic Co-operation and Development 2023; Wewege, Lee and Thomsett 2020; Plaitakis and Staschen 2020; Chu 2018), we discuss the possible complementary, substitutional and

[3] One practical use of mobile technology is for an individual to use a mobile phone to perform tasks relating to finance, such as making payments.

interactive effects of open banking and mobile technology on financial inclusion. Understanding their joint impact in the South African context can yield useful policy insights for policymakers, regulators and financial market actors. This is because South Africa has a relatively well developed and dynamic financial sector, similar to developed economies like the UK. South Africa has a high level of technology penetration and digital engagement, with 74.7% of the population (45.34 million people) using the internet – significantly higher than many other regions globally. Mobile connectivity is even more pronounced, with 118.6 million active mobile connections, equating to 195.4% of the population (World Bank 2024). Given these figures, open banking has the potential to significantly accelerate financial inclusion. This paper seeks to fill a research gap by examining the interplay between open banking and mobile technology, providing actionable insights into harnessing technology for equitable and sustainable development, and situating South Africa within global and regional contexts.

Our study uses a data set tailored to the South African social and economic context: the FinScope consumer survey for South Africa for 2023 (FinMark Trust 2023). This survey has sufficient proxies for open banking and financial inclusion to ensure the study has robust results. Given that open banking is still in its infancy, we use the propensity score matching (PSM) approach to infer the average treatment effect of open-banking platforms on financial inclusion. We use two measures of open banking: a broad measure encompassing screen scraping and a narrow measure focusing on online microfinance lenders and large non-bank fintech lenders strong on information sharing. Our results show that open banking significantly increases the frequency of bank transactions and the use of credit and insurance services. The effect is even greater when open-banking platforms are targeted – in this case to credit, with spillover to savings products. However, banking exclusion may increase because of credit-targeted APIs, attributable to users' limited digital literacy and limited access to technology, or the hidden bias of credit-scoring algorithms.

The rest of this paper is organised as follows. Section 2 provides an overview of open banking and financial inclusion in different contexts, including South Africa. Section 3 presents the literature review, section 4 discusses our methodology, and section 5

presents the empirical results and discusses our findings. Section 6 concludes with policy implications.

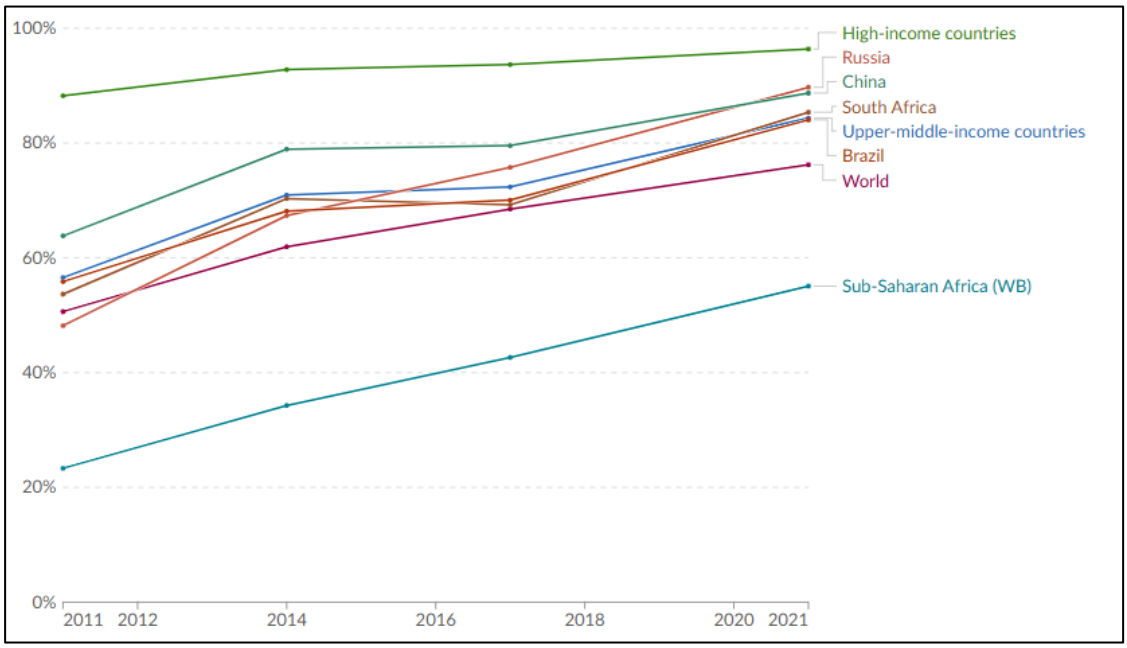
2. An overview of open banking and financial inclusion

2.1 Financial inclusion in different contexts

In recent years, there has been a global recognition that increasing financial inclusion is critical for promoting equal opportunities and reducing poverty. The World Bank defines financial inclusion as “the process where people and businesses have access to useful and affordable financial products and services that meet their transactions, payments, savings, credit, and insurance needs” (Demirgüç-Kunt et al. 2022). Expanding access to financial services, especially to underserved or excluded populations, has changed how different industries operate and enhanced the design and delivery of financial services (Demirgüç-Kunt et al. 2022; Zheng and Ren 2026).

By most criteria, financial inclusion has shown an upward trend over the past 10 years. A well-known data source for measuring financial inclusion is the World Bank’s Global Findex survey. The data highlight salient features of financial inclusion across regions and income levels. The supply-side dimensions include automated teller machines per hundred thousand adults, bank branches per hundred thousand adults, bank accounts per thousand adults, borrowers from commercial banks per hundred adults, depositors with commercial banks per thousand adults, outstanding loans with commercial banks and outstanding deposits with commercial banks. Using the basic measure of financial inclusion – account ownership – Figure 1 shows an upward trend of respondents aged 15 and older who report having an account (by themselves or with someone else) at a bank or other type of financial institution, including mobile money accounts, over the past decade.

Figure 1: Share of adults with an account at a financial institution, 2011–2021 (%)

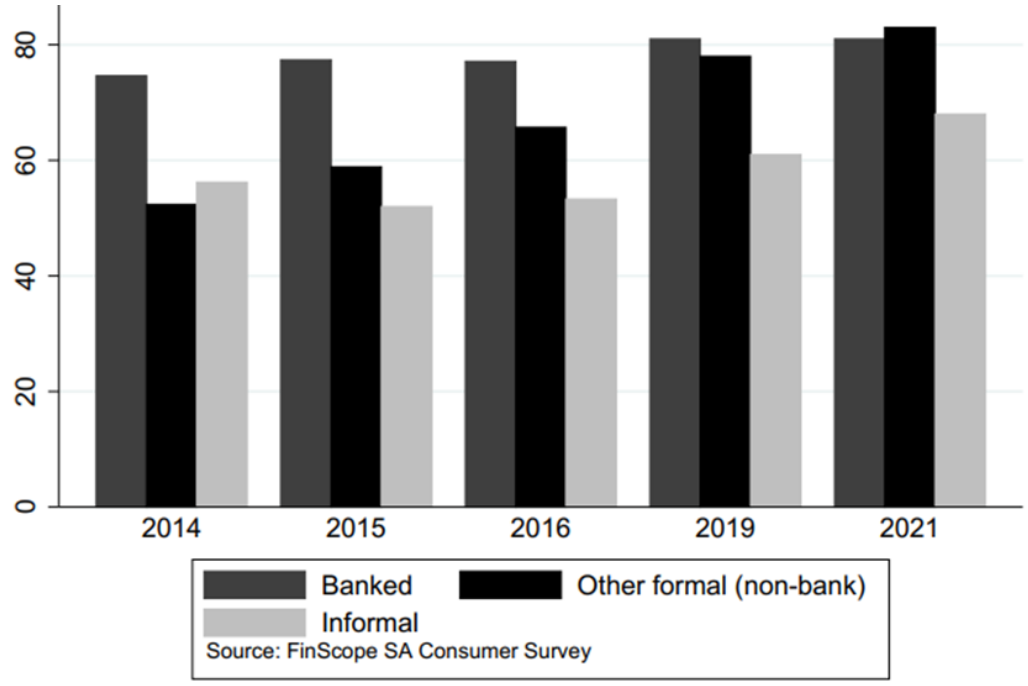


Source: Authors' compilation from various World Bank publications

Figure 1 shows that South Africa compares well with other regions, with its level of financial inclusion (over 80%) placing it well above the average for sub-Saharan Africa. This can be attributed to South Africa's well-developed financial sector, akin to those of high-income countries.

Figure 2 provides a more detailed view of financial inclusion in South Africa. Over the period 2014–2021, it shows an increasing trend of account ownership in non-bank formal financial institutions, while a reasonable percentage of the population remains informally served. This pattern is observed at product level over the same period. For instance, the data also indicate that while credit provided by non-bank financial institutions rose from 36% in 2014 to 70% in 2021, informal credit rose from 15% to 37%, while bank credit showed a sticky rate of change averaging 4% (14% to 18%) over the same period (Nanziri and Gbahabo 2025).

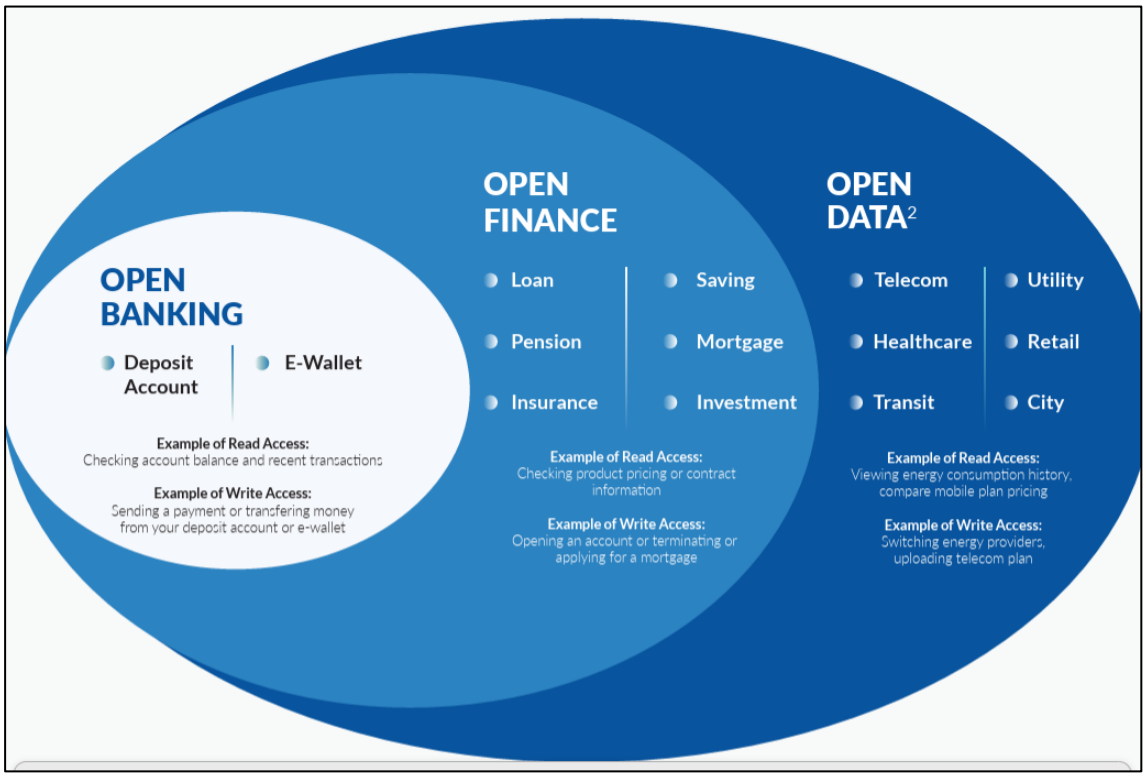
Figure 2: Account ownership by adults aged 18+ years in South Africa, 2014–2021 (%)



2.2 Open banking across the world

Open finance, especially open banking, is becoming popular around the world. Open finance refers to the extension of open-banking data-sharing principles to a wider range of financial products and services, providing consumers with greater control over their financial data and enabling more integrated, innovative and personalised financial services (OECD 2024; Arner, Castellano and Selga 2022). In South Africa, the Intergovernmental Fintech Working Group (IFWG) defines open finance as a framework that enables customer-approved sharing of financial data among financial services providers and third-party entities to foster innovative, tailored products and services (IFWG 2021). It encompasses all financial products and services, including bank accounts, insurance, pensions, investments, mortgages, savings and credit products, as shown in Figure 3. Open finance involves collaboration between banks, fintechs and consumers and aims to increase efficiency and inclusivity in the financial sector. Figure A1 in Annex A provides a summary of the categories of actors in the open banking/finance model and their respective roles.

Figure 3: Product scope in open banking and open finance



Source: CCAF (2024)

Recent trends in open banking are reshaping the financial sector, with Europe having a legitimate claim to being the "cradle of open banking", credited with the development of the Payment Services Directive (PSD)[4] in the European Union (EU) and the Open Banking Standard in the UK. Since its adoption in advanced economies in 2018, open banking has been transforming financial services for consumers, banks, fintechs, regulators and other financial sector stakeholders (Plaitakis and Staschen 2020). While many open-banking initiatives have been launched, the market-driven and regulator-driven approaches are the two main categories. In the regulator-driven approach, government or financial authorities create frameworks that mandate the adoption of open-banking regulations. These regulations typically define the scope, technical standards, security protocols and timelines for compliance, ensuring that all stakeholders operate under a unified system.[5] The market-driven approach relies on voluntary collaboration among financial institutions and fintechs, and the industry

4 Payments Services Directives refer to a European Union regulation designed to create an integrated, efficient market for payment services. https://finance.ec.europa.eu/consumer-finance-and-payments/payment-services/payment-services_en

5 https://www.konsentus.com/a-market-drive-or-regulatory-approach/

defines its standards and protocols, often without government intervention. Banks and financial institutions are then encouraged to open their data and services to third-party providers through APIs, allowing these entities to offer innovative products and services. Data transfer to third-party providers can be done through APIs, screen scraping or reverse engineering. Each approach has implications for data access, quality and reliability, and may raise legal or ethical considerations (see Table A1 in Annex A). Although there has been a shift to API-based open banking, some 18 jurisdictions still use screen scraping (CCAF 2024).

International experience shows that there is no universally superior approach to adopting open banking, with countries taking either the market-led or regulator-led approach, while others transition from a market-led to a regulator-led regime. Several developed economies, including Japan, Singapore and South Korea, are establishing open API policies and introducing a range of measures to promote a market-driven approach to accelerate the take-up of data sharing in banking. Similarly, the United States has opted for a market-led approach, with the Consumer Financial Protection Bureau developing a framework that gives consumers greater rights, privacy and security for their personal financial data. Under this framework, financial providers are required to unlock an individual's personal financial data and transfer it to another provider at the consumer's request, for free (Consumer Financial Protection Bureau 2024). In Ireland, the Central Bank keeps a close eye on open banking and ensures that it is safe and supports economic growth. Customers in Hong Kong may access a wealth of financial information through the Open API Framework, launched in 2019, with 20 banks offering over 500 APIs in the country.

Table 1 provides an overview of some of the adopters of the regulator-led versus market-led open-banking regime (see also Figure A2 in Annex A, which shows timelines of adoption).

Table 1: Global adopters of the open banking/open finance model

Country/Region	Open finance regime	Oversight framework
Australia	Regulator-driven	Consumer Data Right legislation expanded to open finance
Brazil	Regulator-driven	The Central Bank of Brazil rolled out open banking regulation in phases
European Union	Regulator-driven	PSD2 Directive requires banks to share data with licensed third parties
India	Regulator-driven	Enabled by the Reserve Bank of India's Account Aggregator Framework
Japan	Regulator-driven	Amended Banking Act requires banks to open APIs
Mexico	Regulator-driven	Fintech Law (2018) mandates open APIs across financial institutions
Nigeria	Regulator-driven	The Central Bank of Nigeria released regulatory framework for open banking in 2023
South Korea	Regulator-driven	The Financial Services Commission initiated open banking
UAE	Regulator-driven	The Central Bank of the UAE introduced guidelines and standards for open banking
United Kingdom	Regulator-driven	Mandated by the PSD2 and UK Open Banking Regulation via the CMA (2018)
Canada	Market-driven (transitioning)	Initially market-led, now moving toward government-led framework
Kenya	Market-driven	Industry-led API standardisation; no formal regulation yet
New Zealand	Market-driven	Encouraged through innovation; no legal mandate yet
South Africa	Market-driven	Banks and fintechs collaborate voluntarily; regulatory environment is evolving
Singapore	Market-driven (hybrid)	The Monetary Authority of Singapore promotes open banking through guidelines, not mandates
United States	Market-driven	No federal mandate; open banking is led by big banks and fintechs (e.g. Plaid, MX)

Source: Authors' compilation

Open-banking adoption is currently highest in Europe, where users are forecast to reach 132.2 million by the end of 2024 (see Fratini Passi 2022; Casolaro, Rauber and de Lima 2024); moreover, the region still leads with groundbreaking laws like the PSD. The EU's PSD3 creates the foundation for open banking by allowing third parties to access consumer data, stimulating competition and fostering innovation. In terms of categories, APIs have been developed across a plethora of services – including accounting, banking, business management, gambling, marketing, carbon tracking, personal finance and wealth creation (see Table A2 in Annex A for a full list).

2.3 The case of South Africa

2.3.1 Overview of open banking in South Africa

South Africa has a well-developed but highly concentrated financial system, dominated by a few large banks (Absa, Capitec, FirstRand, Nedbank and Standard Bank). This market concentration has led to limited competition, particularly in retail banking. While these banks are financially sound and systemically important, their control of the market can lead to limited innovation, high fees and products that are not aligned with the needs of underserved populations. As shown in Figures 1 and 2, formal financial inclusion is relatively high, with more than 80% of adults aged 18 or older having access to an account from a bank or non-bank financial institution. However, actual frequency of use of financial products, especially in savings, credit and insurance, remains significantly lower. This suggests that while people are technically included in the financial sector, they are not actively benefitting from or engaging with financial services in a meaningful or sustainable way.

In terms of digital technology, South Africa enjoys high internet penetration and financial technology innovation. Since fintechs and digital platforms are at the core of open banking/finance, third-party providers can leverage these platforms to securely and legally access customers' financial data (with their consent) and offer them innovative, tailored products. Thus, open banking can drive product diversity, pricing transparency and more personalised financial services.

The open-banking ecosystem in South Africa comprises regulators, financial institutions and third-party providers. While the country has robust, enabling legislation on personal data and privacy (see the Protection of Personal Information Act), market changes and technological innovations have raised questions about potential gaps in the law, particularly relating to third-party providers and APIs, which fall outside the current regulatory purview. As such, South Africa signalled progress by allowing interested parties to develop platform-based products. To date, platforms like Yoco, Lulalend and 22seven (now known as Vault22) offer digital lending, data-based financial management and payment processing built on data access and automation, evidence that platform-based models in the country have good prospects. Emerging use cases include major banks using bank APIs and marketplace APIs, as shown in

Table 2, with some niche markets. One challenger is Spot, a mobile money app that can be used to connect to the open-banking marketplace and find personalised loans, insurance and rewards offers.

Table 2: Open-banking participants in South Africa

Nature of entity	Technologies and partnerships
Absa Bank	Fintech venture launched in 2016
Bidvest Bank, a niche commercial bank specialising in foreign exchange and providing retail banking, vehicle financing and insurance.	Bank API
Capitec Bank	Partnership with Ozow to use Capitec pay
Discovery Bank	Bank API
First National Bank	Bank API
Investec Bank	Partnered with Bud in 2019, which works with the Investec banking app
Nedbank Group	Partnership with Xero to support small and medium-sized enterprises (SMEs), launched in 2019
Spot	Partnership with Mastercard
Standard Bank (South Africa)	Bank API
TymeBank	TymeBank Stack technologies and partnerships include the following: AWS Docker WSO2 Java Snowflake Mambu Tableau Databricks GDS Link

Source: Authors' compilation from the Open Banking tracker (www.openbankingtracker.com)

2.3.2 Open banking/finance as a solution to the challenge of financial in South Africa

The IFWG (2021) provides a snapshot of the multiple benefits of open banking/finance for financial inclusion in South Africa, with solutions linked to the global categories shown in Table A2 in Annex A. First, financial literacy remains a challenge, as a poor understanding of financial products is a barrier to their effective use. According to the South African Social Attitudes Survey, South Africans on average had a financial literacy level of 55% in 2015, and this may not have changed much given that financial management remains wanting, as evidenced by the annual FinScope surveys. With low financial literacy, consumers are limited in how they can engage with financial services and may miss out on better-value or more appropriate products for their needs. Through personal financial management platforms, open finance can aggregate and display information on a customer's financial products within a single sector (e.g. banking products) or across sectors (e.g. banking, credit, insurance and pension). This can help customers better understand their financial situation, expenditure and savings, enabling them to switch to more suitable alternative products.

Know Your Customer (KYC) procedures can be overly cumbersome for customers, pushing them away from formal financial institutions, especially banks. Moreover, increasing regulations – which sometimes require the impromptu verification of users of financial services in line with anti-money-laundering laws – make formal financial products unattractive to lower-income groups. Open banking/finance can help reduce compliance costs by streamlining the onboarding process. For instance, open finance can enable a secure framework based on APIs that allows customers to digitally authenticate themselves to third-party providers to share data or make a payment (IFWG 2021). In jurisdictions where a customer in a remote location might not have formal proof of address, financial services providers have used digitalised verifications, such as geospatial coordinates, to conduct KYC procedures to open bank accounts or use mobile-money accounts (see the Equity Bank model in Kenya). Open banking would leverage such technologies.

Payments in South Africa remain predominantly cash-based, despite more than 80% of adults owning bank accounts. In 2017, a Mastercard study reported that cash transactions accounted for up to R23 billion per year in South Africa (Payments Afrika

2017). Open banking/finance platforms could provide customers with seamless, convenient and faster payment solutions – for instance, in e-commerce.

According to the FinMark Trust (2023) survey, credit use in South Africa is distributed as follows: 18% of adults access bank credit, 70% rely on non-bank credit and 37% use informal sources of credit. This composition is problematic from a development finance perspective because formal bank credit – which is typically lower cost, regulated and more suitable for productive investment – accounts for the smallest share. The heavy reliance on non-bank and informal credit, which is often short-term and consumption-oriented, suggests constrained access to affordable, long-term financing. For micro and small enterprises (MSEs), the implication is more acute: limited access to formal bank lending restricts working capital expansion, asset acquisition and business scaling. Instead, many MSEs depend on expensive or informal sources of finance, which increases vulnerability, raises the cost of capital, and constrains enterprise growth and job creation. Through consumer credit or credit-score APIs, open banking/finance can enable financial institutions to provide faster, safer and more efficient credit scoring and extend credit more quickly.

In South Africa, the use of insurance, savings and investment products remains skewed to informal instruments, such as funeral schemes, rotating savings schemes and informal clubs called stokvels. According to SARB (2024), South Africa's gross savings stood at 13.7% of GDP in 2024, below the world average of about 25%. With household debt reaching record highs of 80% in the past decade, household saving has been negative, reaching -1.2% in 2024. Potential users have a low level of awareness of savings and investment products, according to the country's FinScope surveys and the Old Mutual Savings and Investment monitor. Furthermore, only 15% of South Africans have non-life insurance, an indication that many individuals, households and businesses are not protected against adverse events. Open bank/finance can support the development of tools to help consumers better understand their savings, investments and pensions by providing them with up-to-date information on costs, tax treatment, performance and risk. For non-life insurance, open bank/finance solutions can provide consumers and businesses with tailored deals and products based on their lifestyle, profiles and financial habits. Consumers can also

receive guidance on risk profiling and learn about good risk characteristics, which can reduce insurance costs (IFWG 2021).

3. Literature review

3.1 Theoretical review

One way to characterise the current competitive dynamics in the banking sector is to relate them to the underlying arrangements of the traditional banking model – where incumbent providers of financial services, with whom consumers have established relationships, have control over consumers' financial data (Borgogno and Colangelo 2019). However, under these arrangements, both parties are disadvantaged in competition (Borgogno and Colangelo 2019). In essence, when data sharing is not governed by fair, open and standardised frameworks, neither the incumbent (banks) nor the challenger (fintechs) fully benefits – both are held back by competitive imbalances, lack of trust or inefficient collaboration. Consumers cannot easily switch to competing financial products and services, as their existing financial providers effectively lock in their financial data. This can be costly to the consumer. Meanwhile, competing service providers can only access and assess prospective consumers' incomplete financial data. Thus, while incumbent financial services providers retain market power, consumers may not benefit from the most competitively provided products and services (Arner, Castellano and Selga 2022).

Given this situation, regulators worldwide have intervened with regulatory guidelines to address data portability issues and reduce switching costs (Borgogno and Colangelo 2019). These regulations aim to balance the competitive dynamics in the banking sector by establishing conditions that allow consumers to have more control over their data. Regulations ensure that open banking works smoothly and safely, protecting customers' rights while allowing them to easily manage their financial data and switch providers. Thus, open banking has propelled the banking industry towards a more customer-centric, platform-based model (Vives 2019). The implications are broad and include the development of financial inclusion channels and an increased role for fintech in the economy. This study thus focuses on how open banking can promote financial inclusion.

The foundation of open banking consists of three components. The first is a sound regulatory framework, or sound standards and trust frameworks, which can be established by the market without regulatory intervention, as in the case of market-led open banking. This framework enables an easier shift to sharing customers' bank data. The second element is APIs, which is the technology that makes data sharing among the ecosystem's participants easier. However, other technologies like screen scraping can also serve as a foundation for data-sharing models (Liu et al. 2022). The third essential element for the open-banking paradigm is consumer agreement in every situation (Stiefmueller 2020). Without a customer's prior authorisation, service providers cannot allow a third party to access the customer's bank information. Despite technological and regulatory developments, consumer agreement in any open-banking programme is not negotiable.

Information-sharing theory suggests that sharing data reduces information asymmetry, allowing better decision-making in financial contexts. However, certain lenders (like fintechs) having access to more or better-quality data can create new imbalances, putting traditional banks at a disadvantage. The potential lender asymmetry favouring fintechs in the open-banking model is a result of the use of advanced technology by fintech lenders to analyse consumer data. This gives fintechs an edge over traditional banks, as they can make quicker, more personalised lending decisions. Fintechs may also benefit from more flexible regulations and consumer trust, giving them a competitive edge over banks.

It can be argued that the theory of information sharing makes financial services less expensive in a variety of ways, such as reducing information asymmetry and lowering service fees to offset the risks associated with opportunistic behaviour. This behaviour occurs when individuals or organisations act primarily in their own self-interest, exploiting situations for personal gain, sometimes at the expense of others. This can result in poor-quality products for customers and unfair pricing. In the context of financial information sharing, data is frequently shared using an API to enable the smooth and secure transfer of data across systems (OpenID Foundation 2022). Restrictive information sharing leads to information asymmetry, with customers potentially excluded from the financial system because they have limited, minimal or no access to credit, suitable payment methods or saving vehicles.

Technology adoption theory

The adoption of new technologies such as online platforms and APIs can be slow, with early and late adopters (see Straub 2009). The latter often prefer to wait and learn from early adopters. Given that new technologies are typically established in affluent nations before making their way to developing nations, the notable uptake of mobile technology in Africa is surprising, the result of several factors that do not follow the typical pattern (Aron 2017; Van der Boor, Oliveira and Veloso 2014). These factors include the leapfrogging of infrastructure, affordable mobile devices, mobile innovations like mobile money, and a growing demand for connectivity. While challenges remain, such as network access and affordability, the success of mobile technology in Africa demonstrates how emerging markets sometimes adopt new technologies faster than expected. Information and communication technologies can help developing nations 'leapfrog' to more advanced and efficient economic systems, as demonstrated by mobile technology (Aron 2017). This technology has greatly reduced travel time by providing efficient navigation and transport options; increased safety and convenience through emergency alerts, location sharing and digital payments; and significantly improved financial inclusion by enabling access to banking, microloans, mobile money services and financial education.

Technology plays a crucial role in transforming how people live, work and access services, particularly in underserved or developing regions (Munyegera and Matsumoto 2016; Jack and Suri 2014). It can also help modernise the vast informal economy that is typical of most developing nations, in the process potentially increasing financial inclusion (Foster and Heeks 2015). As technology can promote financial inclusion by enabling financial services providers to reach previously unbanked communities, it may also be seen as an inclusive innovation (Pansera and Owen 2018). Given the success of mobile technologies in reaching underserved populations, more research is needed on how it can complement open banking in increasing financial inclusion. That is the focus of this paper.

3.2 Empirical evidence

While there is a paucity of empirical work on open banking/finance, studies undertaken thus far provide some insights into its confounders and its potential role in the financial sector and the economy. Briones de Araluze and Cassinello Plaza (2023) explore the relevance of initial trust and social influence in using services based on open banking. They show that perceived usefulness, social influence and initial trust are important determinants of the intention to use open banking, while perceived ease of use plays little role. For South Africa, empirical investigations of the nexus between open banking and financial inclusion can be drawn from regional studies. Fang and Zhu (2023) examine the effect of open-banking regulation on traditional bank loans in the emerging markets of the BRICS countries. They find that open banking plays a significant role in promoting financial inclusion in emerging economies. They also provide evidence that open lending is associated with a decline in consumer loan lending from traditional financing institutions like banks. This may be because open lending systems provide more alternative lending options, where financial data are shared transparently.

Shirazi, Aysan and Nanaeva (2023) investigate the challenges and opportunities of open banking for financial inclusion in Muslim-majority countries. They conclude that while the design of open banking presents both opportunities and risks, overall it contributes to more financial inclusion. Rastogi, Sharma and Panse (2020) present similar results, showing that open banking facilitates financial inclusion and propels a country's economic development. By gathering data through a structured questionnaire, they find that open banking mediates the relationship between financial inclusion and economic development.

Using data from a pan-European survey involving 5 500 participants from 22 nations, Polasik and Kotkowski (2022) examine the factors that influence customers' adoption of open-banking services. They find that while open-banking services have large market potential, they are not expected to increase financial inclusion in Europe. Those who already use digital finance the most are the primary beneficiaries of open banking. Chan et al. (2022) examine the key factors that drive consumers' adoption of open banking and find that social influence strongly mediates the intention to use open banking through performance expectancy. They also provide evidence that financial literacy lowers initial trust of open banking and, thus, induces consumer scepticism.

According to Plaitakis and Staschen (2020), open banking offers emerging and developing economies (EMDEs) the chance to promote innovation and reduce expenses in ways that make it more affordable to provide underserved and unbanked populations with more suitable goods and services. However, they show that in EMDEs, open-banking policies to increase financial inclusion have yet to be proven effective. Giya, Kagee and Thibane (2021) explore the approaches to open banking adopted globally and draw lessons for its implementation in South Africa. The premise of their study is that South Africa is still lagging in its implementation of open banking despite its potential benefits.

While much attention has been paid to the role of mobile technology in promoting financial inclusion, there has been little focus on its interactive role with open banking to facilitate financial inclusion in most developed and developing markets. Explaining user adoption at the micro level is a major focus of the growing body of research on financial inclusion and mobile technology (Murendo and Mutsonziwa 2017; Batista and Vicente 2013; Aker et al. 2016; Blauw and Franses 2016). However, little or no empirical evidence has been documented to support the claim that open banking and mobile technology are jointly important in advancing financial inclusion in South Africa.

Given the above background, we formulate the following hypothesis:

Open banking is a significant determinant of financial inclusion.

4. Methodology

4.1 Empirical strategy

We employ a matching technique, the Propensity Score, widely used in the absence of a field experiment (e.g. see Heckman, Ichimura and Todd (1997) and Dehejia and Wahba (1999)) to evaluate the causal effects of open banking as a treatment and infer financial inclusion outcomes. The evaluation parameter is the average treatment effect on the treated (ATT) and measures the mean impact of treatment. It is expressed as: $ATT = E(\Delta|D = 1) = E(y_1|x, D = 1) - E(y_0|x, D = 0)$, where D is the treatment, y_1 is the outcome for the treated, y_0 is the outcome for the treated if they had not received

the treatment (the counterfactual) and x is a vector of observable characteristics. According to Rubin (1974), adjusting for all observed characteristics, financial inclusion outcomes will be independent of these characteristics – that is, the Conditional Independent Assumption, $y_0, y_1 \perp D|x$. We acknowledge that this assumption can be violated if strong unobserved characteristics are present that could influence selection into treatment (see Heckman, Ichimura and Todd (1997)): for instance, lack of trust in financial institutions or aversion to sharing information with third parties. This selection bias could be circumvented using a difference-in-difference matching estimation if data are available for more than one period, but that is not the case in this study.

Following Rosenbaum and Rubin (1983), we condition matching on a 'propensity score' such that: $ATT = E(\Delta|p(x), D = 1) = E(y_1|p(x), D = 1) - E(y_0|p(x), D = 0)$, where $p(x)$ is the propensity score. The propensity score is obtained by estimating the participation of individual i, then matching with a non-participant with a similar score to construct the comparison group. The study uses nearest neighbour and kernel matching algorithms to make causal claims between open banking and financial inclusion. For the nearest neighbour algorithm, each treated observation i , an observation j that has the closest $p(x)$ is selected: that is, $\min\|p_i - p_j\|$. For treatment greater than control, observations in the control are selected with replacement, otherwise they are selected once. For the kernel approach, each treated observation i is matched with several observations with weights (w) inversely proportional to the distance between the treated and the control, that is, $w(i,j) = K(\frac{p_i - p_j}{h}) / \sum_{j=1}^{n_0} K(\frac{p_i - p_j}{h})$, where h = bandwidth and n_0= number of control observations. The estimator is given by expression (1), where n_1 is the number of treated observations:

$$ATT = \frac{1}{n_1} \sum_{i \in \{D=1\}} \left[y_{1,i} - \sum_j w(i,j) y_{0,j} \right] \quad (1)$$

4.2 Data

The study uses secondary data from the South African FinScope Survey for 2023. This latest survey is selected because open platforms are relatively well entrenched in the economy and financial inclusion is almost stable. The FinScope consumer surveys collect data on financial behaviour under the auspices of FinMark Trust, a reputable, independent demand-side financial data provider across the developing world. The

unit of analysis is the individual consumer in South Africa. The overall sample size of the study is 5 600 respondents, with information on financial inclusion indicators, open banking proxies and demographic characteristics.

The outcome variables

Like Nanziri and Gbahabo (2025), we estimate financial inclusion as a vector of outcome variables comprising credit, savings and investment products, bank transaction frequency and life insurance policies held by a formal financial institution. Credit access is measured as a binary variable equal to 1 if the respondent borrowed money from a formal financial institution over the past 12 months, 0 otherwise. Similarly, savings and investment are binary variables determining whether the respondent maintains savings and investment products in a financial institution. Bank transaction frequency, another binary variable, is coded as 1 if the respondent uses their bank account at least once a month, otherwise 0. Finally, the insurance variable is also coded as 1 if the respondent holds a life insurance policy from a formal financial institution, otherwise it is 0.

The policy variable

A thorough literature review by Gozman, Hedman and Sylvest (2018) informs our measure of open banking. The literature asserts that open banking aims to promote financial inclusion through data sharing between established financial institutions, including banks, fintechs and other innovative digital financial services providers (Babina et al. 2025). The financial services already provided by fintechs in South Africa include payments, savings and deposits, lending, insurance, investments, financial planning and advisory, and capital-raising services targeting SMEs.

The policy variable in this study is therefore open banking, measured as a binary variable equal to 1 if the respondent uses any third-party provider of digital financial services that relies on data-sharing with bank and non-bank institutions, otherwise 0. Specifically, the variable equals 1 if respondents sent, received, made payments or borrowed money over the previous 12 months from any third-party provider of financial services, either through an API or otherwise, that involved some form of data-sharing between the third party and a financial institution. We add screen scraping to obtain a

broader measure of open banking. Table 3 presents a summary of the platforms included in our broad measures of open banking.

Table 3: Third-party financial services providers using APIs in South Africa, 2023

Hello Paisa
Mama Money
Mukuru
MTN Momo
Vodapay
Virtual account (WhatsApp messaging payments) such as Telkom Pay and Nedbank ukheshi
Bank Zero
TymeBank
Discovery
Investec
Bidvest
Mastercard
Visa
SWIFT
American Express or Diners Club

Source: South Africa's 2023 FinScope consumer survey

The covariates

Individual characteristics are included as exogenous covariates to account for individual and contextual heterogeneity that may influence the endogenous regressor and the outcome variable. These covariates have been previously applied in the financial inclusion literature, including by Nanziri and Gbahabo (2025). For instance, employment status is used to capture income stability and access to financial services, while marital status may influence household financial behaviour and risk preferences. Similarly, the age of the respondents reflects lifecycle effects on technology use and financial decisions, and gender accounts for gender-based disparities in financial access and digital adoption (Nanziri and Gbahabo 2025).

Other individual characteristics include the respondents' race, which controls for historical and structural inequalities in economic access, and the level of educational achievement, which is a proxy for financial literacy and digital skills. Finally, we controlled for whether the respondents live in rural or urban areas – as differences in social-economic infrastructure and amenities often reflect access disparities – and the province in which respondents reside, which also captures regional disparities in

policy, infrastructure and service availability (Nanziri and Gbahabo 2025; Nanziri 2016).

5. Results and discussion

5.1 Descriptive statistics

Table 4 provides a summary of our data, showing that a small proportion of the population (8.9%) reported using credit in the previous 12 months, while the respective proportions for savings, transaction frequency and insurance are 98%, 76% and 99.4%. A good 73% of respondents used open-banking platforms, of which 70% used it for payments. In terms of demographics, the average respondent in the sample is a 40-year-old single woman, a matriculant and a non-metropolitan dweller using at least two internet platforms.

Table B1 in Annex B provides a closer view of the users of open-banking platforms. It shows they are mainly black or Coloured, unmarried, female and living in non-metro areas. Thirty-seven per cent of respondents are employed and have at least a matric. Geographically, the ranking follows the business hubs of the country, a pattern that is also observed in terms of financial literacy (see Nanziri and Leibbrandt (2018)) – that is, Gauteng has the highest number of users, followed by Western Cape, KwaZulu-Natal and Eastern Cape. It is encouraging to note an almost equal split between rural and urban dwellers, as the former are often financially excluded.

Table 4: Summary of the data

Variable	Obs.	Mean	Std. dev.	Min.	Max.
Credit	5 600	0.089	0.284	0	1
Savings	5 600	0.479	0.500	0	1
Bank transaction frequency	5 600	0.760	0.427	0	1
Life insurance	5 600	0.775	0.416	0	1
Unbanked	5 600	0.199	0.399	0	1
Open banking	5 600	0.734	0.442	0	1
Internet access	5 600	0.672	0.466	0	1
Digital literacy – social media	5 600	0.950	0.219	0	1
Employed	5 600	0.370	0.483	0	1
No. of adults in household	5 600	2.106	1.203	1	13
Age	5 600	40.162	15.124	16	97
Female	5 600	0.574	0.495	0	1
Married	5 600	0.386	0.487	0	1
Single	5 600	0.481	0.499	0	1
Post-matric	5 600	0.158	0.364	0	1
Apprenticeship	5 600	0.016	0.125	0	1
Matric	5 600	0.376	0.484	0	1
Primary schooling	5 600	0.088	0.283	0	1
No schooling	5 600	0.024	0.152	0	1
Black	5 600	0.581	0.493	0	1
White	5 600	0.221	0.415	0	1
Coloured	5 600	0.136	0.343	0	1
Urban	5 600	0.476	0.499	0	1
Internet access	5 600	0.672	0.470	0	1
Digital literacy	5 600	2.763	1.617	1	6

Source: Authors' compilation from FinScope (2023)

The sub-sample characteristics after the matching exercise are reported in Table B2 in Annex B. The requirement is that the difference between the treatment and control groups should not be statistically significant. Table B2 shows that the matching exercise was successful and is corroborated by Figures B1–B3 in Annex B, which show sufficient areas of common support.

Table 5 shows the proportion of compliers and non-compliers under each category of financial inclusion measure. The table shows that most account owners are compliers. Disaggregating account ownership shows that those who transact frequently use open-banking platforms, but there is an almost equal split for the users of life insurance and credit products. On the other hand, most users of savings products are non-compliers.

Table 5: Mean financial inclusion for the treatment and control groups

		Financial inclusion				
		Banked (account ownership)	**Bank transaction frequency**	**Life insurance**	**Credit**	**Savings**
Open banking	Compliers (T)	0.993	0.942	0.782	0.084	0.407
	Non-compliers (C)	0.361	0.343	0.760	0.099	0.643

Notes: Treatment (T) and Control (C) groups for open banking.

5.2 Estimated effect of open banking on financial inclusion

First, we report the determinants of open banking in Table 6, on the basis of which the propensity score is calculated. The table shows that the significant predictors of the probability of using open-banking platforms include being younger than 60, being female, being Coloured, having a matric, dwelling in an urban area in the Eastern Cape or Gauteng, being employed, having internet access and being digitally literate.

Table 6: Open banking participation equation

Variables		**TREAT (open banking)**
Age		
60+ (base category)	16–17 years	0.982***
		(0.138)
	18–29 years	0.610***
		(0.077)
	30–44 years	0.542***
		(0.071)
	45–59 years	-0.523***
		(0.072)
Gender	Female	0.200***
Male (base category)		(0.037)
Province		
Limpopo (base category)	Western Cape	0.075**
		(0.091)
	Eastern Cape	0.214**
		(0.094)
	Northern Cape	0.129
		(0.116)
	KwaZulu-Natal	0.077
		(0.089)
	Free State	0.038
		(0.101)
	North West	-0.112
		(0.095)
	Gauteng	0.332***
		(0.086)

	Mpumalanga	0.000
		(0.099)
Population group		
White (base category)	Black	0.029*
		(0.050)
	Coloured	0.215***
		(0.069)
	Asian	0.027
		(0.088)
	Urban	-0.150***
		(0.048)
Employment status	Employed (y/n)	0.123***
		(0.042)
Marital status	Single	0.100
Divorced/widow (base category)		(0.066)
	Married	-0.011
		(0.062)
Education	Primary schooling	-0.098
No schooling (base category)		(0.067)
	Matric	0.296***
		(0.045)
	Post-matric	-0.127**
		(0.060)
	Apprenticeship	0.258*
		(0.147)
Internet access		0.105**
		(0.046)
Digital literacy		0.362***
		(0.085)
Constant		0.423***
		(0.126)
Observations		5 600
Pseudo R-squared		0.0600

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

The propensity score matching results reported in Table 7 show that open banking lowers the incidence of being unbanked but increases bank transaction frequency and use of life-insurance products. It also leads to a decline in the use of formal credit and savings products. The decline in the use of credit may be attributed to fewer platforms for credit access (0.8%) than for payment platforms (69.7%) in our sample. Although the kernel matching did not yield a perfect match between the treated and control samples, as the nearest neighbour did (see Table B2 in Annex B), all variables were included in the analysis, and the results in Table 7 show that the potential bias from the imbalance is negligible.

Overall, there is evidence that open banking improves both the extensive margins (reducing the incidence of being unbanked) and intensive margins (increasing transaction frequency and use of life-insurance products). The results for bank transaction frequency provide a ray of hope for reducing the incidence of dormant accounts, thus improving effective financial inclusion.

Table 7: Average treatment effect of open banking on financial inclusion

Estimator	t-test (1)	OLS (2)	ATTn (3)	ATTk (4)
Unbanked	-0.632*** (0.008)	-0.606*** (0.007)	-0.570*** (0.014)	-0.563*** (0.014)
Bank transaction frequency	0.599*** (0.009)	0.569*** (0.009)	0.545*** (0.018)	0.532*** (0.015)
Life insurance	0.021* (0.012)	0.028** (0.012)	0.036*** (0.017)	0.047*** (0.013)
Formal credit	-0.015* (0.008)	-0.015* (0.008)	-0.017*** (0.008)	-0.025*** (0.010)
Formal savings	-0.236*** (0.014)	-0.222*** (0.014)	-0.185*** (0.024)	-0.186*** (0.017)

Note: Bootstrapped standard errors for the ATT estimators. *** p<1, **p<5, *p<10 per cent level of significance. t-test: regression of welfare variable on the treatment dummy; OLS: financial inclusion regression on its predictors (age, education, gender, marital status, employment, province, rural/urban dummy, digital access and literacy); ATTn: average treatment effect using the nearest neighbour random draw; ATTk: average treatment effect using kernel matching (b-width = 0.0396)

5.3 Disaggregating open banking

In this section, we repeat the exercise using a narrower measure of open banking that eliminates screen scraping. Here, the open-banking measure constitutes microfinance online lenders and large non-bank fintech lenders that use APIs, emphasising the role of digital platforms in open banking (see Babina et al. (2025)). The variable takes on a value of 1 if respondents used any one of the platforms in Table 8, 0 otherwise. Our data show that up to 2% of the population uses these platforms. The propensity score matching approach allows us to use this small sample as treatment and infer the average treatment effect on the compliers.

Table 8: Fintech platforms that proxy open banking

Microfinance online lenders	Large non-bank fintech lenders
Wonga	Lulalend
Unifi	Jumo
GetBucks	FundingHub
Boodle	Yoco Capital
Bayport financial services	Lendico
RainFin	Invoice Worx
Finance27	Retail Capital
FASTA	Fincheck
Lime24	Merchant Capital
Funchoice	Fundrr

Source: FinScope consumer survey for South Africa (2023)

Table 9 presents the results. The high degree of heterogeneity in our results has implications for implementation. As open banking here is related to lending platforms, it is comforting to see the significant positive effect of open banking on credit access, relative to the negative effect observed in Section 5.2, where open banking is aggregated. This result is consistent with findings in the literature that open banking tends to exhibit large effects when targeted – for example, Shirazi, Aysan and Nanaeva (2023). These authors find that targeted open banking in Muslim-majority countries (previously excluded by religious beliefs that disincentivise participation in secular financial institutions) increased financial inclusion and participation in the respective economies. This is corroborated by the result for bank transaction frequency in this section. Although it is consistently positive and significant, the magnitude of estimates in Table 9 are also larger than in Table 7, because open banking in Section 5.2 includes various platforms.

Another positive result is the significant effect of open banking on saving. This result, too, is similar to financial behaviour observed in credit programmes, where borrowers are incentivised to save to qualify for larger amounts they can borrow. For example, in the credit-builder loan model, borrowers make regular payments that act as forced savings to help them build financial history (credit scores) and discipline. In this model, up to 95% of these loans are provided to non-prime borrowers, with a significant portion going to sub-prime borrowers. This model is common in the microfinance literature and M-Shwari credit products where consumers borrow and save simultaneously (see Basu (2009); Nasrin, Baskaran and Rasiah (2017); Ntwiga and Weke (2016); Rastogi

et al. (2024)). In a country like South Africa, where savings are low, open banking may provide an opportunity to change this behaviour, with potential welfare gains like asset or wealth creation.

A surprising result is the significant increase of the unbanked brought about by open banking. The literature attributes this outcome to possible low digital literacy and access to technology, which may prevent some consumers from understanding and using open banking (Bianco and Vangelisti 2022). This is plausible given that our data show that digital literacy is relatively low in South Africa, even though social media use is higher than 60%. Another possible reason for this result is credit-scoring bias, which may disproportionately affect marginalised groups, leading to financial exclusion (Yap 2023). Moreover, without proper targeting, open-banking algorithms may simply replicate the existing inequalities in banking exclusion (Sakyi-Nyarko, Ahmad and Green 2022; Ozili 2023).

Table 9: Average treatment effect of open banking on financial inclusion

Estimator	t-test (1)	OLS (2)	ATTn (3)	ATTk (4)
Unbanked	-0.152* (0.087)	-0.094 (0.080)	0.048*** (0.106)	0.048*** (0.037)
Bank transaction frequency	0.193** (0.093)	0.130 (0.086)	0.952*** (0.112)	0.952*** (0.045)
Life insurance	0.034 (0.091)	0.119 (0.084)	0.810 (0.160)	0.810 (0.013)
Credit	0.628*** (0.062)	0.563*** (0.058)	0.714*** (0.132)	0.714*** (0.079)
Savings	-0.289*** (0.109)	-0.241** (0.106)	0.190*** (0.185)	0.190*** (0.075)

Note: Bootstrapped standard errors for the ATT estimators. *** p<1, **p<5, *p<10 percent level of significance. t-test: regression of welfare variable on the treatment dummy; OLS: financial inclusion regression on its predictors (age, education, gender, marital status, employment, province, rural/urban dummy, digital access & literacy); ATTn: average treatment effect using the nearest neighbour random draw; ATTk: average treatment effect using kernel matching (b-width = 0.0396)

6. Conclusion

This paper set out to assess whether open banking can deepen financial inclusion in South Africa within a largely market-led regulatory environment. The findings indicate that open banking has significant potential to expand access to and usage of formal financial services. Using nationally representative survey data, the analysis shows that open banking reduces the likelihood of being unbanked and increases the uptake of credit, savings and insurance products, as well as the frequency of banking transactions. Importantly, its effects extend beyond existing customers to those previously excluded from the formal financial system, suggesting meaningful gains along the extensive margin of inclusion. At the same time, open banking improves service quality and operational efficiency, generating benefits for both consumers and financial institutions.

However, these gains are not automatic or uniformly distributed. The evidence also points to potential exclusionary effects, particularly in credit-targeted open-banking models. Increased reliance on digital platforms, algorithmic decision-making and complex financial products may disadvantage individuals with low digital literacy, limited access to technology or thin credit histories. Without appropriate safeguards, open banking could inadvertently reinforce existing inequalities, even as it expands aggregate access.

The profile of the typical open-banking user – predominantly middle-aged, employed and relatively educated – suggests that uptake remains uneven across socio-economic groups. This underscores the importance of complementary policies that address structural barriers to participation, including gaps in digital skills and uneven technological infrastructure.

The policy implications are clear. While the current market-led approach has facilitated innovation, a more structured regulatory framework may be necessary to ensure consumer protection, data security and equitable access. Moving toward a regulator-led or hybrid model would allow clearer standards for data sharing, explicit consent mechanisms and broader interoperability across financial services providers. Expanding information-sharing frameworks beyond credit data, under well-defined

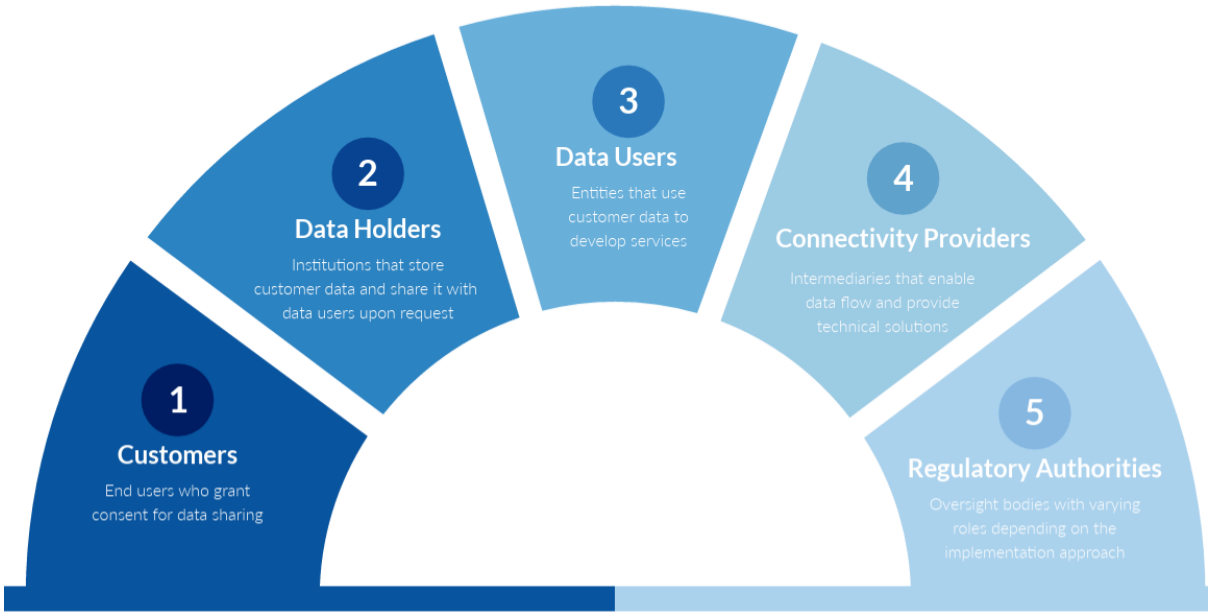
safeguards, could further enhance inclusion while mitigating the risk of over-indebtedness.

Industry actors also have a critical role to play. Investments in digital literacy initiatives, transparent product design and customer support systems will be essential to translate technological innovation into inclusive financial development. Lessons from agency banking and other inclusion-oriented models may offer useful guidance for scaling open banking responsibly.

Annexures

Annex A

Figure A1: Actors in open banking and open finance



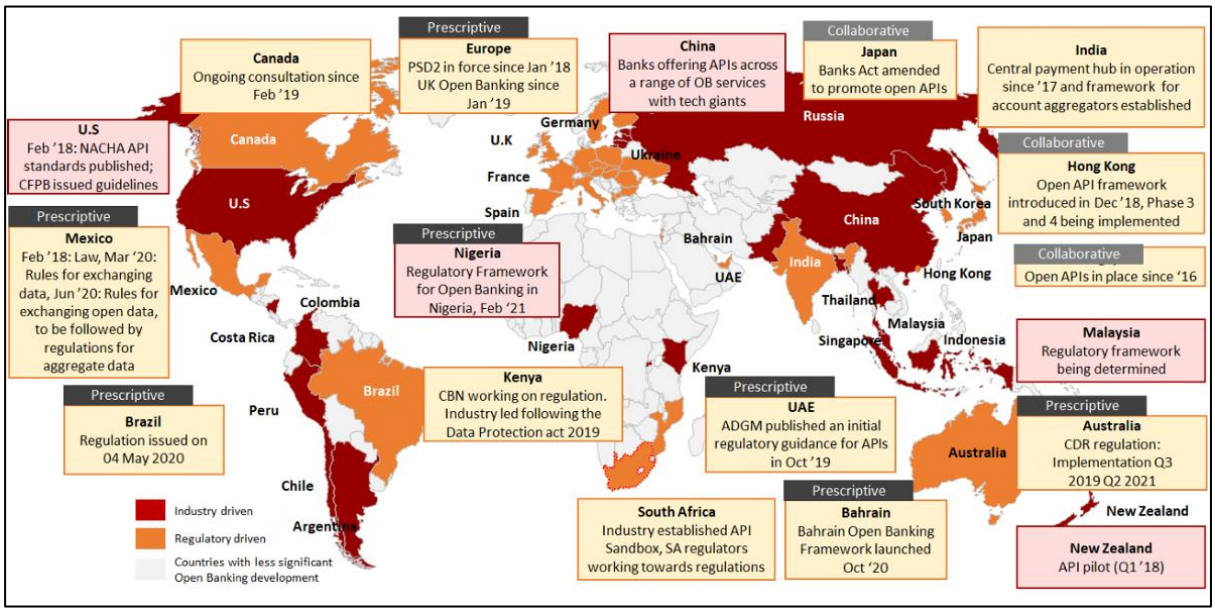
Source: CCAF (2024)

Table A1: Differences between the various data-access channels

	APIs	Screen Scraping	Reverse Engineering
Data Source	APIs are provided by financial institutions or data providers. APIs offer a structured and standardised way to access financial data.	Screen scraping involves extracting data from the user interface of the bank website or mobile application. It does not have a direct connection to the data source and may be subject to changes in the website's design or structure, leading to potential compatibility issues.	Reverse engineering involves deconstructing a system to replicate API functionality without access to the original source code.
Data Access	APIs provide developers with a documented set of endpoints and methods to access specific financial data.	Screen scraping involves simulating user interactions with the bank website or mobile application, such as submitting forms or clicking buttons, to retrieve the desired financial data.	Reverse engineering attempts to imitate API behaviour by analysing the system's communication patterns or behaviour.
Data Quality and Reliability	Financial institutions and data providers ensure data consistency and integrity through APIs, reducing the risk of errors or outdated information.	Changes in the website's design or structure can break the screen scraping process, leading to data extraction failures.	It may result in unreliable data, as the recreated APIs may not perfectly replicate the original system's data handling mechanisms.
Legal and Ethical Considerations	APIs often have clear terms of service and usage policies, ensuring proper data usage and respecting data privacy regulations.	Screen scraping is considered unsecured as it involves sharing sensitive user login credentials.	Reverse engineering can raise legal and ethical issues, especially if done without permission or if it violates intellectual property or privacy rules.

Source: CCAF (2024)

Figure A2: Global overview of open banking and open finance



Source: IFWG (2021)

Table A2: Global categories of APIs

Category	Number of providers
Account aggregation	5
Accounting	14
API aggregators	19
Authentication and identity	1
Auto loans	4
Bank APIs	4
Banking API aggregators	1
Business lending	1
Business management	9
Business payments	13
Buy now, pay later	4
Carbon tracking	2
Card-linked loyalty	4
Cash back	1
Commercial credit	5
Compliance	1
Core banking	1
Credit scores	8
Debt collection	2
Document processing	0
Financial auditing	0
Gambling protection	1
Home buying	1
Investment brokerage	3
Invoice factoring	2
KYC	2
Consumer credit	5

Marketplace	1
Mortgage	4
Open banking aggregators	1
Payments	20
Personal finance management	24
Taxes	7
Wealth management	10

Source: https://www.openbankingtracker.com/api-directory

Annex B

Table B1: Characteristics of the users of open banking in South Africa (2023)

	Mean	SD
Employed	0.377	0.485
Age	40.651	15.382
Female	0.592	0.491
Married	0.386	0.487
Single	0.478	0.500
Post-matric	0.143	0.350
Apprenticeship	0.017	0.128
Matric	0.404	0.491
Primary schooling	0.087	0.282
No schooling	0.023	0.150
Black	0.590	0.492
White	0.209	0.407
Coloured	0.142	0.349
Urban	0.450	0.480
Western Cape	0.156	0.363
Eastern Cape	0.111	0.314
Northern Cape	0.051	0.219
Free State	0.064	0.245
KwaZulu-Natal	0.156	0.363
Northwest	0.077	0.266
Gauteng	0.237	0.425
Mpumalanga	0.071	0.256
Limpopo	0.078	0.269

Source: Authors' compilation from South African FinScope survey 2023

Table B2: Sub-sample characteristics after matching

	Nearest neighbour matching					Kernel matching				
	Mean			t-test		Mean			t-test	
Variable	Treated	Control	% bias	t	p>|t|	Treated	Control	% bias	t	p>|t|
16–17 years	0.015	0.017	-1.3	-0.72	0.472	0.015	0.015	0.2	0.11	0.910
18–29 years	0.244	0.247	-0.8	-0.34	0.732	0.244	0.251	-1.6	-0.72	0.471
30–44 years	0.380	0.382	-0.5	-0.21	0.834	0.380	0.375	1.0	0.45	0.655
45–59 years	0.204	0.212	-1.9	-0.87	0.387	0.204	0.219	-3.7	-1.64	0.101
60+ years	0.157	0.141	3.9	1.34	0.152	0.157	0.140	5.3	2.11	0.035
Female	0.599	0.597	0.6	0.28	0.782	0.599	0.585	3.0	1.33	0.182
Western Cape	0.156	0.170	-3.8	-1.63	0.104	0.156	0.165	-2.5	-1.10	0.271
Eastern Cape	0.115	0.118	-1.0	-0.39	0.698	0.115	0.107	2.7	1.11	0.266
Northern Cape	0.053	0.051	0.8	0.31	0.760	0.053	0.047	2.7	1.11	0.267
KwaZulu-Natal	0.161	0.149	3.3	1.41	0.159	0.161	0.166	-1.4	-0.58	0.559
Free State	0.067	0.056	4.6	1.07	0.938	0.067	0.068	-0.3	-0.13	0.894
North West	0.075	0.075	0.1	0.04	0.966	0.075	0.077	-0.6	-0.28	0.777
Gauteng	0.226	0.227	-0.2	-0.11	0.914	0.226	0.223	0.6	0.26	0.792
Mpumalanga	0.072	0.081	-3.7	-1.49	0.136	0.072	0.071	0.3	0.14	0.891
Limpopo	0.075	0.073	0.7	0.30	0.762	0.075	0.075	-0.1	-0.03	0.976
Black	0.577	0.553	5.0	1.19	0.228	0.578	0.559	3.6	1.58	0.114
Coloured	0.148	0.155	-2.1	-0.85	0.393	0.148	0.149	-0.5	-0.22	0.824
Asian	0.061	0.051	4.2	1.22	0.255	0.061	0.061	0.2	0.08	0.940
White	0.214	0.242	-6.6	-0.92	0.304	0.214	0.230	-3.9	-1.74	0.082
Urban	0.443	0.434	1.8	0.80	0.424	0.443	0.445	-0.5	-0.20	0.838
Employed (y/n)	0.374	0.375	-0.1	-0.05	0.963	0.374	0.386	-2.2	-0.96	0.336
Single	0.484	0.509	-4.9	-1.18	0.230	0.484	0.483	0.2	0.10	0.918
Married	0.377	0.363	2.8	1.24	0.214	0.377	0.382	-1.0	-0.46	0.649
Divorced/widowed	0.139	0.128	3.3	1.43	0.152	0.139	0.135	1.1	0.49	0.622
Primary schooling	0.086	0.068	6.2	0.93	0.303	0.086	0.074	4.1	1.92	0.055
Matric	0.411	0.438	-5.7	-1.41	0.116	0.411	0.416	-1.0	-0.45	0.656
Post-matric	0.142	0.149	-2.1	-1.00	0.320	0.142	0.161	-5.3	-2.41	0.016
Apprenticeship	0.017	0.009	6.3	0.99	0.303	0.017	0.015	1.7	0.74	0.457
Internet access	0.681	0.696	-3.2	-1.44	0.149	0.681	0.693	-2.5	-1.13	0.261
Digital literacy	0.959	0.958	0.6	0.28	0.776	0.959	0.961	-0.9	-0.45	0.654

Source: Author's compilation

Figure B1: Propensity score before matching

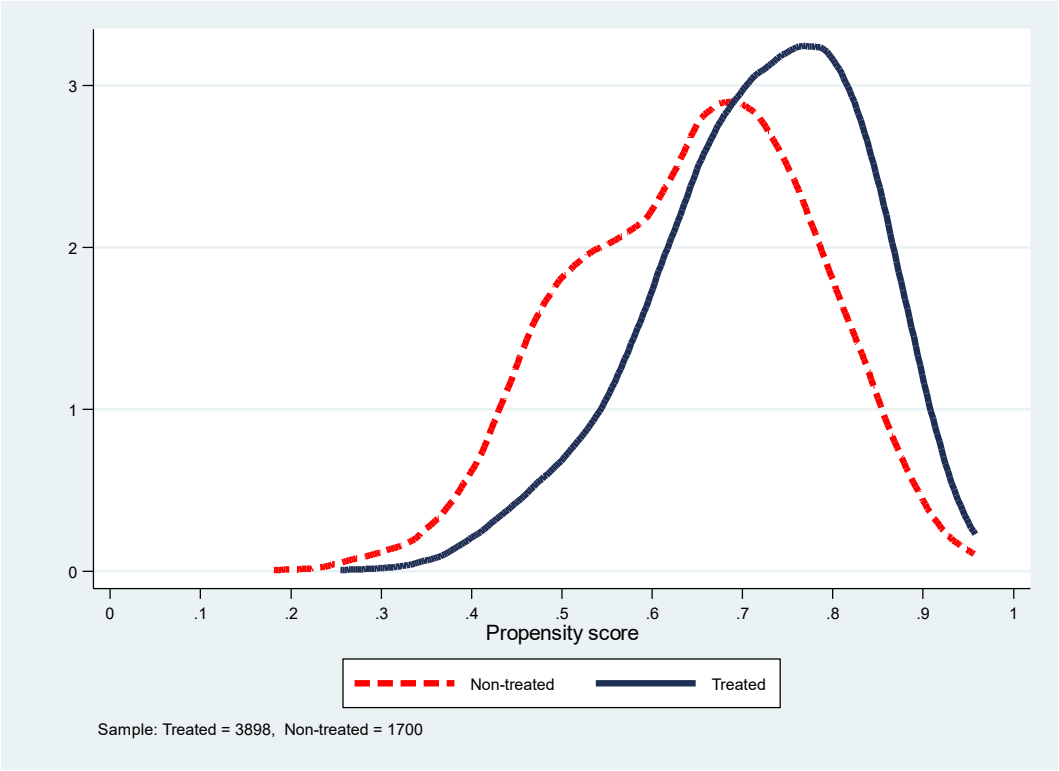


Figure B2: Propensity score: matched sample (nearest neighbour)

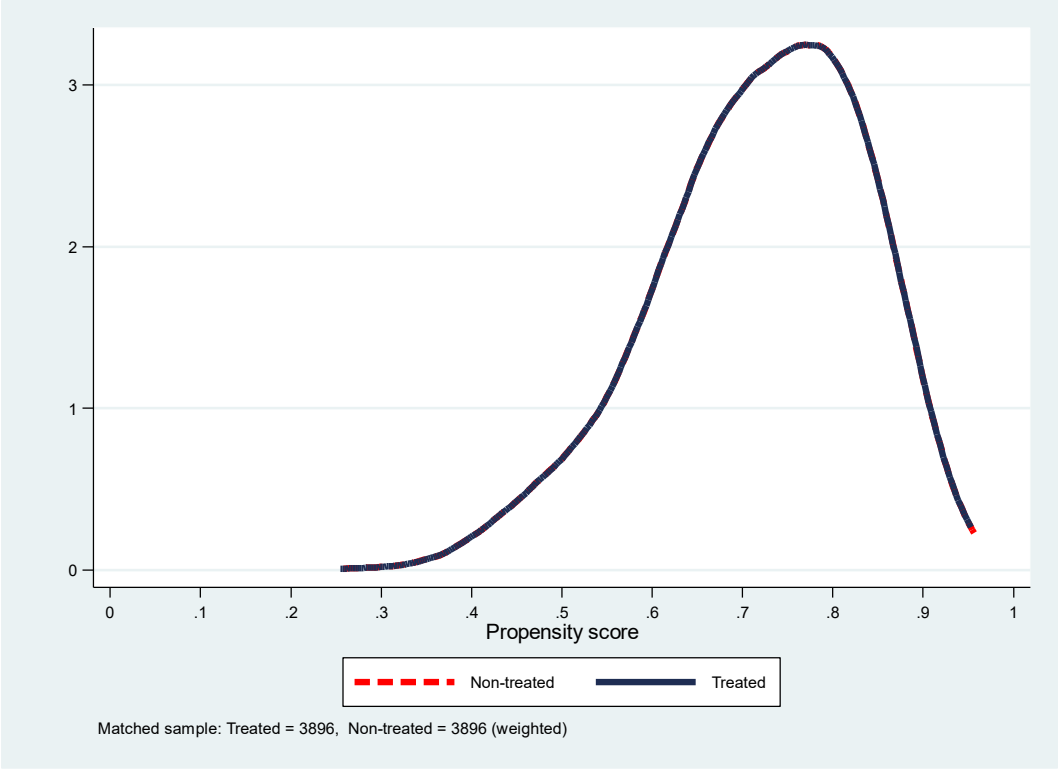
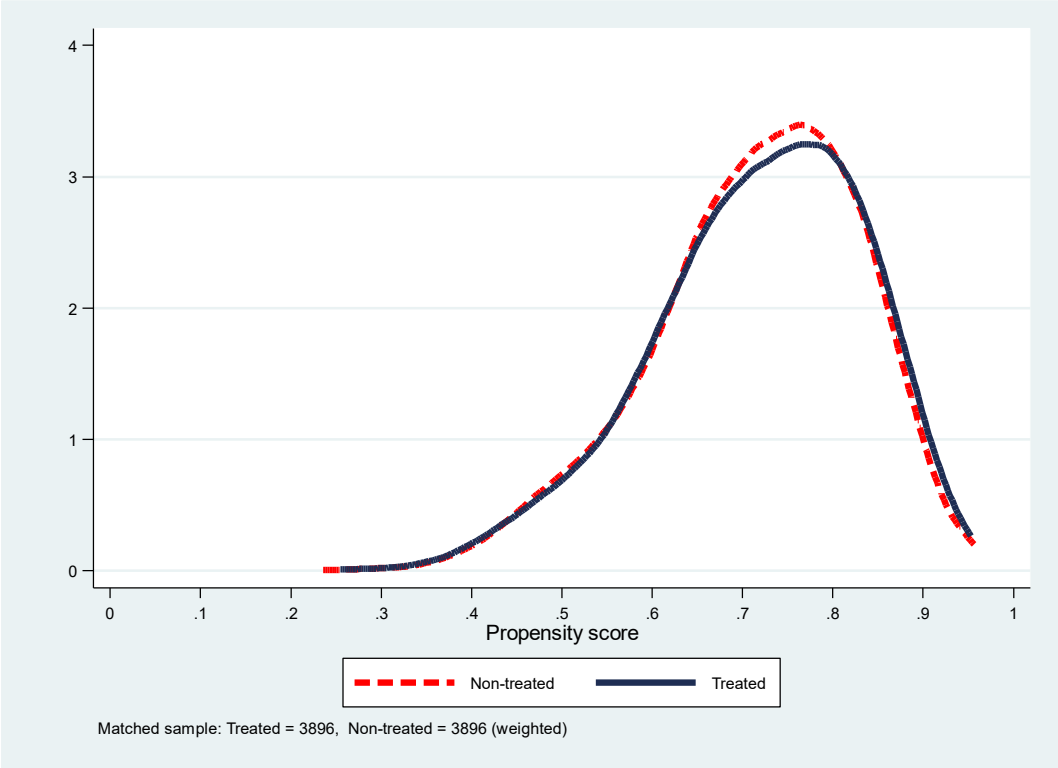


Figure B3: Propensity score: matched sample (kernel)



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