

Financial Access Under the Microscope*

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Abstract

The nexus between finance and growth has long been debated with mixed results. However, few studies can establish a causal link and the mechanisms between access to finance and long-term growth. Using microdata on the universe of individual bank loans from a developing country, we study the impact of a government-sponsored banking expansion program that set up credit cooperatives on financial access. We show that the program raised the likelihood of access to bank loans for the previously unbanked population, especially in areas with ex-ante lower bank presence. The overall effect is driven by credit cooperatives, which grant loans to unbanked individuals, allow them to build credit history, and switch to commercial banks. Commercial banks skim-cream less risky borrowers from credit cooperatives a few years into the program, and grant them cheaper, larger, and longer-term loans. However, these borrowers receive smaller and shorter-term loans compared to similar individuals already at banks, though their loan terms improve over time. These results suggest that the microfinance sector plays an important role in mitigating information frictions in credit markets.

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1 Introduction

A long-standing literature argues that financial underdevelopment acts as a constraint on economic growth and poverty reduction.¹ However, few studies can establish a causal link and pin down the mechanisms between access to finance and long-term growth. Randomized evaluations suggest that programs which expand financial access have modest effects on entrepreneurial activity and income growth (Banerjee et al., 2015). By contrast, observational studies document sizable increases in informal entrepreneurship, employment, and income following bank expansion programs (Bruhn and Love, 2014). Several theoretical contributions emphasize potential negative effects of financial access due to changes in credit market competition (Banerjee, 2013; Zinman, 2014). As a result, there are open questions about the impact of microcredit expansions on economic growth and the precise mechanisms behind this relationship.

We shed light on these questions based on the notion that the microfinance sector may serve an important screening role in the credit market. We argue that credit cooperatives which target underprivileged populations allow their previously unbanked borrowers to create credit history and signal their creditworthiness, which helps reduce information frictions. This under-documented role of credit cooperatives is particularly useful in countries where there is little collateralizable wealth, for instance due to a lack of land registries, illiquid markets for collateral, or weak institutions. The commercial banking sector benefits from the reduction in information asymmetries and cream-skims the less risky borrowers from the microfinance sector. As a result, microcredit expansion programs potentially benefit the local economy not only directly by providing financial services to previously unbanked individuals, but also indirectly by facilitating the transition of low-risk borrowers among those individuals to the formal banking sector.

To document this phenomenon, we analyze a banking expansion program which set up government-subsidized savings and credit cooperatives across Rwanda.² The program created an extensive network of community-focused credit cooperatives (henceforth, “SACCOs”) across the 416 municipalities, such that more than 90% of Rwandans reside within 3 miles of a SACCO (AFI, 2014). Despite an official launch in 2009, different cooperatives started their lending operations in different months starting in late 2011. To analyze the banking expansion program, we use data from a com-

¹See, e.g., King and Levine (1993), Beck et al. (2000), Burgess and Pande (2005), and Burgess et al. (2005).

²Rwanda is representative of other developing countries. In 2015 Rwanda had a credit-to-GDP ratio of 21.3% compared to an average of 24% for sub-Saharan African economies and 19% for low-income countries (World Bank World Development Indicators).

prehensive credit register which contains detailed information on the universe of loans extended by credit institutions to individual borrowers for a total of 9 years around the implementation of the program. Our identification strategy exploits ex-ante municipality-level variation in financial access, measures of exposure to the program, and time-series variation from the staggered implementation of the program.

We show that the program raised the likelihood of access to bank loans for the previously unbanked population, especially in areas with ex-ante lower bank presence. This effect are driven by credit cooperatives set up through the program. We also describe the transition of previously unbanked individuals who switch from borrowing from a credit cooperative to borrowing from a commercial bank. Based on the notion that borrowing from credit cooperatives allows previously unbanked individuals to enter the credit register and build credit history, we track individuals' borrowing activities, distinguishing between those who continue borrowing from credit cooperatives and those who become customers at commercial banks. Switchers to commercial banks are ex-post less risky than non-switchers in that they have lower default risk. When they switch from a SACCO to a bank, these borrowers benefit from cheaper, larger, and longer-term loans from the bank than do similar borrowers at credit cooperatives. They also receive smaller and shorter-term loans compared to similar individuals already at banks, but their loan terms improve over time. These results suggest that commercial banks engage in “cream-skimming” behavior when they extend credit to new borrowers. They also emphasize an important role for the microfinance sector coupled with credit reference bureaus in mitigating information frictions in the credit market.

To our knowledge, this is the first paper that employs extensive microdata from a credit register to study the impact of a banking program on financial access and the local economy in a developing country. The credit register, covering the universe of banked individuals in a country, allows us to overcome power issues that are common in randomized evaluations ([Banerjee et al., 2015](#)). The data refers to bank loan exposures to individuals in Rwanda during the 2008-2016 period and contains extensive information on borrower characteristics. The clean credit register dataset includes 3.3 million observations on bank-borrower loan exposures on a monthly basis for 150,533 unique individual borrowers. For each observation, we also know whether the loan is non-performing, the location of the borrower and lender, and key borrower characteristics such as age, gender, marital status, and sector of activity (government employee or otherwise). We are able to further match the loan data with economic outcomes at the municipality and district level.

Our paper relates to a large literature emphasizing the benefits of financial development for economic growth, both across countries and at the micro level using surveys and randomized experiments. Our work directly contributes to the branch of literature on financial inclusion and financial access. Theory predicts that access to credit facilitates investment in human capital and small firms, enabling individuals to get out of poverty (Banerjee and Newman, 1993; Galor and Zeira, 1993; Aghion and Bolton, 1997). Access to financial services also allows households to smooth consumption (Jappelli and Pagano, 1989; Bacchetta and Gerlach, 1997; Ludvigson, 1999). While numerous macro studies document the importance of well-functioning financial systems for long-run growth and development (King and Levine, 1993; Jayaratne and Strahan, 1996; Beck et al., 2000), the micro evidence is more mixed (Beck, 2016; Cull et al., 2016; Demirguc-Kunt et al., 2017).³

For instance, randomized field studies reveal “a consistent pattern of modestly positive, but not transformative, effects” of microcredit (Banerjee et al., 2015). By contrast, analyses of household surveys and banking data, which are typically aggregated at the district or state level, show stronger results. Burgess and Pande (2005) and Burgess et al. (2005) document that the Indian social banking program significantly reduced rural poverty through increased savings mobilization and credit provision.⁴ In a case study of the branch network expansion by Banco Azteca in Mexico, Bruhn and Love (2014) find that expanded access to finance boosts labor market activity and incomes, particularly among poor individuals and in areas with lower bank presence. Brown et al. (2015b) show that the expansion of an East European commercial microfinance bank in low-income regions led to an increase in the share of banked households; moreover, low and middle-income households were more likely than high-income households to open and use accounts with this bank.⁵

Notwithstanding this convincing literature, prior studies are unable to pin down the exact financial products offered by banks (e.g., checking, savings, or credit accounts) that drive the link between bank expansion and poverty alleviation. This limitation is particularly relevant in light of recent evidence that poor individuals make limited usage of banking services. In a randomized evaluation

³See, for instance, Pitt and Khandker (1998), Khandker (2005), Morduch et al. (1998), Roodman and Morduch (2009) for studies of microfinance for Bangladesh, Karlan and Zinman (2010) for South Africa, Kaboski and Townsend (2011, 2012) and Fulford (2013) for Thailand. Moreover, in recent years several countries faced significant deterioration of loan performance in the microfinance sector (Beck, 2015), exposing problems associated with rapid expansions of microcredit and household debt.

⁴See also Panagariya (2006), Kochar (2011), and Fulford (2013) for follow-up studies. Young (2017) documents positive impacts on agriculture and manufacturing of a bank branch expansion program in 2005.

⁵The positive effects of increased bank branch density are extensively documented for developed economies (see, e.g., Gilje et al. (2016), Brown et al. (2017), and Nguyen (2017)). For instance, Celerier and Matray (2017) show that the U.S. interstate bank branching deregulation of the 1980s and early 1990s was followed by an increase in the share of banked households, with boosting effects on wealth.

across three countries (Chile, Malawi, and Uganda), [Dupas et al. \(2017\)](#) find that only a small fraction of individuals effectively use bank accounts despite a high rate of account opening. Similarly, [Agarwal et al. \(2017\)](#) show that a large financial inclusion program in India led to 255 million account openings in less than three years. Yet, despite substantial participation of previously unbanked households in the program, and positive balances on three quarters of the new accounts, most new customers did not actively use the accounts in the six-month period following account opening. In a study that looks at loan granting in addition to bank account openings and usage, [Allen et al. \(2014\)](#) examine the case of Equity Bank in Kenya. The bank's expansion into low-income and under-served regions led to an increase in the likelihood of households having bank accounts and obtaining loans.

Our paper is also related to [Agarwal et al. \(2017\)](#), who study a financial inclusion program in India and exploit regional variation in ex-ante financial access to document an increase in both aggregate lending and loan defaults in regions with lower pre-existing access to banking services. This result suggests that the program allowed banks to meet credit demand from previously unbanked borrowers. Nevertheless, the rise in the number of bank accounts and overall credit in more exposed areas did not lead to any differential effects on economic growth. In addition, [Agarwal et al. \(2017\)](#) focus on short-term effects (by examining outcomes in the first year and a half of the program) and conduct their analysis with data that is aggregated at the district level; therefore, the analysis cannot establish if the increase in credit or loan defaults is driven by the new bank accounts attributed to the program or by all the other existing bank accounts within each district. A common feature of existing studies is that they rely on survey data to measure access, usage of financial services, and economic outcomes. This approach has the drawback that surveys may not be nationally representative and suffer from reporting biases, especially in relation to questions about finance ([Greer et al., 2006](#)). Furthermore, the data is often aggregated at the district or state level, inviting questions about outcomes being driven by a particular financial intermediary versus its competitors.⁶ Unlike previous studies, we use supervisory data on the lending activities of all microfinance institutions and commercial banks in a country, which allows us to overcome challenges related to aggregation and reporting biases. In addition, the data allow us to gauge not only which banks are driving gains in access to bank credit, but also to track individuals' borrowing activities

⁶Although banks tend to impose barriers to entry through minimum account balances or large overdraft fees ([Barr and Blank, 2008](#); [Ho and Ishii, 2011](#)), the expansion of banks to poorer (rural) areas can have indirect effects on financial inclusion through increased competition with existing microcredit providers and other institutions that are attracted by the profitable opportunities in those areas.

over time and across lenders, measure the length of their credit history, determine their risk profile based on loan performance, and analyze the terms on which they are able to borrow from, and switch among, different lenders. Finally, the data extends several years into the program, allowing us to examine medium-term effects on financial access as well as impacts on the local economy.

The remainder of the paper is organized as follows. In Section 2 we describe the financial sector in Rwanda and the banking expansion program. Section 3 describes our data sources and Section 4 reports our baseline results on the impact of the banking expansion program on financial access. In Section 5 we analyze the transition of borrowers to the formal banking sector. Section 7 concludes.

2 Institutional Background

2.1 Rwandan Economy and Financial Sector

Rwanda is a landlocked country in East Africa with a population of 11.5 million. The country has a large rural population and few natural resources. Following a range of business-friendly reforms in the early 2000s, Rwanda experienced gains in competitiveness and strong economic growth. Annual GDP growth averaged 7.8% between 2008 and 2016, leading to a doubling of per capita income (IMF, 2017a). In 2007 the World Bank’s Doing Business survey ranked Rwanda second in Africa and 56th in the world. The 2016-2017 World Economic Forum’s Global Competitiveness Index ranked it 52nd among 138 countries, outperforming the Sub-Saharan Africa (SSA) average on all dimensions other than market size. The reforms associated with the “Vision 2020” economic strategy, which strives to make Rwanda a middle-income country by 2020, have been accompanied by a reduction in poverty and income inequality (IMF, 2017b).⁷

In recent years Rwanda also experienced rapid growth in its banking sector. Total bank assets grew from 22% to 39% of GDP during 2008-2016, while bank credit to the private sector grew at an annual average of 13% in real terms over the same period (IMF, 2017a). Commercial banks represent about two-thirds of total banking sector assets. The banking sector is relatively concentrated, with the 3 largest commercial banks (out of 17) accounting for more than half of total bank assets, loans and deposits.⁸ Most banks are foreign-owned, but the majority of bank funding is domestic and

⁷Gender inequality in Rwanda is the lowest in SSA. The World Economic Forum’s 2016 Gender Gap Index ranks Rwanda 1st among low- and-middle-income countries and 5th worldwide in closing the gender gap.

⁸There are 17 banks in total: 11 commercial banks (one of which is pending regulatory approval), 1 development bank, 1 cooperative bank, and 4 micro-finance banks. We observe the lending activities of the 16 active banks in our data. For purposes of this paper, we refer to all these banks as “commercial banks”. We include micro-finance banks

comes from local deposits, limiting exposure to external shocks. There are also 480 microfinance institutions (MFIs), including 416 municipal credit cooperatives (Umurenge SACCOs) that were set up as part of the banking expansion program studied here. MFIs account for almost 6% of total bank assets.⁹

Over the past decade Rwanda made notable improvements on financial inclusion. Access to formal financial services increased from 21% to 68% of the adult population between 2008 and 2016, and access to formal credit between 5% and 17% over the same period (FinScope, 2012, 2016). According to statistics across 26 countries where FinScope surveys are conducted to measure financial access and use of financial products, Rwanda is second only to Mauritius in terms of adult population with access to formal financial services.¹⁰ These developments are the results of policies and regulations aimed at expanding financial access for the unbanked population. The Economist Intelligence Unit’s Global Microscope, which ranks countries based on policies for financial inclusion, put Rwanda in eighth position among 55 countries in 2016. One such policy is the large-scale banking expansion program which created credit cooperatives (SACCOs) and is the focus of our paper.

2.2 Banking Expansion (SACCO) Program

We study the municipal credit cooperative (Umurenge SACCO) program, which set up a government-subsidized SACCO (short for “savings and credit cooperative”) in each of Rwanda’s 416 municipalities.¹¹ The goal of the program was to provide financial services at low transaction costs, especially in rural communities. SACCOs were allowed to provide financial services to all individuals, but in practice targeted the unbanked population. The program was launched in March 2009 and initially focused on providing access to savings accounts, with different SACCOs only extending their first loans in late 2011. The program significantly improved the availability of financial services across the country, with 1.6 million new customers and 91% of Rwandans residing within 3 miles of a SACCO (AFI, 2014). Almost half of SACCO loans are extended for trade and tourism services and about one-fifth for agricultural activities, including livestock and fishing (MFR, 2015).

in this list because, in contrast to micro-finance institutions, they have a similar legal status as commercial banks.

⁹While not captured in our supervisory dataset, the financial sector also includes informal or semi-formal institutions such as village savings and loans associations, as well as mobile money providers that carry out financial transactions for various institutions (MFR, 2015).

¹⁰Rwanda also fares well compared to its regional peers in terms raising financial inclusion. The share of adult population with access to formal financial services (68% in 2016) places Rwanda above its East African peers such as Kenya (67% in 2013), Tanzania (57% in 2013), Uganda (54% in 2013) and Mozambique (24% in 2014).

¹¹Municipalities (translated in Kinyarwanda as “umurenge”) are administrative subdivisions of the 30 counties that make up 5 provinces.

Umurenge SACCOs are financial intermediaries owned by their members. From a legal perspective, they are formed as micro-finance institutions with the main objective of providing credit and savings facilities exclusively to members, financed mainly from their own resources.¹² These credit cooperatives are regulated under both the Finance and Cooperative laws and are supervised by the Rwanda Cooperative Agency and the National Bank of Rwanda. They are located in both rural and urban areas, with the vast majority only having one branch with membership drawn from the local community (Brown et al., 2015a). Although established as private cooperatives, Umurenge SACCOs received subsidies from the government before reaching the break-even point. By the end of 2013, 85% of SACCOs were profitable and stopped receiving subsidies (AFI, 2014).¹³

It has been widely argued that the Umurenge SACCO program substantially increased the share of the population with access to bank accounts, boosting financial inclusion especially in economically underprivileged areas. We document the rise in the share of banked population using data from the 2012 and 2016 FinScope surveys. As shown in Table A1, between 2012 and 2016 the share of individuals with a savings account in any financial institution (banks, SACCOs, or other MFIs) rose from 31.9% to 36.4%, and the share of individuals with a savings account in a SACCO rose from 19.2% to 25.8%. Furthermore, the share of individuals who were granted loans by any credit institution doubled from 4.6% in 2012 to 8.1% in 2016. These results suggest that the program coincided with gains in financial inclusion and are consistent with government and news reports.

Our analysis takes the next step and examines whether the banking expansion program had deeper effects than simply increasing access to basic financial services such as bank savings accounts. Specifically, we are interested in the program's impact on previously unbanked individuals' ability to take up loans from SACCOs (and on which terms), their ability to build credit history, and eventually to borrow from the formal banking sector, with possible beneficial effects on local economic activity.

¹²Both Umurenge SACCOs and other MFIs have the legal status of cooperatives and are microfinance institutions in the sense that they pursue social goals and serve underprivileged groups. Umurenge SACCOs differ from other types of SACCOs in the sense that they target borrowers based on their geographical location (the municipality) while other SACCOs target borrowers based on employment type (MFR, 2015).

¹³At set-up, SACCOs were required to maintain a liquidity ratio of 80%, which was reduced to 30% after December 2013. The minimum capital requirement is about USD 8,000. SACCOs generally hold high levels of capital, in excess of 30% of total assets (MFR, 2015).

3 The Credit Register Data

Our study employs detailed data on the lending activities of all credit institutions, including SACCOs, and local economic outcomes (at the municipality or district level). Rwanda has a well-functioning and comprehensive credit register that is maintained by the Credit Reference Bureau (CRB), a private credit bureau solutions provider with operations across Africa, under the supervision of the National Bank of Rwanda.¹⁴ The credit register collects data on all the loans granted by deposit-taking institutions that are supervised by the central bank, including commercial banks, SACCOs, and other MFIs. Reporting institutions provide loan-level information on a monthly basis with no threshold for loan size. Our period of analysis runs from January 2008 until December 2016. The credit register is highly representative of total banking sector loans, as shown in Figure 1.¹⁵

In our analysis we consider all loans to individuals. We have 3.3 million observations on bank-borrower loan exposures on a monthly basis. For each loan we also know whether it has accumulated arrears (which we use to construct a non-performing loan dummy), the amount in arrears, the borrower's location (municipality and district) and other characteristics such as age, gender, marital status, and sector of employment (government or non-government).¹⁶ After cleaning the data, we have information on the lending activities of banks, SACCOs and other MFIs vis-a-vis 150,533 unique individuals in 292 municipalities.¹⁷ The borrowers are identified with a unique numerical code which allows us to track their loans over time and across lenders. All loans are extended in local currency.

Summary statistics for the key variables used in the regression analysis are reported in Table 1 for the sample of loans with complete information (except interest rates). We show the figures for all financial institutions and separately for SACCOs, commercial banks, and other MFIs. The average loan balance amounts to Rwandan franc (RWF) 3.61 mn (approximately USD 4,200) and the average interest rate on outstanding loans is 18%. SACCOs provide smaller, shorter-term, and

¹⁴The original provider was a subsidiary of CRB Africa and was taken over in 2015 by TransUnion Africa Holdings, an international credit and information management provider.

¹⁵The figure compares total bank credit in billions of Rwandan francs (RWF) from the credit register with aggregate statistics from bank balance sheets. The latter aggregate figures (i.e., total credit to both individuals and firms) are only available for the 16 active commercial banks operating in Rwanda and at the quarterly frequency. To ensure comparability, we compute the former also using credit to both individuals and firms in each quarter from the same 16 banks.

¹⁶The non-government employee category contains all individuals who do not work in the public sector.

¹⁷This sample covers 11% of total lending to both individuals and firms captured in the credit register and this share is relatively stable over time.

more expensive loans than other credit institutions. Commercial banks have the highest market share, accounting for 46.7% of all granted loans, SACCOs account for 30.3% of loans, and other MFIs for the remaining 23%. More than one third of borrowers are female, 20% are younger than 30 years old, and 90% are non-government employees. The share of non-performing loans over the sample period is 9.7% (6.7% for SACCOs, 12.5% for banks, and 8.0% for other MFIs).

As discussed in detail below, a key ingredient to our empirical analysis is municipality-level ex-ante bank presence, which we measure in the baseline analysis as the share of unbanked population. This variable is computed as the share of the working-age individuals (> 16 years of age) in a municipality who do not have an outstanding bank loan before the SACCO starts operating in that municipality. Given that each SACCO effectively started its lending activities in a different month (when we observe the SACCO granting its first loan in the credit register), bank presence varies both across municipalities and over time. Average bank presence is 99.3% with a standard deviation of 0.007. We use this measure to compare the differential impact of the banking expansion program on financial access in regions with varying degrees of ex-ante bank presence. In additional tests we employ an alternative measure of bank presence based on the number of bank branches in each municipality prior to the program and show our results are largely robust. The average number of bank branches per 1,000 population is 0.658 with a standard deviation of 1.229.

To study the real effects of the banking expansion program, we further match the loan-level data with economic outcomes at the municipality (and district) level. Our main measure of economic activity is night-time luminosity at monthly frequency. These data were obtained from the National Oceanic and Atmospheric Administration (NOAA) of the U.S. Department of Commerce.

4 The Banking Expansion Program and Access to Credit

4.1 Empirical Strategy

To identify the effect of the banking expansion program on access to credit we exploit two sources of variation. First, we use variation from the staggered implementation of the banking expansion program, with different SACCOs extending their first loans in different months starting in late 2011. The time-series variation in exposure to the program is illustrated in Figure 2, which shows the number of SACCOs that granted their first loan in each month of the banking expansion program during the sample period. The first cooperatives granted loans as early as November 2011, while

the last one disbursed its first loan in April 2016. Second, we exploit cross-sectional variation in ex-ante bank presence across municipalities. Geographical variation in bank presence is illustrated in Figure 3.

As discussed in Section 2.2, data from the FinScope surveys offer suggestive evidence that the banking expansion program coincided with an increase in financial inclusion for the overall population (Table A1). Here we ask if the program had deeper effects on financial access by raising the probability of loan granting for previously unbanked individuals, especially in areas with large unbanked population. Using a panel dataset at the borrower-municipality-period level, we estimate the following specification:

$$Pr(Loan)_{imt} = \beta(Bank\ Presence_{mt} \times Post_{mt}) + \delta'X_i + \alpha_m + \varepsilon_{imt} \quad (1)$$

where the dependent variable is the probability that individual i in municipality m has an outstanding loan with any financial institution in period t , where $T = 2$ i.e., there are two periods—the pre- or the post-program period. $Bank\ Presence_{mt}$ is the regional measure of exposure to the banking expansion program (discussed in detail below); $Post_{mt}$ is a dummy variable equal to 1 for the post-program period, that is, the period when each SACCO starts its lending activities in municipality m ; and \mathbf{X}_i is a set of individual characteristics, including gender, marital status, age, and sector of occupation. We also explore specifications where we restrict the pre- and post-program periods to 12, 24, and 36 months around the introduction of SACCOs.¹⁸ Municipality fixed effects α_m control for unobserved spatial heterogeneity, for instance, in credit demand, the degree of urbanization, or economic development, that affects all municipalities simultaneously. We estimate equation 1 as a linear probability model with Ordinary Least Squares (OLS) and the standard errors are clustered at the municipality level (Abadie et al., 2017).

In the baseline analysis we measure regional exposure to the program ($Bank\ Presence_{mt}$) with the share of individuals in the pre-period that do *not* have an outstanding bank loan in total working-age population in the municipality m . This measure varies across time as different SACCOs started their lending activities in different months, and pre-program exposure refers to the month before they did so. In additional analysis, we alternately measure regional exposure to the banking expansion program with the number of bank branches (see Section 4.4). We expect the SACCO program to

¹⁸In Section 4.5 we also examine the robustness of our results in a more granular panel dataset at the borrower-municipality-month level which does not collapse the data into two (pre- and post-program) periods but rather exploits the entire time dimension of the data and enables the introduction of time-varying municipality fixed effects.

be more effective at raising the probability of loan granting in municipalities with relatively more unbanked population. Therefore, β should be positive.

The OLS estimate of β will be unbiased and can be interpreted as the causal impact of the banking expansion program under several identifying assumptions. The first assumption relates to our measure of program exposure being the share of population without bank loans within the municipality. For an unbiased estimate, the likelihood of loan granting during the program, at the municipality level, should be orthogonal on the share of pre-program share of population with bank loans (parallel trends assumption and no convergence effects). Second, the pre-program bank presence should be uncorrelated with municipality characteristics that may affect the impact of the program. Third, the staggered roll-out of the banking expansion program should be uncorrelated, both in the cross-section of municipalities and over time, with unobserved characteristics or other macroeconomic policies. We conduct falsification and robustness tests in Sections 4.4 and 4.5.

4.2 Baseline Results

We begin with a visual assessment of the impact of the banking expansion program on loan granting in areas with different levels of ex-ante bank presence. Figure 4 shows the number of borrowers with a loan (at any financial institution) up to 36 months before and after the program for municipalities with above- and below-median bank presence. We observe parallel trends in the number of individuals with a bank loan prior to the start of the program across high vs. low bank presence municipalities, supporting the assumption of parallel pre-existing trends in financial development across municipalities. We also notice a rising gap in financial access as the program is rolled out, with the number of loan recipients rising in municipalities with initially low bank presence. The OLS estimate of β will pin down the statistical significance and economic magnitude of this differential, which under our identifying assumptions we can attribute to the banking expansion program.

The baseline regression results are reported in Table 2. The first three columns refer to loans granted by all institutions (commercial banks, SACCOs, and other MFIs) and report results with no fixed effects (column 1), with municipality fixed effects (column 2), and respectively with borrower characteristics as well, including gender, marital status, age, and employment status (column 3). Column 3 shows our preferred specification. The results show that the point estimate of β is stable and precisely estimated across specifications and indicate that the SACCO program significantly raised the probability of individuals obtaining a loan, particularly in municipalities with lower ex-

ante bank presence. In terms of economic magnitude, the coefficient estimates reported in column 3 indicate that a one standard deviation increase in *Bank Presence* is associated with a relative increase in the probability of loan granting by 12.5 percentage points. This effect is economically significant—the estimated impact represents an increase of 21% relative to the sample mean.

A natural question that emerges from this baseline result is whether the overall program effect is driven by the credit cooperatives set up during the program or by other financial intermediaries. To answer this question, in columns 4-6 we separate the baseline effect by type of lender (SACCO, other MFI, or commercial bank). The results suggest that the main effect is driven by SACCOs, and is zero for commercial banks and other MFIs.

Our findings remain qualitatively unchanged and reveal important program dynamics when we restrict the sample period to a 12-, 24- or 36-month window before and after the introduction of credit cooperatives (see Table A3). The coefficient estimates in columns 2, 6, and 10 indicate that the likelihood of individuals having a loan is higher by 2.9 percentage points in the first year, 6.3 percentage points in the next two years, and respectively 9.4 percentage points in the three years of the banking expansion program (in those municipalities with ex-ante bank presence that is lower by one standard deviation than elsewhere). The increasing size of the effect over time suggests that the program had sustained effects on financial access as opposed to a one-time (transitory) effect.

4.3 Borrower Heterogeneity

So far we have shown that the banking expansion program significantly increased access to bank loans, especially from SACCOs. Here we exploit the richness of our microdata to analyze heterogeneity in the program effect based on borrower characteristics. While the credit register does not collect information on borrower (household) income, consumption, or assets, it has information on borrower age, gender, marital status, and sector of employment. We use these dimensions of borrower heterogeneity to further analyze the program impact using a number of dummy variables.

As shown in Table 3, our results suggest that the program expanded the provision of credit through SACCOs to all types of borrowers in areas with lower ex-ante bank presence irrespective of gender, marital status, age or sector of employment—though the effects are slightly stronger for males and non-government employees (columns 1 and 4).¹⁹ If we think government employees

¹⁹An important caveat in interpreting these results is that we cannot precisely disentangle credit supply from credit demand effects. As most of our data is for first-time borrowers, we cannot exploit multiple bank relationships by individual borrowers with borrower fixed effects.

are low-risk due to the stability of their labor contracts, the stronger effect for non-government employees (for SACCOs compared to other lenders) suggests the program was able to reach out to high-risk individuals who were otherwise unable to obtain loans. While the program does not have a statistically discernible effect on banks and MFIs, the results in column 8 suggest these lenders extended credit after the program to relatively creditworthy borrowers (government employees) as opposed to riskier borrowers (non-government employees).

4.4 Falsification Tests

We assess the validity of our results and rule out several concerns about identification with the following tests.

First, we address a potential concern related to the our key *Bank Presence* variable, defined as the share of working age individuals who do not have an outstanding bank loan before the program. Due to the definition of this variable, we might worry that our baseline results are driven by a process of convergence in financial development across municipalities. Put differently, the pre-program share of unbanked population could be related to changes in financial access during the program for reasons of convergence rather than the SACCO program itself. We address this concern using an alternative measure of ex-ante bank presence based on the number of bank branches.²⁰ In Table A4 we report coefficient estimates from the same regression specification as in baseline Table 2 but with *Bank Presence* now defined as the inverse of the pre-program *number of bank branches* per 1,000 working-age population. Our conclusions remain unchanged.

Second, we would like rule out the possibility that our results are driven by events other than the implementation of the SACCO program. For this purpose, we conduct a placebo test by moving the date of program implementation (*Post* dummy) to 6 and 12 months before the actual program date. The results in columns 1-2 of Table A5 show that shifting the time of the SACCO program yields economically small and statistically insignificant coefficients on the interaction term of interest. Furthermore, we would like to rule out the possibility that our estimates pick up a possible correlation between the program exposure variable (*Bank Presence*) and unobserved local economic conditions, so we randomly re-assign this variable across municipalities. In column 3 of Table A5 we report the average coefficient of interest across 500 regressions corresponding to

²⁰In this draft we use data on the geographical distribution of bank branches as of 2016 instead of 2011 due to data limitations. Our results are valid under the assumption that the number of bank branches is sticky during 2011-2016, which is plausible given aggregate statistics from the IMF's Financial Access Survey.

randomized assignments of the *Bank Presence* variable across municipalities. In this case, too, the average estimated coefficient is close to zero and statistically insignificant, suggesting that our main findings are not driven by a spurious correlation between ex-ante bank presence and access to bank loans.

4.5 Robustness Tests

We conduct two additional analyses that assess the sensitivity of our findings to an alternative data treatment and the external validity of our results in a different dataset.

In the first test, we bring together the cross-sectional individual-level data from the 2012 and 2016 FinScope surveys, which are conducted across 26 developing countries and focus on the factors driving financial behavior. We use the same empirical strategy as in the baseline analysis, specifically, we estimate a linear probability model that relates financial inclusion and access to credit during the program to ex-ante bank presence. The main differences from the baseline analysis is that the FinScope surveys are observational rather than supervisory data (and hence may suffer from limitations related to representativeness and reporting bias) and borrower location is identified at the district (rather than municipality) level, for 30 districts. The dependent variables are dummies with value 1 for survey respondents with a savings account, and respectively for respondents with a savings account *and* a loan from a SACCO or commercial bank. As shown in Table A2, the probability of having a savings account and being granted a loan (conditional on having an account) increased between 2012 and 2016 relatively more for individuals in districts with lower initial bank presence, confirming our baseline findings in this alternative data source (see Annex A-I for a detailed description of the survey and research design).

Finally, we examine the robustness of our results to exploiting the full time variation in our data and setting up the regression dataset at the borrower-municipality-month level. Compared to the baseline, we no longer collapse the data into two (pre- and post-program) periods. This data structure allows us to introduce time-varying municipality fixed effects, which control for unobserved time-varying credit demand shocks within a municipality and for the possibility that areas with different levels of initial bank presence may experience differential trends in financial development. The results are shown in Tables A6-A7. The estimates in columns 1-2 of Table A6 suggest that the baseline program effect is robust to setting up the data in this way. Breaking out the overall program effect by time elapsed since the introduction of the SACCOs (columns

3-4) reveals statistically significant effects over time. The coefficient estimate in column 2 indicates that a one standard deviation differential in ex-ante bank presence is associated with an increase in the probability of loan granting by 0.92 percentage points. This estimate represents an increase of 4.90% relative to the sample mean. The magnitude of this differential effect increases over time in the first three years of the program (column 3). Our results are the same, if not stronger, when we add municipality-time trends in the regressions (column 4).

5 Switching Loans—From SACCOs to Commercial Banks

The first part of our analysis examined the impact of the banking expansion program on financial access. We showed that the program increased access to credit, especially in areas with lower initial bank presence, and through newly set-up SACCOs. Commercial banks also expanded credit with a lag, in the same areas, suggesting a spillover effect from credit cooperatives to commercial banks. These results are indicative of a potential signaling mechanism by which credit cooperatives screen borrowers and enable them to reveal their creditworthiness. Specifically, it appears that unbanked individuals take up loans from SACCOs and enter the credit register, which allows them to build a credit history. According to a microfinance report, by mid-2014, almost 3,000 searches were conducted in the credit registry by SACCOs and 8,000 by other MFIs (MFR, 2015).

Our results also showed that from this pool of first-time borrowers, high-quality borrowers are subsequently able to obtain loans from the formal banking sector. This interpretation suggests an important role for credit cooperatives in reducing information asymmetries between unbanked individuals and potential lenders and hence in mitigating information frictions in the credit market.

In this section we aim to shed light on the transition from the “informal” to the “formal” banking system by analyzing borrowers who switch from SACCOs to commercial banks.²¹ Specifically, we examine the characteristics of loans to switching borrowers (“switchers”), such as the loan interest rate, amount, maturity, and performance, relative to loans granted to similar borrowers.

²¹We exclude other (non-SACCO) MFIs from this analysis as switches to or from these other MFIs are less interesting from an economic viewpoint and since it makes our analysis of the transition from the “informal” to the “formal” banking system clearer.

5.1 Empirical Strategy

Following [Ioannidou and Ongena \(2010\)](#), we define *switching loans* as new loans (i) from borrowers who had at least one relationship with a financial institution (either a bank or a SACCO) in the previous year; and (ii) with a financial institution with which the borrower did not have a lending relationship in the previous year. All new loans not satisfying these two conditions are classified as non-switching loans. Using this definition, we find 2,180 switching loans corresponding to 11% of first-time SACCO borrowers who switch to commercial banks.

Ideally we would like to compare the terms of switching loans (a borrower in a relationship with lender A takes up a new loan from lender B) with those of loans offered by the existing bank (lender A). Given that we are unable to observe the loan conditions offered by lender A to such borrowers, we compare switching loans with two alternative comparator groups: (i) new loans granted by SACCOs to similar, non-switching, borrowers, which we identify using a matching procedure (described below); and (ii) new loans extended by banks to individuals who switch across commercial banks (individuals already at banks).

Loan conditions across switchers and comparator borrowers may vary for multiple reasons, including borrower characteristics, lender characteristics, and economic conditions. To alleviate worries that such factors cause a bias in our results, the matching procedure combines exact matching with propensity score matching in two steps. In a first step, we “exactly” match loans on the same month of loan origination and the same financial institution, and thus compare only loans granted *in the same month by the same lender*. Within this sample of loans, in the second step we carry out one-to-one propensity score matching procedure that incorporates a large set of borrower and loan characteristics.

Table 4 reports summary statistics for the treatment group and the two alternate control groups. Switching loans given by banks (i.e., to borrowers who switched from SACCOs to banks) are larger and have lower interest rates and longer maturities compared to new loans given by SACCOs to non-switchers. Compared to new loans to individuals already at banks, switching loans have similar interest rates but are markedly smaller and have shorter maturities.

5.2 Results for Switching Loans

First we examine the loan terms of switching loans (for borrowers who switch for the first-time from a SACCO to a commercial bank) compared to similar borrowers who did not switch and obtained loans from SACCOs. According to our two-step matching procedure, the loans in the control group were granted by SACCO in the same month, and we further control for all observable borrower and loan characteristics.

As shown in columns 1-4 of Table 5, switchers obtain cheaper, larger, and longer term loans. The coefficient magnitudes suggest that switching loans are on average cheaper by 502 basis points, are larger by 78%, and their maturity is longer by almost 8 months. These are economically sizable effects: with an average interest rate for SACCO loans of 24.2%, the estimates indicate the switchers enjoy a 20% discount on new loans at commercial banks. Furthermore, there is no difference in loan performance between switching and non-switching borrowers.

Then we turn to comparing switching borrowers from SACCOs to commercial banks to a second comparison group, namely switching borrowers from one commercial bank to another. Thus, the loans in the treatment and control groups were granted by the same commercial bank in the same month, but the treatment group includes new loans to borrowers who switched from a SACCO, while the control group comprises new loans to borrowers who were already in the formal banking system and switched from another commercial bank.²²

As seen in columns 5-8 of Table 5, SACCO-to-bank switchers receive smaller and shorter-term loans, but exhibit better ex-post loan performance compared to bank-to-bank switchers. There is no difference in loan pricing across the two groups. These results suggest that commercial banks engage in “cream-skimming” behavior when they select new clients from the SACCO borrower pool. When comparing borrowers that were screened by the banking system and have built credit history at either a SACCO or a bank, commercial banks choose low-risk borrowers with better ex-post loan performance.

5.3 Results for Post-Switching Loans

To further analyze the transition of SACCO borrowers to the formal banking sector, we also exploit the time dimension of the credit register and analyze *subsequent* loans that switching borrowers

²²We drop continuing borrowers from the sample to limit any confounding effects of relationship lending i.e., loan conditions improve over time as the relationship between the bank and the borrower matures.

obtain from their new commercial bank. Using a similar approach to the previous section, we compare the terms of all the subsequent loans granted to a SACCO-to-bank switcher with the terms of the first loan granted to the switcher by a given commercial bank. Formally, we do exact matching on the borrower and the bank, and then run a propensity score matching based on a set of loan characteristics: amount, maturity, interest rate, and two dummies for collateralized and mortgage loans. Subsequent loans are grouped into buckets depending on the date of granting (<6 months; 7-12 months; 13-24 months; and >24 months after the first loan). In this way, we tease out the effect of credit history on later loan conditions.

The results are reported in Table 6 and show that later loans gradually become less expensive, larger, and longer term (columns 1-3). Coefficient estimates indicate that loans granted more than two years after switching are cheaper by 334 basis points, larger by 48.5%, and longer dated by 2 months compared to the first switching loan. Finally, there is an improvement in loan performance for loans granted later into the bank-borrower relationship, reflecting the relatively greater creditworthiness of SACCO borrowers selected by the commercial bank.

6 Real Effects

To further document the economic impact of the bank expansion program, in this section we test whether the program was associated with an increase in local economic activity. To this end, we use Visible Infrared Imaging Radiometer Suite (VIIRS) Low Lights Imaging Data, which capture night-light intensity across municipalities at monthly frequency. Satellite data on night-lights are a reliable measure of local economic activity. Previous studies have shown these data are a strong predictor of economic growth and industrial production (Michalopoulos and Papaioannous, 2014; Pinkovskiy and Sala-i Martin, 2016). Night-time intensity data are also increasingly used as a proxy of local economic activity in the empirical banking literature (Brown et al., 2015b; Abuka et al., 2017). The data for Rwanda are available starting in April 2012.²³

We estimate a series of specifications that exploit the same spatial variation in access to bank credit across municipalities, before the implementation of the program, as in the baseline tests. Specifically, we examine the differential response in the growth rate of night-time lights for municipalities with relatively lower ex-ante share of banked individuals growth. The growth rate of night-lights is

²³Unfortunately, similar data for the period before the program are only available, from a different satellite, for a very small number of municipalities (fewer than 10% of the baseline sample).

computed year-on-year to minimize seasonal effects related to weather patterns and cloud cover, but we also include a demanding set of fixed effects to further control for time-varying and spatial unobservable heterogeneity in night-lights.

Table 7 shows the results from specifications that include varying sets of fixed effects (seasonal/-month, year, and district). Notably, the coefficient estimates are stable across specifications. As shown in the most demanding specifications with month, year, and district fixed effects (columns 5-6), economic activity grows relatively faster during the roll-out of the SACCO program in municipalities with lower ex-ante bank presence. Furthermore, unpacking this effect by time elapsed since the start of the program yields stable and statistically significant coefficients. The coefficient estimate in column 5 indicates that the banking expansion program raised the growth rate of night-lights by 0.23 percentage points more for borrowers in municipalities with initial bank presence at the 5th percentile of the distribution compared to borrowers in areas with bank presence at the 95th percentile. This differential effect corresponds to a 58% increase relative to the mean.²⁴

7 Conclusions

We exploit spatial and temporal variation in the implementation of a large-scale government-supported banking expansion program to analyze financial access by the unbanked low-income population and its transition to the formal banking sector. Our data come from a large supervisory dataset comprising the universe of individual loans granted by financial institutions in Rwanda during 2008-2016. The program set up one credit cooperative in each municipality in Rwanda. We document several positive effects of the program on financial access and the local economy. The program raised the likelihood of access to bank loans for the previously unbanked population relatively more in municipalities with ex-ante lower bank presence. This effect is driven by credit cooperatives.

We also describe the transition of individuals who gain access to loans during this program to the formal banking sector (specifically, to commercial banks). From the pool of first-time credit cooperative borrowers, low-risk individuals migrate to commercial banks. In particular, credit cooperative borrowers obtain first-time loans from commercial banks that are cheaper, larger, and longer term compared to similar borrowers who do not obtain such loans. Credit cooperative borrowers also obtain first-time loans from commercial banks that are smaller and shorter-term

²⁴ $0.1641 \times (99.79\% - 98.37\%) = 0.23$. Further, $0.23/0.41=0.58$.

compared to similar switching borrowers from other commercial banks, and are less risky. However, as their relationship with the commercial bank deepens, switching borrowers enjoy cheaper, larger, and longer term loans from their relationship bank in the years following their first bank loan.

Our analysis supports the notion that credit cooperatives which target low-income individuals may serve an important screening and signaling role for these individuals, alleviating informational asymmetries between borrowers and lenders. Commercial banks cream-skim low-risk borrowers from credit cooperatives by offering attractive loan terms. Our findings suggest that the microfinance sector coupled with well-functioning credit reference bureaus mitigate informational frictions in the credit market and is crucial for financial development.

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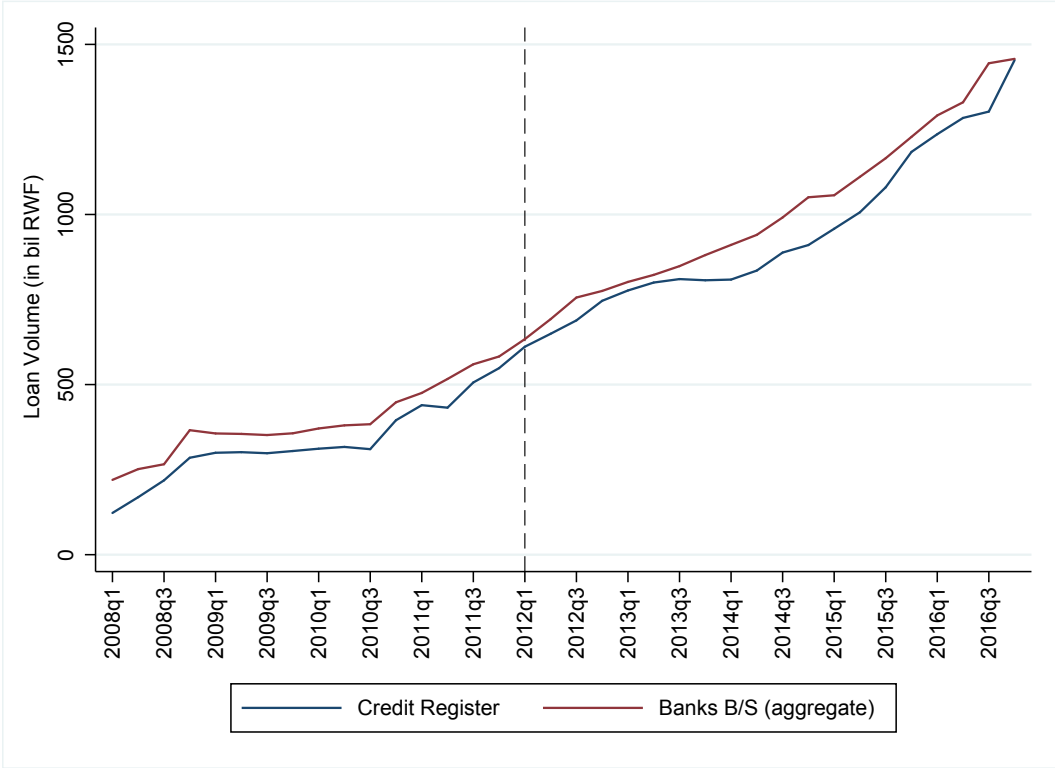
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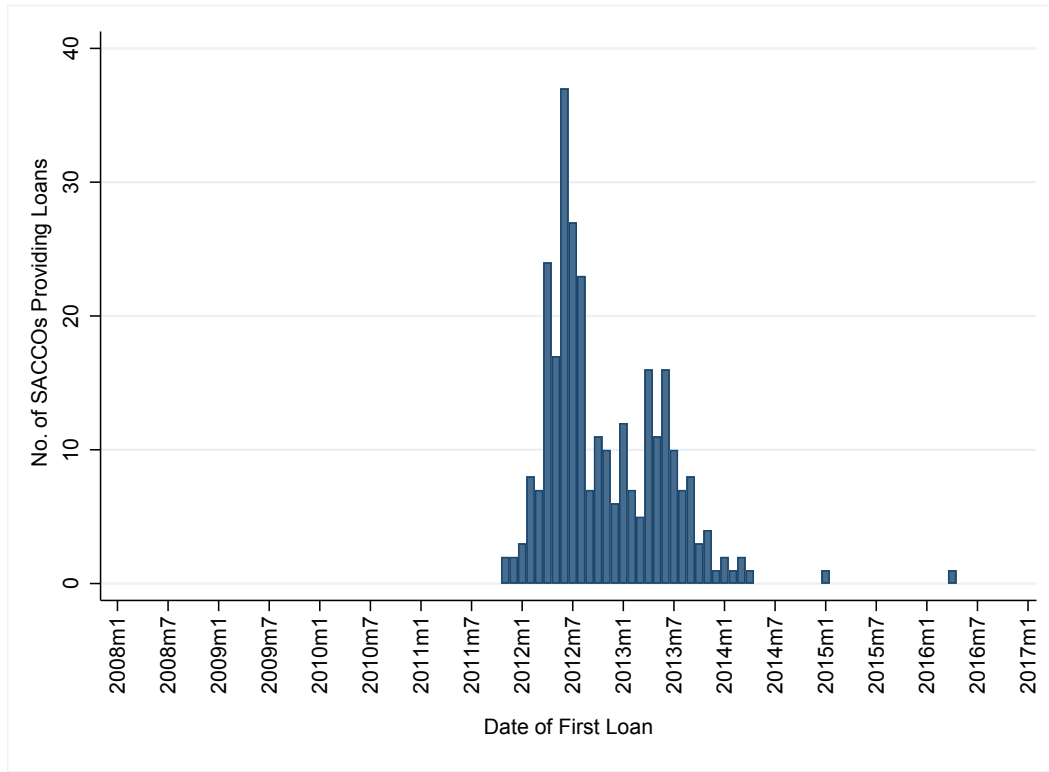
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Figure 1: Credit Register Representativeness



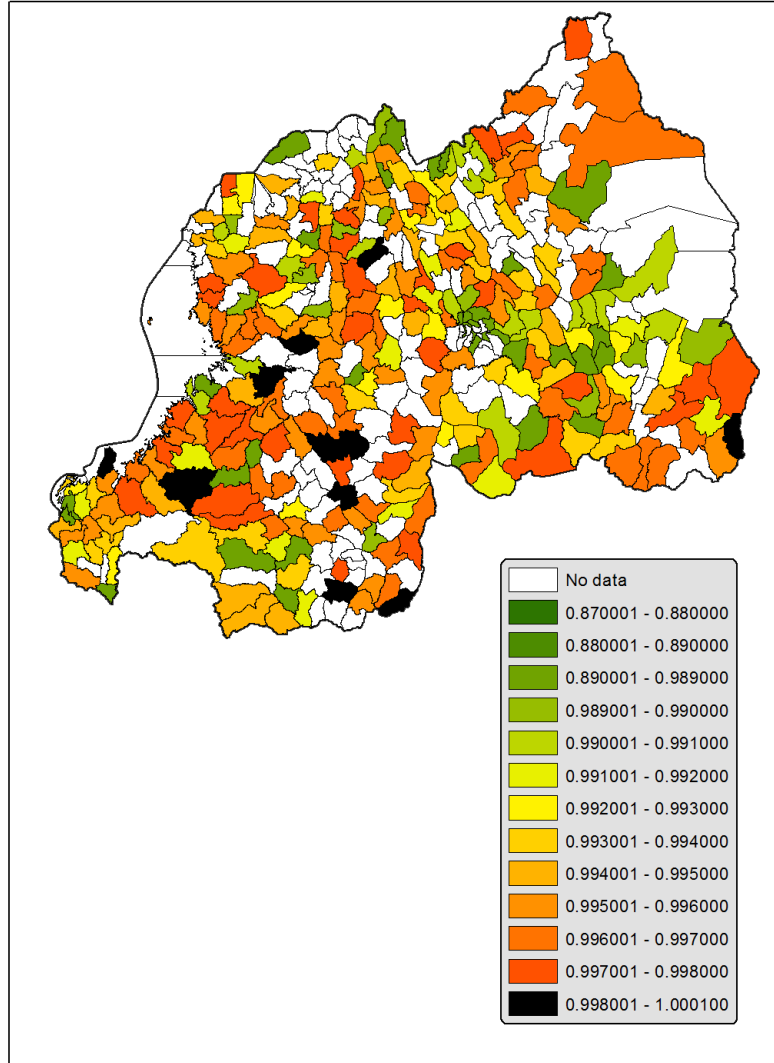
Notes: The figure shows total bank credit in billions of Rwandan francs (RWF) from the credit register as compared to aggregate statistics from bank balance sheets. Data sources: Rwandan Credit Reference Bureau, National Bank of Rwanda.

Figure 2: Staggered Implementation of SACCO Program



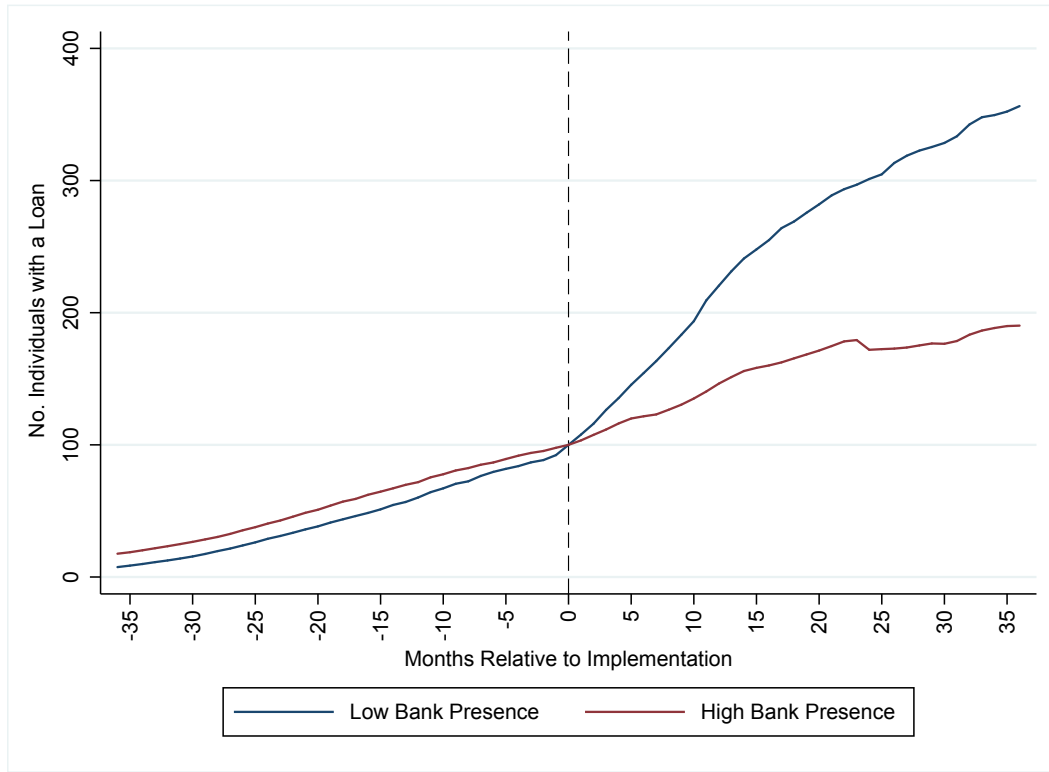
Notes: The figure depicts the number of SACCOs that granted their first loan during the banking expansion program. Data sources: Rwandan Credit Reference Bureau, National Bank of Rwanda.

Figure 3: Pre-program Bank Presence



Notes: The figure illustrates cross-sectional heterogeneity in bank presence (measured as the pre-program share of working-age population without an outstanding bank loan) across Rwandan municipalities. The variable is measured before the program, that is, as of the month before the SACCO in each municipality started its lending activities. Data sources: Rwandan Credit Reference Bureau, National Bank of Rwanda.

Figure 4: Bank Presence and Financial Access Around SACCO Program



Notes: The figure shows the relative increase in financial access (number of borrowers with a loan from any financial institution) in municipalities with low vs. high ex-ante bank presence (defined as below vs. above median share of working-age population without a loan before the banking expansion program). The series are normalized at 100 in January 2012. Data sources: Rwandan Credit Reference Bureau, National Bank of Rwanda.

Table 1: Summary Statistics

Notes: The table presents summary statistics for selected variables in our regression sample for which all variables are available (except interest rates). The sample period is 2008:M1 to 2016:M12 and includes 150,533 unique individuals in 292 municipalities who borrow from commercial banks, SACCOs, and other MFIs. Bank Presence-population is the share of the working-age population (aged 16 and above) without a loan before the program (that is, in the month before each SACCO started its lending activities). Bank Presence-branches is the (inverse of) the number of branches (per 1,000 population) before the program. For the Bank Presence variables, higher values of bank presence indicate lower bank penetration. No. Branches is the unscaled number of branches in 2011. The dummy variable Young takes value 1 for individuals below 30 years of age. Loan amounts are expressed in Rwandan franc (RWF). Data sources: Rwandan Credit Reference Bureau.

	All financial institutions (n=372)				SACCOs (n=292)			
	N	Mean	p50	SD	N	Mean	p50	SD
A. Loan Characteristics								
Loan Exposure (RWF mn)	3,281,328	2.519	0.550	16.58	994,808	0.574	0.314	1.027
Loan Principal Amount (RWF mn)	3,281,328	3.610	1	23.72	994,808	0.854	0.500	1.070
Interest Rate (%)	2,503,708	18.11	17.36	11.61	389,794	23.10	20	17.48
Maturity (months)	3,281,328	27.31	24	24.58	994,808	15.86	12	7.122
Non-Performing Loan (dummy)	3,281,328	0.0966	0	0.295	994,808	0.0662	0	0.249
Loan from a Bank	3,281,328	0.467	0	0.499	994,808	0	0	0
Loan from a SACCO	3,281,328	0.303	0	0.460	994,808	1	1	0
Loan from Other MFI	3,281,328	0.230	0	0.421	994,808	0	0	0
B. Borrower characteristics								
Female	150,533	0.372	0	0.483	74,318	0.261	0	0.439
Single	150,533	0.0970	0	0.296	74,318	0.0978	0	0.297
Young	150,533	0.199	0	0.386	74,318	0.178	0	0.374
Non-Government Employee	150,533	0.901	1	0.298	74,318	0.933	1	0.250
	Commercial Banks (n=16)				Other MFIs (n=64)			
	N	Mean	p50	SD	N	Mean	p50	SD
A. Loan Characteristics								
Loan Exposure (RWF mn)	1,531,281	4.316	0.872	24.02	755,239	1.438	0.532	3.299
Loan Principal Amount (RWA mn)	1,531,281	6.129	1.500	34.42	755,239	2.134	0.979	3.844
Interest Rate (%)	1,438,024	18.01	18	8.737	675,890	15.47	9.400	11.81
Maturity (months)	1,531,281	35.64	36	29.31	755,239	25.53	24	22.38
Non-Performing Loan (dummy)	1,531,281	0.125	0	0.331	755,239	0.0796	0	0.271
Loan from a Bank	1,531,281	1	1	0	755,239	0	0	0
Loan from a SACCO	1,531,281	0	0	0	755,239	0	0	0
Loan from Other MFI	1,531,281	0	0	0	755,239	1	1	0
B. Borrower characteristics								
Female	68,859	0.461	0	0.498	30,422	0.399	0	0.490
Single	68,859	0.104	0	0.305	30,422	0.117	0	0.322
Young	68,859	0.212	0	0.393	30,422	0.180	0	0.372
Non-Government Employee	68,859	0.924	1	0.265	30,422	0.616	1	0.486
C. Municipality characteristics								
Bank Presence - population	292	0.993	0.994	0.00705	292	0.993	0.994	0.00705
Bank Presence - branches	292	0.957	1	0.0731	292	0.957	1	0.0731
No. Branches in Pre-Period	292	0.658	0	1.229	292	0.658	0	1.229
Share of Urban Population	292	0.0916	0	0.230	292	0.0916	0	0.230

Table 2: Impact of SACCO Program on Access to Credit

Notes: The table presents coefficient estimates from a regression of an indicator variable for individuals who were granted a loan on an interaction terms between *Bank Presence* and *Post* dummy, and borrower characteristics, as defined in Section 4.1. *Bank Presence* is standardized with mean equal to zero and a standard deviation of one. The data are at the borrower-municipality-period level, with two periods (a municipality-specific pre- and a post-SACCO period). The sample period is 2008:M1 to 2016:M12. Standard errors clustered at the municipality level in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Data sources: Rwandan Credit Reference Bureau.

	Dummy =1 if individual has a loan with					
	Any Institution			SACCO	MFI	Bank
	(1)	(2)	(3)	(4)	(5)	(6)
Bank Presence x Post	0.125*** (0.0253)	0.125*** (0.0253)	0.125*** (0.0253)	0.133*** (0.0187)	0.00382 (0.00648)	0.00321 (0.0155)
Post	0.762*** (0.00875)	0.762*** (0.00875)	0.762*** (0.00875)	0.494*** (0.0144)	0.0953*** (0.00443)	0.305*** (0.0118)
Bank Presence	-0.0976*** (0.0177)					
Female			-0.00609*** (0.00144)	-0.0932*** (0.00590)	0.0213*** (0.00272)	0.0539*** (0.00660)
Single			0.0918*** (0.00269)	-0.0579*** (0.00384)	0.114*** (0.00657)	0.0810*** (0.00544)
Young			-0.0588*** (0.00244)	-0.0164*** (0.00235)	-0.0504*** (0.00286)	-0.0141*** (0.00441)
Non-Government Employee			-0.0880*** (0.00412)	0.0656*** (0.00601)	-0.282*** (0.0110)	0.0773*** (0.00644)
Municipality FE	N	Y	Y	Y	Y	Y
Borrower Controls	N	N	Y	Y	Y	Y
No. Observations	301,066	301,066	301,066	301,066	301,066	301,066
No. Municipalities	292	292	292	292	292	292
No. Individuals	150,533	150,533	150,533	150,533	150,533	150,533
Adjusted R^2	0.620	0.624	0.641	0.450	0.199	0.212

Table 3: Impact of SACCO Program on Access to Credit—Borrower Heterogeneity

The table presents coefficient estimates from a regression of an indicator variable for individuals who were granted a loan from a SACCO (columns 1-4) or other MFI or a commercial bank (columns 5-8), on an interaction terms between *Bank Presence* and *Post* dummy, further interacted with borrower characteristics, as defined in Section 4.1. *Bank Presence* is standardized with mean equal to zero and a standard deviation of one. The data are at the borrower-municipality-period level, with two periods (a municipality-specific pre- and a post-SACCO period). The sample period is 2008:M1 to 2016:M12. Standard errors clustered at the municipality level in parentheses. ***, $p < 0.01$, **, $p < 0.05$, * $p < 0.1$. Data sources: Rwandan Credit Reference Bureau.

	Dummy =1 if individual has a loan with							
	SACCO				MFI or Bank			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Bank Presence x Post x Female	0.0904*** (0.0115)				0.0209 (0.0195)			
Bank Presence x Post x Male	0.161*** (0.0266)				-0.00757 (0.0189)			
Bank Presence x Post x Single		0.129*** (0.0155)				0.0254 (0.0191)		
Bank Presence x Post x Married		0.138*** (0.0228)				-0.00502 (0.0162)		
Bank Presence x Post x Young			0.135*** (0.0177)				0.000206 (0.0187)	
Bank Presence x Post x Old			0.131*** (0.0194)				0.0194 (0.0181)	
Bank Presence x Post x Non-Government Employee				0.141*** (0.0209)				-0.00373 (0.0180)
Bank Presence x Post x Government Employee				0.104*** (0.0117)				0.0680*** (0.0194)
Municipality FE	Y	Y	Y	Y	Y	Y	Y	Y
Time (Pre/Post) FE	Y	Y	Y	Y	Y	Y	Y	Y
Borrower Controls	Y	Y	Y	Y	Y	Y	Y	Y
No. Observations	301,066	301,066	301,066	301,066	301,066	301,066	301,066	301,066
No. Municipalities	292	292	292	292	292	292	292	292
No. Individuals	150,533	150,533	150,533	150,533	150,533	150,533	150,533	150,533
Adjusted R^2	0.453	0.450	0.450	0.451	0.289	0.289	0.288	0.290

Table 4: Switching Analysis—Treatment vs. Control Groups

Notes: The table presents average loan and borrower characteristics for the treatment and control groups in the analysis of switching loans described in Section 5 (column 1 is for borrowers who switch from a SACCO to a commercial bank; column 2 is for SACCO borrowers who do not switch; column 3 is for commercial bank borrowers who switch to another commercial bank). *** p<0.01, ** p<0.05, * p<0.1 for two-sided t-tests of equality of means between the treatment and control group. Data sources: Rwandan Credit Reference Bureau.

	Switching Loans (SACCO → Banks) (n=2,180)	New Loans from SACCOs to Non-Switchers (n=56,617)	New Loans from Banks to Bank → Bank Switchers (n=5,423)
	(1)	(2)	(3)
Loan Interest Rate	19.35	24.19***	19.51
Loan Maturity	23.34	14.10***	34.75***
Loan Amount	1.688	0.667***	6.513***
Collateralized Loan	0.003	0.000**	0.013***
Female Borrower	0.265	0.260	0.321***
Young Borrower	0.846	0.805***	0.861*
Mortgage	0.052	0.017***	0.080***
Non-Government Employee	0.886	0.925***	0.817***
Multiple Bank Relationships	0.574	0.122***	0.650***
Bank Presence	0.992	0.992	0.979***
NPL (ex-post)	0.072	0.060**	0.146***

Table 5: Impact of SACCO Program on Access to Credit—Analysis of Switching Borrowers

Notes: The table presents the coefficient estimate on switching loans from a regression of loan characteristics (indicated as column headings) on an indicator for switching loans. The comparison between switching and other loans is for the same original lender and year: month (“exact matching”) and propensity score matching (on additional loan and borrower characteristics.) The dataset is a cross-section of loans. Standard errors clustered at the municipality level in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Data sources: Rwandan Credit Reference Bureau.

	Control Group: New loans by inside SACCOs to non-switching SACCO borrowers				Control Group: New loans by the same commercial bank to switchers from another bank			
	Interest Rate (1)	Amount (2)	Maturity (3)	NPL (4)	Interest Rate (5)	Amount (6)	Maturity (7)	NPL (8)
Switching Loan – Other Loans	-5.020*** (0.564)	0.789*** (0.086)	7.906*** (0.451)	-0.003 (0.009)	-0.215 (0.424)	-4.188*** (1.252)	-4.792*** (1.38)	-0.035** (0.015)
<i>Exact matching on:</i>								
Year:Month of Loan Initiation	Y	Y	Y	Y	Y	Y	Y	Y
Inside SACCOs	Y	Y	Y	Y	N	N	N	N
Outside Bank	N	N	N	N	Y	Y	Y	Y
<i>Propensity score matching on:</i>								
Loan Amount	Y	N	Y	Y	Y	N	Y	Y
Loan Maturity	Y	Y	N	Y	Y	Y	N	Y
Loan Interest Rate	N	Y	Y	Y	N	Y	Y	Y
Bank Presence	Y	Y	Y	Y	Y	Y	Y	Y
Young	Y	Y	Y	Y	Y	Y	Y	Y
Female	Y	Y	Y	Y	Y	Y	Y	Y
Public-Sector Employee	Y	Y	Y	Y	Y	Y	Y	Y
Multiple Bank Relationships	Y	Y	Y	Y	Y	Y	Y	Y
Collateralized Loan	Y	Y	Y	Y	Y	Y	Y	Y
Mortgage	Y	Y	Y	Y	Y	Y	Y	Y
No. Switchers	2,180	2,180	2,180	2,180	2,180	2,180	2,180	2,180

Table 6: Switching Analysis—Loan Terms and Defaults

Notes: The table presents the coefficient estimate on additional loans from a regression of loan characteristics (indicated as column headings) on an indicator for additional loans, grouped in buckets depending on the time elapsed since the first loan. The comparison between additional and other loans is for the same original lender and year: month (“exact matching”) and propensity score matching (on additional loan and borrower characteristics.) The dataset is a cross-section of loans. Standard errors clustered at the municipality level in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Data sources: Rwandan Credit Reference Bureau.

New Loans of Switching Borrowers in Same Bank vs. Original Switching Loan				
	Interest Rate (1)	Loan Amount (2)	Loan Maturity (3)	NPL (4)
1 to 6 Months Since Switching Loan	-0.321 (0.239)	0.021 (0.104)	0.141 (0.489)	0.001 (0.007)
7 to 12 Months Since Switching Loan	-0.813** (0.317)	0.039 (0.158)	0.502 (0.662)	-0.009 (0.011)
12 to 24 Months Since Switching Loan	-1.643*** (0.365)	0.177 (0.209)	1.268 (0.816)	-0.041*** (0.013)
24+ Months Since Switching Loan	-3.344*** (0.561)	0.485** (0.199)	2.054* (1.248)	-0.058*** (0.021)
<i>Exact matching on:</i>				
Borrower	Y	Y	Y	Y
Outside Bank	Y	Y	Y	Y
<i>Propensity score matching on:</i>				
Loan Amount	Y	N	Y	Y
Loan Maturity	Y	Y	N	Y
Loan Interest Rate	N	Y	Y	Y
Collateralized Loan	Y	Y	Y	Y
Mortgage	Y	Y	Y	Y
No. Switching Loans/Borrowers	2,180	2,180	2,180	2,180

Table 7: Impact of SACCO Program on Local Economic Activity

Notes: The table presents coefficient estimates from a regression of the (year-on-year) growth rate of night-time luminosity on *Bank Presence*, *Post*, and their interaction. Night-lights come from the VIIRS Low Light Imaging Data. The variables *Bank Presence* and *Post* are included in the regressions, but their coefficients are not shown. The dataset is a balanced panel at the municipality-month level over the period 2012:M4-2016:M12. There are 285 municipalities in the sample, compared to 292 municipalities in the baseline regressions, as 7 municipalities have program starting dates before the start of the sample period (2012:M4). The bank presence variable is expressed in percentages. Standard errors clustered at the municipality level in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Data sources: Rwandan Credit Reference Bureau and National Oceanic and Atmospheric Administration (NOAA) of the U.S. Department of Commerce.

Dep. Var.:	Growth rate in night-time lights					
	(1)	(2)	(3)	(4)	(5)	(6)
Bank Presence x Post	0.1280*** (0.042)		0.1625*** (0.040)		0.1641*** (0.036)	
Bank Presence x Post: 0-12 months		0.1247*** (0.043)		0.1679*** (0.041)		0.1714*** (0.038)
Bank Presence x Post: 13-24 months		0.1273*** (0.043)		0.1705*** (0.042)		0.1740*** (0.038)
Bank Presence x Post: 25-36 months		0.1293*** (0.043)		0.1706*** (0.041)		0.1743*** (0.038)
Bank Presence x Post: > 36 months		0.1253*** (0.043)		0.1697*** (0.041)		0.1735*** (0.038)
Observations	10,426	10,426	10,426	10,426	10,426	10,426
R^2	0.045	0.053	0.090	0.091	0.093	0.095
Mean of Dep. Var.	0.4059	0.4059	0.4059	0.4059	0.4059	0.4059
Seasonal/month FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	No	Yes	Yes	Yes	Yes
District FE	No	No	No	No	Yes	Yes

Online Appendix

A-I Banking Expansion Program and Financial Access: Additional Evidence from Survey Data

We test whether the banking expansion program increased financial access using survey data from the 2012 and the 2016 rounds of the FinScope surveys, run by Access to Finance Rwanda as part of a cross-country project developed by FinMark Trust. The purpose of the FinScope surveys is to describe levels of access to and takeup of financial products and services in the formal and informal financial sector. The microdata for Rwanda are at the district level. Summary statistics on financial inclusion are shown in Table A1.

We employ the same identification strategy as in the baseline analysis, with the only difference that it is conducted at the district rather than municipality level. We take the 2012 survey data as the pre-program period and the 2016 survey data as the post-program outcome.²⁵ Similar to the main analysis, the variable that captures exposure to the program is *Bank Presence* and is defined as the share of working-age individuals without an outstanding bank loan before the program (in the month before each SACCO started its lending operations) and is constructed from the credit register. In all specifications we control for borrower characteristics. We estimate the following specification:

$$Pr(Access)_{idt} = \beta(Bank\ Presence_d \times Post_t) + \delta' X_i + \alpha_d + \phi_t + \varepsilon_{idt} \quad (A-I)$$

where the dependent variable is alternately the probability that individual i in a district d has a savings account or a bank loan (conditional on a savings account) in year t (where $t = 2012$ or $t = 2016$); α_d are district fixed effects; and ϕ_t are survey fixed effects.

The results, shown in Table A2, show that the likelihood of individuals having savings and loan accounts is relatively higher in districts with pre-program lower bank presence than in other districts. Both savings and loan accounts are relatively more prevalent in SACCOs. The point estimates are close to those in our primary analysis.

²⁵Ideally, we would have used the 2008 survey as baseline, but we were not granted access to the microdata. It is important to note, however, that using 2012 as the benchmark will likely underestimate the effects of the program given its implementation starting in 2011.

Table A1: Descriptives on SACCO Program and Financial Inclusion—Survey Evidence

Notes: The table presents descriptive statistics for two key variables on financial inclusion: an indicator variable for individuals with savings accounts and an indicator variable for individuals with savings and loan accounts. The dataset is repeated cross-sections of borrowers in the 2012 and 2016 FinScope surveys. Source: FinScope Surveys, 2012 and 2016 rounds.

	2012 survey (n=6,150)		2016 survey (n=12,480)	
	Mean	SD	Mean	SD
	(1)	(2)	(3)	(4)
Savings Account in a Bank, SACCO or Other MFI	0.319	0.466	0.364	0.481
Savings Account in a Bank or SACCO	0.305	0.460	0.343	0.475
Savings Account in Bank	0.153	0.360	0.120	0.325
Savings Account in SACCO	0.192	0.394	0.258	0.438
Savings Account in Other MFI	0.032	0.175	0.044	0.204
Loan in a Bank, SACCO or Other MFI	0.046	0.210	0.081	0.273
Loan in a Bank or SACCO	0.040	0.195	0.067	0.249
Loan in Bank	0.022	0.145	0.025	0.156
Loan in SACCO	0.019	0.138	0.044	0.205
Loan in Other MFI	0.008	0.088	0.018	0.131

Table A2: Impact of SACCO Program on Financial Access—Survey Evidence

Notes: The table presents coefficient estimates from a regression of an indicator variable for individuals who have savings accounts (top panel) or loan accounts (bottom panel) on an interaction term between Bank Presence and Post dummy (equal to 1 for the 2016 survey), and borrower characteristics. The dataset is repeated cross-sections of borrowers in the 2012 and 2016 FinScope surveys. Standard errors clustered at the district level in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Source: FinScope Surveys, 2012 and 2016 rounds.

Dep. Var.:	Dummy =1 if individual has a savings account in:		
	Bank or SACCO (1)	SACCO (2)	Bank (3)
Bank Presence x Post	1.305 (0.897)	0.902** (0.372)	0.879 (0.929)
Post	-1.237 (0.885)	-0.816** (0.359)	-0.893 (0.921)
Female	-0.113*** (0.00900)	-0.0836*** (0.0104)	-0.0474*** (0.00580)
Young	-0.0914*** (0.00838)	-0.0681*** (0.00873)	-0.0538*** (0.00849)
Single	-0.158*** (0.0168)	-0.120*** (0.0102)	-0.0602*** (0.0136)
No Formal Education	-0.196*** (0.0111)	-0.124*** (0.00939)	-0.113*** (0.0124)
District FE	Y	Y	Y
Observations	18,630	18,630	18,630
Adjusted R-squared	0.097	0.064	0.116
Mean Dependent Variable	0.326	0.239	0.121
Dep. Var.:	Conditional on having a savings account, dummy =1 if individual has a loan in:		
	Bank or SACCO	SACCO	Bank
Bank Presence x Post	1.296*** (0.420)	1.098*** (0.362)	0.475 (0.358)
Post	-1.191*** (0.397)	-1.008*** (0.347)	-0.450 (0.346)
Female	-0.00115 (0.0184)	0.00132 (0.00833)	-0.00270 (0.0162)
Young	-0.0648*** (0.0186)	-0.0375*** (0.0110)	-0.0271 (0.0189)
Single	-0.0683*** (0.0197)	-0.00973 (0.0151)	-0.0679*** (0.0173)
No Formal Education	-0.0469 (0.0295)	-0.00445 (0.0188)	-0.0530** (0.0257)
District FE	Y	Y	Y
Observations	2,949	2,949	2,949
Adjusted R-squared	0.037	0.047	0.020
Mean Dependent Variable	0.055	0.035	0.022

A-II Additional Results

Table A3: Impact of SACCO Program on Access to Credit—Different Windows Around Program Implementation Date

Notes: The table presents coefficient estimates from a regression of an indicator variable for individuals who were granted a loan on an interaction terms between *Bank Presence* and *Post* dummy, and borrower characteristics, as defined in Section 4.1. *Bank Presence* is standardized with mean equal to zero and a standard deviation of one. The data are at the borrower-municipality-period level, with two periods (a municipality-specific pre- and a post-SACCO period). The periods are of 12-, 24-, and 36- months around the month when each SACCO starts its lending activities. Standard errors clustered at the municipality level in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Data sources: Rwandan Credit Reference Bureau.

	Window: 12 months around the shock			Window: 24 months around the shock			Window: 36 months around the shock				
	Dummy =1 if individual has a loan in			Dummy =1 if individual has a loan in			Dummy =1 if individual has a loan in				
	Any	SACCO	MFI	Any	SACCO	MFI	Any	SACCO	MFI	Bank	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Bank Presence x Post	0.0226*** (0.00406)	0.0294*** (0.00345)	-0.00144 (0.000907)	-0.00166 (0.00391)	0.0519*** (0.00413)	0.0630*** (0.00798)	-0.000290 (0.00145)	-0.00283 (0.00493)	0.0851*** (0.0131)	0.0938*** (0.0126)	0.00361 (0.00971)
Municipality FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Time (Pre/Post) FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Borrower Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
No. Observations	301,066	301,066	301,066	301,066	301,066	301,066	301,066	301,066	301,066	301,066	301,066
No. Municipalities	292	292	292	292	292	292	292	292	292	292	292
No. Individuals	150,533	150,533	150,533	150,533	150,533	150,533	150,533	150,533	150,533	150,533	150,721
Adjusted R^2	0.170	0.105	0.176	0.095	0.251	0.206	0.191	0.127	0.388	0.306	0.193

Table A4: Impact of SACCO Program on Access to Credit—Alternative Exposure Variable

Notes: The table presents coefficient estimates from a regression of an indicator variable for individuals who were granted a loan on an interaction terms between *Bank Presence* and *Post* dummy, and borrower characteristics, as defined in Section 4.1. *Bank Presence* is defined as the inverse of the pre-program number of bank branches per 1,000 working-age population and is standardized with mean equal to zero and a standard deviation of one. The data are at the borrower-municipality-period level, with two periods (a municipality-specific pre- and a post-SACCO period). Standard errors clustered at the municipality level in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Data sources: Rwandan Credit Reference Bureau.

	Dummy =1 if individual has a loan with					
	Any Institution			SACCO	MFI	Bank
	(1)	(2)	(3)	(4)	(5)	(6)
Bank Presence x Post	0.0556* (0.0288)	0.0556* (0.0288)	0.0556* (0.0288)	0.0832*** (0.0183)	-0.00502 (0.00635)	-0.0146 (0.0157)
Post	0.762*** (0.0156)	0.762*** (0.0156)	0.762*** (0.0156)	0.494*** (0.0186)	0.0953*** (0.00450)	0.305*** (0.0119)
Bank Presence	-0.0428** (0.0208)					
Female			-0.00609*** (0.00144)	-0.0932*** (0.00590)	0.0213*** (0.00272)	0.0539*** (0.00660)
Single			0.0918*** (0.00269)	-0.0579*** (0.00384)	0.114*** (0.00657)	0.0810*** (0.00544)
Young			-0.0588*** (0.00244)	-0.0163*** (0.00235)	-0.0504*** (0.00286)	-0.0141*** (0.00441)
Non-Government Employee			-0.0880*** (0.00411)	0.0656*** (0.00601)	-0.282*** (0.0110)	0.0773*** (0.00644)
Municipality FE	N	Y	Y	Y	Y	Y
Borrower Controls	N	N	Y	Y	Y	Y
No. Observations	301,066	301,066	301,066	301,066	301,066	301,066
No. Municipalities	292	292	292	292	292	292
No. Individuals	150,533	150,533	150,533	150,533	150,533	150,533
Adjusted R^2	0.603	0.611	0.628	0.436	0.199	0.213

Table A5: Impact of SACCO Program on Access to Credit—Falsification Tests

Notes: The table presents coefficient estimates from a regression of an indicator variable for individuals who were granted a loan from a SACCO on an interaction term between *Bank Presence* and *Post* dummy as defined in Section 4.1. In columns 1-2 we implement a falsification test by moving the date of program implementation (*Post* dummy) 6 and 12 before the actual date. In column 3 we implement a second falsification test by randomly assigning the *Bank Presence* variable across municipalities. Specifically, we perform 500 random re-assignments of the *Bank Presence* variable across municipalities and report the average coefficient of interest across replications. The data are at the borrower-municipality-period level, with two periods (a municipality-specific pre- and a post-SACCO period). The sample period is 2008:M1 to 2016:M12. Standard errors clustered at the municipality level in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Data sources: Rwandan Credit Reference Bureau.

	Dummy =1 if individual has a Loan		
	Falsification Test 1		Falsification Test 2
	Post-period 6M Before Shock	Post-period 1Y Before Shock	Random Bank Presence
	(1)	(2)	(3)
Bank Presence x Post	0.0145 (0.00883)	-0.00565 (0.00913)	0.0002 (0.0155)
Municipality FE	Y	Y	Y
Time (Pre/Post) FE	Y	Y	Y
Borrower Controls	Y	Y	Y
No. Observations	301,066	301,066	301,066
No. Municipalities	292	292	292
No. Individuals	150,533	150,533	150,533
Adjusted R^2	0.206	0.214	0.625

Table A6: Impact of SACCO Program on Access to Credit—Alternative Data Structure

Notes: The table presents coefficient estimates from a regression of an indicator variable for individuals who were granted a bank loan on an interaction terms between *Bank Presence* and *Post* dummy, and borrower characteristics, as defined in Section 4.1. The dataset is a balanced panel at the bank-borrower-month level. Standard errors clustered at the municipality level in parentheses. Data sources: Rwandan Credit Reference Bureau.

	Dummy =1 if individual has a loan, and 0 otherwise			
	(1)	(2)	(3)	(4)
Bank Presence x Post	0.708*** (0.202)	0.711*** (0.202)		
Bank Presence x Post: 0-12 months			0.712*** (0.201)	0.934* (0.481)
Bank Presence x Post: 13-24 months			0.756*** (0.201)	0.985** (0.480)
Bank Presence x Post: 25-36 months			0.749*** (0.200)	0.988** (0.480)
Bank Presence x Post: > 36 months			0.728*** (0.200)	0.978** (0.483)
Female		-0.0239*** (0.00153)	-0.0239*** (0.00153)	-0.0239*** (0.00153)
Single		0.0894*** (0.00263)	0.0894*** (0.00263)	0.0894*** (0.00263)
Young		-0.0449*** (0.00275)	-0.0449*** (0.00275)	-0.0448*** (0.00275)
Non-Government Employee		-0.0719*** (0.00389)	-0.0719*** (0.00389)	-0.0719*** (0.00389)
Municipality FE	Y	Y	Y	Y
Time (Year:month) FE	Y	Y	Y	Y
Borrower Controls	N	Y	Y	Y
Municipality Time Trends	N	N	N	Y
No. Observations	16,257,564	16,257,564	16,257,564	16,257,564
No. Municipalities	292	292	292	292
No. Individuals	150,533	150,533	150,533	150,533
Adjusted R^2	0.173	0.195	0.196	0.034

Table A7: Impact of SACCO Program on Access to Credit, By Institution Type—Alternative Data Structure—By Lender Type

The table presents coefficient estimates from a regression of an indicator variable for individuals who were granted a bank loan on an interaction terms between *Bank Presence* and *Post* dummy, and borrower characteristics, as defined in Section 4.1. The dataset is a balanced panel at the bank-borrower-month level. Standard errors clustered at the municipality level in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Data sources: Rwandan Credit Reference Bureau.

Dummy =1 if individual has a loan with:								
	SACCO			Other MFI			Bank	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(9)
Bank Presence x Post	2.729*** (0.462)	0.828* (0.442)	1.010** (0.447)	0.213*** (0.0771)	0.0337 (0.0950)	0.0297 (0.0904)	-2.021*** (0.459)	-0.0113 (0.126)
Bank Presence x Post: 0-12 months								-0.00161 (0.108)
Bank Presence x Post: 13-24 months			1.061** (0.447)			0.0301 (0.0903)		0.00493 (0.108)
Bank Presence x Post: 25-36 months			1.054** (0.449)			0.0321 (0.0901)		0.0132 (0.108)
Bank Presence x Post: > 36 months			1.043** (0.451)			0.0330 (0.0901)		0.0116 (0.107)
Female	-0.0271*** (0.00165)	-0.0271*** (0.00165)	-0.0271*** (0.00165)	0.00715*** (0.00112)	0.00715*** (0.00112)	0.00715*** (0.00112)	-0.00672*** (0.00225)	-0.00672*** (0.00225)
Single	-0.0145*** (0.00108)	-0.0145*** (0.00108)	-0.0145*** (0.00108)	0.0497*** (0.00265)	0.0497*** (0.00265)	0.0497*** (0.00265)	0.0631*** (0.00223)	0.0631*** (0.00223)
Young	-0.00260*** (0.000734)	-0.00265*** (0.000737)	-0.00265*** (0.000737)	-0.0262*** (0.00116)	-0.0261*** (0.00116)	-0.0261*** (0.00116)	-0.0198*** (0.00324)	-0.0196*** (0.00324)
Non-Government Employee	0.0219*** (0.00151)	0.0219*** (0.00151)	0.0219*** (0.00151)	-0.127*** (0.00522)	-0.127*** (0.00522)	-0.127*** (0.00522)	0.0205*** (0.00272)	0.0205*** (0.00272)
Municipality FE	Y	Y	Y	Y	Y	Y	Y	Y
Time (Year:month) FE	Y	Y	Y	Y	Y	Y	Y	Y
Borrower Controls	Y	Y	Y	Y	Y	Y	Y	Y
Municipality Time Trends	N	Y	Y	N	Y	Y	N	Y
No. Observations	16,257,564	16,257,564	16,257,564	16,257,564	16,257,564	16,257,564	16,257,564	16,257,566
No. Municipalities	292	292	292	292	292	292	292	292
No. Individuals	150,533	150,533	150,533	150,533	150,533	150,533	150,533	150,533
Adjusted R^2 0.124	0.034	0.036	0.116	0.091	0.091	0.102	0.023	0.023