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MICROFINANCE BANKS AND HOUSEHOLD ACCESS TO FINANCE

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Microfinance Banks and Household Access to Finance

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Abstract: We examine how the expansion of the branch network of a microfinance bank between 2006 and 2010 in South-East Europe has affected the use of bank accounts by households in the region. Our analysis is based on survey data reporting the use of bank accounts, socioeconomic characteristics and geographic location of 8,000 households in four countries. We geocode the location of each household and match this data with branch location information for the major microfinance bank in the region, ProCredit Bank, as well as for a large retail bank in each country. We report three key results: First, in locations where ProCredit opened a new branch between 2006 and 2010 the share of households with a bank account increased more than in locations where it did not open a new branch. Second, a new ProCredit branch leads to a stronger increase in the use of bank accounts among low- and middle-income households than among high-income households. Third, we find that ProCredit not only opens branches in areas with high economic activity, but also in areas where average household incomes are low. Overall our results suggest that microfinance banks do expand the frontier of finance as compared to ordinary retail banks.

Keywords: Access to finance, Microfinance, Bank-ownership, Mission drift.

JEL Codes: G21, L2, O16, P34.

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1. Introduction

Over the past 15 years the microfinance industry has become increasingly formalized and commercialized. The provision of financial services to the poor by deposit-taking, for-profit microfinance banks rather than non-profit, donor-funded NGOs is seen as a crucial step towards expanding access to finance. Poor households require financial services to align income and expenditure patterns and to insure themselves against income and expenditure shocks. It is therefore crucial that microfinance institutions have the ability to provide savings services rather than just credit. Moreover, commercial microfinance banks arguably have stronger incentives to scale up the provision of financial services to the poor than not-for-profit institutions.

International donors and development banks continue to support microfinance banks through subsidized credit lines and equity participation. This support is rationalized by the conjecture that microfinance banks generate positive externalities by offering financial services to households which would not be served by "ordinary" retail banks. Whether commercial microfinance providers do actually expand the frontier of finance has, however, been questioned by practitioners and academics (e.g. Christen, 2001). Indeed, cross-country evidence by Cull et al. (2007) suggests that there is a trade-off between the scale and financial performance of microfinance providers and their outreach to the poor.

In this paper we examine to what extent microfinance banks expand the frontier of household finance in South-East Europe. We focus our analysis on four countries in which the major microfinance bank in the region - ProCredit Bank - has a substantial branch network: Albania, Bulgaria, Macedonia and Serbia. Our main data source is the EBRD Life in Transition Survey (LITS). This survey provides information on the use of bank accounts, socioeconomic characteristics and geographic location of over 8,000 households in our four countries in 2006 and 2010. We geocode the location of each household in the survey and

match this data to hand-collected information on the branch network of ProCredit Bank. We further match the location of households with the branch network of a major retail bank in each of the four countries. We subsequently analyze whether the expansion of the branch network of ProCredit Bank between 2006 and 2010 is associated with an increase in the use of bank accounts, and whether this increase is particularly strong for low-income households and households that are self-employed.

Our results suggest that ProCredit Bank has expanded the frontier of finance in South-East Europe. Difference-in-difference results show that in those locations where ProCredit opened a new branch between 2006 and 2010 the share of households with a bank account increased significantly more than in locations where ProCredit did not open a new branch. The economic magnitude of this volume effect depends on whether a retail bank is also located in a region: In regions where a retail bank is present a new ProCredit branch is associated with an 32 percentage point increase in the use of bank accounts. In regions where a retail bank is not present the volume effect of a new ProCredit branch is 38 percentage points.

In line with our predictions we find a differential impact of new ProCredit branches across household types (composition effect). The opening of a new ProCredit branch leads to a stronger increase in the use of bank accounts among low-income and middle-income households than high-income households. The increase in the incidence of bank accounts is also higher for self-employed households than for households that earn wage-income or households that rely on state or private transfers. Finally, we find that ProCredit is more likely to open new branches in locations where economic activity is high (as measured by night-light activity) but where average household income is low. This location effect is in line with our predictions: If microfinance banks have a comparative advantage in serving low-income households, they are more likely to open branches in areas with a high share of such households.

Emerging Europe is an ideal region to study the impact of commercial microfinance banks on household access to finance. First, despite substantial economic growth over the last decade the use of financial services is still low in the region. In the four countries covered by our analysis bank account use varied between 18% and 55% of households in 2006. By comparison similar survey data shows that in Western Europe more than 95% of all households hold bank accounts (Beck & Brown 2011). Second, between 2006 and 2010 the number of bank branches and the share of households with bank accounts increased substantially in all four countries. This allows us to examine whether the increase in the use of bank services over time is related to the expansion of microfinance bank branches. Third, in this region we find the presence of an internationally renowned commercial microfinance bank (ProCredit Bank) as well as ordinary retail banks with large branch networks. This allows us to examine how the proximity to a microfinance bank affects access to finance, controlling for the presence of retail banks. Fourth, Emerging Europe has seen considerable foreign direct investment in the retail banking sector over the past decade (see e.g. Claeys and Hainz, 2007). Today, international banking groups (e.g. Raiffeisen International, UniCredit, Intesa San Paolo) maintain retail bank networks throughout the region. This raises the question whether public investment in the banking sector, e.g. by supporting microfinance banks, is necessary in these markets. If the retail networks of international banking groups provide similar banking services as microfinance banks, then public support of the latter is hardly warranted.

This paper contributes to the growing literature on household access to formal banking services in developing and emerging economies. Examining cross-country aggregate data on branch penetration and number of bank accounts Beck et al. (2007) find that government and foreign ownership of banks is negatively associated with access to finance. Examining cross-country information on product terms of large banks, Beck et al. (2008) find that barriers for bank customers are higher where banking systems are predominantly government-owned and

lower where there is more foreign bank participation. Beck and Brown (2011) provide evidence on the relation between household characteristics, bank-ownership and household use of banking services for 28 transition economies. Their analysis (also based on the LITS data) suggests that foreign banks cherry pick their clients: high-income and well-educated households are more likely to have bank accounts in countries where foreign banks have higher market shares. Recent household surveys have also allowed researchers to examine the relation between household characteristics and the use of formal and informal financial services in Sub-Saharan Africa (see for example, Honohan and King, 2009; Beck et al., 2010; Atiero et al., 2011).[1] We complement the above literature by documenting how the proximity to microfinance banks as opposed to ordinary retail banks affects the use of banking services at the household level.

We further contribute to the ongoing debate on the mission drift of commercial microfinance institutions. Examining income-statement and loan portfolio data for 124 of the largest microfinance institutions worldwide for the period 1999-2002, Cull et al. (2007) find evidence for a mission drift in commercialization: Larger and more profitable microfinance institutions have higher average loan sizes and serve a lower share of female clients. Mersland and Strøm (2010) examine data for 379 microfinance institutions from 74 countries over the period 2001-2008. They also find evidence for a mission drift: More profitable institutions display higher average loan sizes. Their findings suggest, however, that this mission drift may be contained if commercial microfinance providers become more cost-efficient.

We contribute to the above literature by providing household-level evidence (as opposed to bank-level evidence) on how commercial microfinance banks impact on access to finance. Moreover, in contrast to the existing literature on mission drift, we study outreach in terms of bank account use instead of loan take-up. Providing suitable financial products besides loans

[1] There have been a series of country-level studies on Brazil, Mexico, and Romania, among others, over the past ten years. Most of these, however, use a sample that is geographically limited, even within the respective country. For a broader overview and discussion, see World Bank (2007).

has become an increasingly important aspect of the business of microfinance institutions but has achieved less attention in the literature so far (World Bank, 2007; Berg, 2010). Finally, rather comparing the outreach of commercial microfinance banks to that of non-commercial microfinance institutions, we compare their outreach to that of ordinary retail banks. In our view, this is the relevant comparison for policy makers deciding on whether to continue supporting commercial microfinance banks, especially in Emerging Markets.

The remainder of this paper is organized as follows. In section 2, we present a model of household deposit decisions and bank location decisions and derive hypotheses for our empirical analysis. Section 3 describes our data. Section 4 presents the methodology and empirical results and section 5 concludes.

2. Model and hypotheses

In this section we develop a simple model that illustrates how the presence of a microfinance bank affects the number and type of households which use a bank account and how this impact depends on the presence of a retail bank. At the same time our model points to potential selection effects, i.e. the decision of a microfinance bank to open a branch in a location will depend both on the characteristics of households in that area and the presence of a retail bank. Our model is related to that of Mulligan and Sala-i-Martin (2000) who study the extensive margin of holding bank deposits as opposed to cash money. We extend their model to consider heterogeneous banks.

Model set up

Households live in one of L regions in the economy. There are n_l households in each region l. Each household i has assets A_i. Each household has to decide whether to hold its wealth in cash or to deposit it in a bank.

Households face a fixed cost of opening a bank account $\varphi_i > 0$ which depends on (i) the fees to open an account, (ii) the non-monetary procedural costs of opening an account and (iii) the distance to the bank to open an account. There are two **banks** in the economy: a Microfinance Bank (MFB) and a Retail Bank (RB). We assume that the fees of opening an account as well as the procedures of opening an account are less costly at the microfinance bank than at the retail bank. Low procedural costs may be related to less complicated procedures or "cultural barriers" between bank staff and households. As a result, for a household which is located at an equal distance (d) to both bank types, the costs of opening an account at the microfinance bank are lower: $\varphi_{MFB}(d) < \varphi_{RB}(d)$.

We assume that the return to a household from opening an account is increasing in wealth. For simplicity we assume that the return is linear in wealth and that the return per unit wealth is higher at the retail bank than at the microfinance bank: $R_{RB} > R_{MFB}$. The higher return at the retail bank can be rationalized with higher interest rate or with access to a broader range of financial services (e.g. payment services or wealth management).

In our model, the decisions of banks and households take place in two steps: First, banks decide simultaneously whether to open a branch in a location. Second, households decide whether to open an account at one of the bank branches in their location. In the following we solve the model by backward induction.

Household deposit decisions

When deciding on whether to open a bank account, and at which bank to do so, households weigh the anticipated benefits of opening the account against the fixed cost of opening an account: $R_j \cdot A_i \geq \varphi_{i,j}(d_{i,j})$. Condition [3] denotes the minimum level of assets required for a household i to yield a positive return from opening a bank account at bank j given that the household is located at a distance $d_{i,j}$ from the bank.

[3] $$A_i \geq \frac{\varphi_j(d_{i,j})}{R_j}$$

We assume for simplicity that distance is dichotomous: Households either live close to the nearest branch of a bank type ($d_{i,j}$ =0), i.e in the same region. Alternatively they live far from the nearest branch of a bank type ($d_{i,j}$ =1), i.e. in a different region. If the nearest branch of bank j is located in another region we assume that the costs of opening an account are prohibitively high even for households with the highest asset level $\bar{A}$; i.e. $\bar{A} < \frac{\varphi_{MFB}(1)}{R_{MFB}}, \frac{\varphi_{RB}(1)}{R_{RB}}$. We assume that for households which live in the same region asa bank branch ($d_{i,j}$ =0) the threshold of assets required to benefit from a retail bank account is higher than that required at a microfinance bank:

[4] $$\frac{\varphi_{MFB}(0)}{R_{MFB}} < \frac{\varphi_{RB}(0)}{R_{RB}}$$

Based on this assumption we can establish that there are four types of households with different demand for bank accounts in the economy: Type 1 households will never open a bank account, no matter which bank branch is located in their region. These households have very low asset levels: $A_i < \frac{\varphi_{MFB}(0)}{R_{MFB}}$. Type 2 households only open an account if there is a branch of the microfinance bank in their region. These households have asset levels: $\frac{\varphi_{RB}(0)}{R_{RB}} > A_i \geq \frac{\varphi_{MFB}(0)}{R_{MFB}}$. Type 3 households will open an account if either of the banks has a branch in their region, but would prefer an account at the microfinance bank. These households have moderate asset levels: $A_i \geq \frac{\varphi_{RB}(0)}{R_{RB}}$ and $A_i < \frac{\varphi_{RB} - \varphi_{MFB}}{R_{RB} - R_{MFB}}$. Finally, Type 4

households will open an account if either of the banks has a branch in their region, but prefer the retail bank. These are households with high asset levels: $A_i \geq \frac{\varphi_{RB}(0)}{R_{RB}}$ and $A_i \geq \frac{\varphi_{RB} - \varphi_{MFB}}{R_{RB} - R_{MFB}}$.

Location decision of banks

The decision to open a branch in a region is determined by the number of potential clients. We assume for simplicity that each bank type j has fixed costs of running a branch β_j and earns a fixed income per client π_j. The number of clients required for a branch to break even is therefore $\frac{\beta_j}{\pi_j}$. We assumed above that there are L regions with population sizes of n_l in the economy. The share of each type of household in each region is defined as $\delta_1^l, \delta_2^l, \delta_3^l, \delta_4^l$ and is known with certainty by all banks. Hereby, $\sum_h \delta_h^l = 1$.

Given that some households would open an account at either bank, the decision of the microfinance bank to locate in a region depends on the location decision of the retail bank (and vice-versa). The number of clients served by the microfinance bank if it opens a branch is given by:

$$\begin{cases} \left(\delta_l^2 + \delta_l^3\right) n_l & \text{if the retail bank is in the region} \\ \left(\delta_l^2 + \delta_l^3 + \delta_l^4\right) n_l & \text{if the retail bank is not in the region} \end{cases} \quad [5]$$

The number of clients served by the retail bank is given by:

$$\begin{cases} \left(\delta_l^4\right) n_l & \text{if the microfinance bank is in the region} \\ \left(\delta_l^3 + \delta_l^4\right) n_l & \text{if the microfinance bank is not in the region} \end{cases} \quad [6]$$

The profits of the banks depending on their mutual decisions to enter a location are presented in Table 1.

Table 1. Profits of banks

		Retail Bank	
		not enter	enter
Microfinance Bank	not enter	$0, 0$	$0, \mathrm{n}_\mathrm{l}\left[\delta_\mathrm{l}^3 + \delta_\mathrm{l}^4\right]\pi_{\mathrm{RB}} - \beta_{\mathrm{RB}}$
	enter	$\mathrm{n}_\mathrm{l}\left[\delta_\mathrm{l}^2 + \delta_\mathrm{l}^3 + \delta_\mathrm{l}^4\right]\pi_{\mathrm{MFB}} - \beta_{\mathrm{MFB}}, 0$	$\mathrm{n}_\mathrm{l}\left[\delta_\mathrm{l}^2 + \delta_\mathrm{l}^3\right]\pi_{\mathrm{MFB}} - \beta_{\mathrm{MFB}}, \mathrm{n}_\mathrm{l}\left[\delta_\mathrm{l}^4\right]\pi_{\mathrm{RB}} - \beta_{\mathrm{RB}}$

Results and empirical hypotheses

Given the income and cost structure of each bank type $(\pi_{\mathrm{MFB}}, \beta_{\mathrm{MFB}}, \pi_{\mathrm{RB}}, \beta_{\mathrm{RB}})$ and the population size of a region n_l we derive the following results from equations [5, 6] and Table 1:

(i) Branch network: Given the presence of a retail bank in the location, the microfinance bank is more likely to open a branch when the share of low- and moderate-wealth households $(\delta_\mathrm{l}^2 + \delta_\mathrm{l}^3)$ in the region is higher. If a retail bank has no branch in the region the share of high-wealth households δ_l^4 also influences the decision of the microfinance bank. A higher share of very-low-income households (δ_l^1) does not increase the propensity of the microfinance bank to open a branch as these households do not demand bank accounts.

(ii) Client structure: In any region where the microfinance bank and the retail bank have a branch the former will serve low- and moderate-wealth households $\left(\delta_\mathrm{l}^2, \delta_\mathrm{l}^3\right)$, while the latter serves high-wealth households $\left(\delta_\mathrm{l}^4\right)$. Comparing locations where only one of the banks is located the microfinance bank is also more likely to serve low-wealth households $\left(\delta_\mathrm{l}^2, \delta_\mathrm{l}^3, \delta_\mathrm{l}^4\right)$ than the retail bank $\left(\delta_\mathrm{l}^3, \delta_\mathrm{l}^4\right)$.

(iii) Aggregate use of bank accounts: If in addition to a retail bank a microfinance bank opens a branch in a region then the number of households which have a bank account will increase. The additional account holders $\left(\delta_1^2\right)$ will be characterized by low levels of wealth. If a microfinance bank enters a region where there is no retail bank branch then the increase in the volume of accounts is larger $\left(\delta_1^2, \delta_1^3, \delta_1^4\right)$, as households with low, moderate and high wealth open accounts with the bank.

Our empirical analysis is based on matched household survey and bank branch-network data over a period of four years. This allows us to measure the impact of new microfinance bank branches on household use of bank accounts. Based on our results above we derive the following three empirical hypotheses:

Hypothesis 1 (volume effect): In regions where the microfinance bank opens a new branch the share of households with bank accounts increases stronger than in regions where the microfinance does not open a branch. This volume effect of microfinance banks is higher in regions where there is no retail bank branch.

Hypothesis 2 (composition effect): If the microfinance bank opens a branch in a region where a retail bank is already located the increase in account use by low- and -middle-income households is stronger than for the lowest-income or high-income households. If the microfinance bank opens a branch in a region where a retail bank is not located the increase in account use by low-income and middle-income households is similar to that for high-income households.

Hypothesis 3 (location effect): Given the presence of a retail bank branch, a microfinance bank is more likely to open a new branch in regions with a higher share of low-income and middle-income households.

3. Data and methodology

3.1. Life in Transition Survey and bank branch data

Our main data source is the EBRD-World Bank Life in Transition Survey (LITS) which was conducted in 29 countries in 2006 and 2010 as a repeated cross-sectional survey. In each country, 50-75 Primary Sampling Units (PSUs) were selected with the probability of selection proportional to PSU size. Then twenty households within each PSU were randomly selected, resulting in 1,000-1,500 observations per country. The first part of the interviews was conducted with the household head and yields information on household composition, housing, expenses and the use of services. For the second part of the survey, a randomly selected adult household member was interviewed about attitudes and values as well as the personal work history, education and entrepreneurial activity. In this study, we use information from the first part of the survey to obtain indicators of household use of banking services, location, size and income as well as the gender and age of the household head. From the second part of the survey, we obtain indicators of education, employment status, religion and ethnicity.

We focus our study on four South-Eastern European countries: Albania, Bulgaria, Macedonia and Serbia. For these four countries we augment the LITS survey data with geographical information on the location of PSUs. We then match the LITS survey data with geographical information on the branch location of the largest microfinance bank in the region: ProCredit Bank. We further match our survey data with geographical data on the branches of a large retail bank in each country. In each country, we choose the largest, country-wide retail bank for which bank branch location data is publicly available.[2] Appendix 1 provides information on the ProCredit and retail banks.

[2] In Albania and Serbia the chosen retail banks are those with the largest branch network in the respective country. In Macedonia we take the largest bank in terms of assets because the availability of online branch

We hand-collect the 2006 and 2010 branch location information for ProCredit Bank and the retail banks from the bank websites. Then we specify the exact location in terms of the latitude and longitude of each branch and PSU using Google maps. Appendix 2 offers a cartographical overview of the locations of PSUs, ProCredit branches and retail bank branches by country in 2006 and 2010.

[Insert Table 2 here]

Table 2 provides the definitions and sources of all variables used in our analysis. We drop all observations with missing information so that our final sample consists of 3,992 observations in 2006 and 4,244 observations in 2010. The dependent variable in our empirical analyses is Account which indicates whether any member of the household has a bank account. Table 3 shows that in each of the four countries the average use of bank accounts increased strongly between 2006 and 2010. The increase is largest in Macedonia and Albania where the share of households with account rose by 38 and 26 percentage points respectively. The increase in Bulgaria (11 percentage points) and Serbia (14 percentage points) is also substantial.

[Insert Table 3 here]

Table 3 shows that the surge in bank accounts in the region coincides with the expansion of the branch networks of both ProCredit as well as the retail banks. The number of ProCredit branches in our sample increased from 111 in 2006 to 254 in 2010, while the number of retail bank branches increased from 352 to 633. As a consequence of this branch expansion the

location information is best for this bank. Only in Bulgaria we have to resort to the fourth largest bank in terms of assets because all three larger banks do not provide historical branch location information for 2006 online.

average travel distance[3] in kilometers between ProCredit branches and surveyed households was reduced from 21.6 km to 10.5 km. By comparison, the average distance between retail bank branches and surveyed households was reduced from 10.5 km to 7.3 km. Overall, the larger number of bank branches and the shorter travel distances to households indicate that the retail banks chosen for our analysis have a more comprehensive coverage in the region than ProCredit Bank.

We measure the proximity between households and bank branches with the dummy variables ProCredit close and Retail bank close. These indicators are one if the nearest ProCredit or retail bank branch, respectively, is within a travel distance of five kilometers of the PSU where a household is located, and zero otherwise. As robustness tests, we employ different travel distance cut-offs (10km, 20km). We use distance thresholds as opposed to continuous measures of travel distance in order to capture the idea that the fixed costs of opening and the transaction costs of using a bank account depend on whether a household is within walking, cycling or local public transport distance of a bank branch or not.

[Insert Table 4 here]

We relate the use of bank accounts not only to the proximity to microfinance and retail bank branches but also to the economic environment and socioeconomic characteristics of households. Table 4 reports summary statistics for these variables by survey wave. We expect the use of accounts to be related to the economic activity in the location of households. As a proxy for local economic activity, we use the variable Nightlight. This variable measures the light intensity at night in the area where each PSU is located on a scale ranging from 0 to 63 which represents the visible band (where a greater value indicates higher light intensity).[4]

[3] Travel distance, in contrast to linear distance, is the road distance between two locations as obtained from Google maps.
[4] Further information can be found online: http://www.ngdc.noaa.gov/dmsp/faq.html#A.

This proxy was suggested by Henderson et al. (2011, 2012) who show that satellite night lights data are a useful measure for economic activity in geographic regions where national accounts data are of poor quality or unavailable. In our sample, the night light intensity ranges from 0 in very remote and unpopulated areas to 63 in the respective capitals and economic hubs.

In our theoretical model, we establish how microfinance banks may differ in their propensity to serve low-wealth households as compared to ordinary retail banks. As an indicator of household wealth we employ a measure of current household income. We measure household income (in log USD) with households' annual consumption expenses according to the OECD household equivalized scale. The variable Lowest income tercile then is a dummy variable which is one if the household income is in the lowest (first) income tercile in its country of location (by survey wave), and zero otherwise. Similarly, the variable Middle (Highest) income tercile is a dummy variable which is one if the household income is in the second (third) income tercile in its country of location (by survey wave), and zero otherwise.

As microfinance banks also strive to serve households that rely on informal entrepreneurial activity or agricultural income, we examine the relative propensity of ProCredit to bank such households. The income source of a household is captured by the dummy variables Self-employed, Wage income and Other income. The variable Self-employed takes on the value of one if the most important income source of the respondent was self-employment. In our sample 14% of households observed in 2006 are Self-employed, while this is the case for 20% of households observed in 2010. The variable Wage income takes on the value of one if the most important income source of the respondent was wages in cash or in kind. In our sample 44% of households observed in 2006 rely on Wage income, while this is the case for 45% of households observed in 2010. The variable Other income takes on the value of one if the most

important income source was neither wage income nor self-employment. Most households in this category rely on transfer income such as pensions or remittances.

We employ household-level covariates to control for variation in household demand for financial services and the transaction costs of using these services. University degree indicates whether the respondent has a tertiary-level degree and thus might be more knowledgeable about financial matters. We further control for Household size, which is the number of adults and children living in a household, as well as the Age (measured in log years) of the household head. The dummy variable Female captures the gender of the household head. Language captures whether the respondent speaks at least one official language of the respective country and is thus a measure of social integration. Finally, Muslim is a dummy variable indicating whether the respondent is a follower of Islam and might be reluctant to use commercial banking services for religious reasons.[5] We control for ownership of a Car, which may affect the transaction costs of using a bank account, but which is also a proxy for household wealth. Finally, we control for the household use of technical devices, i.e. Computer, Mobile phone and Internet access as these may reduce the transaction costs of having a bank account (e.g. through mobile banking or e-banking). At the same time, a household's use of these devices may mirror its economic activity or wealth.

3.2. Synthetic panel dataset

Our identification strategy is based on exploiting the branch expansion of ProCredit Bank in the period 2006-2010. The LITS 2006 and LITS 2010 surveys provide repeated cross-section data, so that we do not observe the same household in 2006 and again in 2010. We therefore generate a synthetic panel by matching households observed in 2006 with similar households observed in 2010. Our matching procedure is based on the proximity of households to branches of ProCredit Bank and the retail bank, our proxy for economic

[5] Using the LITS 2006 data Grosjean (2011) provides evidence that regions in South-East Europe which were under the influence of the Ottoman Empire show a lower level of financial development.

activity (Nightlight) as well as on the level and source of household income. The matching variable ProCredit close in 2006 measures whether the household was located within 5km of a ProCredit branch in 2006. Retail bank close in 2006 measures whether the household was located within 5km of a retail bank branch in 2006. Note that for all households observed in 2010 we assume that households have not moved location between 2006 and 2010. Nightlight below median measures whether the household is located in an area where the light intensity at night is below the country median (per wave). Households are matched on income level with the variables Lowest income tercile, Middle income tercile and Highest income tercile. Finally, they are matched on income source with the variables Wage income, Self-employed, and Other income.

We perform a one-to-one match (without replacement), i.e. each household in the LITS 2006 survey is matched to one household covered by the LITS 2010 survey. LITS 2006 households that cannot be matched to a LITS 2010 household are dropped. Likewise, LITS 2010 households that cannot be matched to a LITS 2006 household are also dropped. In addition, we drop all observations that have missing values for any of our variables of interest. As shown in Table 5 Panel A, our matching process generates a total sample of 2,938 potential household pairs for our synthetic 2006-2010 panel.

To identify the impact of new ProCredit Bank branches opened between 2006 and 2010, we drop 1,171 household pairs which were already close to ProCredit Bank branches in 2006. We further consider only household pairs for which the proximity to a retail bank branch does not change between 2006 and 2010. We thus drop 128 household pairs for which closeness to a branch of the retail bank changed in our observation period. This leaves us with a total synthetic panel of 1,639 household pairs in two sub-samples: 534 pairs which are already within a 5km radius of a retail bank branch in 2006 as well as 1,105 household pairs which are not within a 5km radius of a retail bank branch in 2006 and 2010. Table 5, Panel B provides details of the characteristics of our final synthetic panel dataset.

[Insert Table 5 here]

4. Results

As outlined in section 2 we test three hypotheses in our empirical analysis: Do more households have a bank account in regions where ProCredit Bank opened a new branch between 2006 and 2010 compared to locations where it did not open a branch (volume effect)? Does a new ProCredit Bank branch increase the use of bank accounts more for low-income and self-employed households than it does for high-income households or households with other income sources (composition effect)? Is ProCredit Bank more likely to open new branches in regions with a higher share of low-income or self-employed households (location effect)? We present our results for the volume effect in section 4.1 followed by results for the composition effect in section 4.2 and the location effect in section 4.3.

4.1. Volume effect

Table 6 presents univariate results for the volume effect based on a difference-in-difference analysis. For each household pair in our synthetic panel we calculate the change in the use of a bank account between 2006 and 2010. At the pair level this yields a value of either 0 (no change), +1 (an account is used in 2010 but not in 2006) or -1 (an account is used in 2006 but not in 2010).[6] We then compare the average change in account of those pairs for which a new ProCredit branch was opened within a radius of 5km to those pairs for which a new ProCredit branch was not opened within a radius of 5km. This comparison is conducted separately for household pairs which are close to a retail bank and households which are not close to a retail bank.

[6] Of the 1,639 pairs in our synthetic panel 542 pairs take on the value +1, 916 the value 0 and 181 the value -1.

The first row of Table 6 presents results for household pairs which are located close to a retail bank (in 2006 and 2010). For pairs in regions where ProCredit opened a new branch we find an increase in the use of bank accounts of 37 percentage points. By contrast, for household pairs in regions where ProCredit did not open a new branch the use of bank accounts increased by only 5 percentage points. The difference-in-difference result suggests that the use of bank accounts increased by 32 percentage points more in regions where a new ProCredit branch was opened in addition to an existing retail bank branch.

The second row of Table 6 presents results for household pairs which are not close to a retail bank in 2006 or 2010. The results in this row show that the use of bank accounts increases by 58 percentage points in those locations where ProCredit Bank did open a new branch as compared to 19 percentage points in regions where no new branch was opened. The difference-in-difference estimate suggests that the use of bank accounts increased by 38 percentage points more in areas without a retail bank but where ProCredit Bank opened a new branch between 2006 and 2010.

The Table 6 results suggest that the volume effect of microfinance branches is (slightly) lower in regions where a retail bank branch is present compared to regions where the retail bank is not present. This confirms the predictions of our model in section 2. That said, the results for the subsample where the retail bank is not close have to be interpreted with care because of the low number of pairs which are located in areas with new ProCredit branches (only 40 observations).

[Insert Table 6 here]

In Appendix 3 we test whether the difference-in-difference results displayed in Table 6 are robust to changes in the distance thresholds employed in our matching procedure and empirical analysis. The analysis presented above defines “closeness” to a ProCredit branch or

a retail bank branch as households lying within a 5km radius of the nearest branch. In our robustness tests we extend this radius to 10km (Panel A) and 20km (Panel B). The results presented in Appendix 3 confirm our findings for the subsample of households which are located close to a retail bank. In this subsample, a new ProCredit branch is associated with an increase in bank account use by 31 percentage points (Panel A – 10 km radius) and 41 percentage points (Panel B – 20 km radius), respectively. As a result of changes in sample composition we can no longer estimate reliable difference-in-difference effects for the subsample of households which are not close to a retail bank.[7]

The univariate results displayed in Table 6 are confirmed by the multivariate analysis presented in Table 7. Here, we focus the analysis on the subsample of household pairs that are close to the retail bank in 2006 and 2010. We report the outcome of first-difference OLS regressions relating the change in account use (D.Account) within each household pair over time to the change in proximity to ProCredit (D.ProCredit close). We control for differences in all socioeconomic characteristics within household pairs that are not used in the matching procedure and thus may vary across observation periods. We also control for the change of the average characteristics of the PSU in which the matched households are located (D.Average Income per PSU, D.Share of Self-employed per PSU, D.Share of Wage income per PSU, D.Nightlight per PSU). Standard errors are reported in brackets and are clustered at the PSU-level.

Column (1) of Table 7 provides estimates controlling for the change in household characteristics, whereas column (2) adds the change in average PSU characteristics. We find that for households that are close to a retail bank the use of accounts increases by 26 percentage points when ProCredit opens a new branch within the five kilometer travel

[7] By doing so the number of observations available for our empirical analysis is reduced as our identification strategy relies on considering only those households which are not close to a ProCredit branch in 2006. At the same time, the share of observations in our two subsamples – retail bank "close" and retail bank "not close" - shifts towards the former as we extend the proximity radius.

distance radius between 2006 and 2010. This result remains unchanged when controlling for average PSU characteristics.

Together the results in Tables 6 and 7 provide evidence of a significant volume effect induced by the expansion of the ProCredit Bank branch network between 2006 and 2010. In the next section we study which households benefit most from new ProCredit branches.

4.2. Composition effect

Table 8 presents univariate results for the composition effect based on a difference-in-difference analysis. Replicating our analysis in Table 6 we compare the average change in the use of bank accounts by household pairs in regions where a new ProCredit branch was opened between 2006 and 2010 to those for pairs in regions where a new ProCredit branch was not opened. We conduct this comparison only for household pairs which are close to a retail bank because of the low number of household pairs where the retail bank was not close in 2006 and 2010 but where ProCredit opened a bank branch between 2006 and 2010. In Panel A, we compare the impact of new ProCredit branches on the use of bank accounts for households with different income levels (Lowest income tercile, Middle income tercile or Highest income tercile). In Panel B, we do the same analysis by household income source (Self-employed, Wage income or Other income).

[Table 8 here]

The Table 8, Panel A results confirm that in regions where a retail bank is already present new ProCredit Bank branches are associated with a stronger increase in the use of bank accounts for low- and middle-income households than for high-income households. When comparing these effects to the change in account use without a new ProCredit Bank branch, the reported difference-in-difference estimates suggest that a new ProCredit branch increases

the use of bank accounts most among low-income households (by 40 percentage points). The estimated effects for middle-income households (32 percentage points) and high-income households (18 percentage points) are substantially lower.

The Table 8, Panel B results show that in regions where a retail bank is present, a new ProCredit Bank branch is associated with a substantial increase in the use of bank accounts among all income source groups. Comparing this increase in bank accounts with the change in bank accounts in regions without a new ProCredit branch, the difference-in-difference estimates suggest that new microfinance bank branches leads to a strong increase in bank accounts especially among households whose primary income source is self-employment (38 percentage points). The effect is somewhat lower among wage-income households (33 percentage points) and households with other incomes (27 percentage points).

[Table 9 here]

Table 9 provides a multivariate analysis of the composition effect. Hereby we replicate our analysis from Table 7 and control for changes in household and PSU characteristics. We capture potential differential effects of the microfinance bank on account use across households with different income levels with the interaction effects D.ProCredit close*Lowest income tercile and D.ProCredit close*Middle income tercile. Similarly, we capture differential effects across households with different income sources with the interaction terms D.ProCredit close*Self-employed and D.ProCredit close*Wage income.

The magnitudes of the column (1) estimates of Table 9 confirm our univariate findings. The positive interaction effects D.ProCredit close*Lowest income tercile and D.ProCredit close*Middle income tercile suggest that in locations where ProCredit opens a new branch low-income and middle-income households increase the use of bank accounts more than high-income households (the base category). Our point estimates shows that a new ProCredit

branch increases the likelihood of using a bank account by 15 (11) percentage points more for low-income (middle-income) households than for high-income households. However neither of these point estimates is statistically significant at conventional levels.

Column (2) analyzes the differential impact of new ProCredit branches on account use for household with different primary sources of income. The significantly positive base effect of D.ProCredit close together with the insignificant but positive interaction effects D.ProCredit close*Self-employed and D.ProCredit close*Wage income are largely in line with our univariate results. While, in economic terms, the increase is strongest for Self-employed households, the differences between the three income source groups are not statistically significant.

Overall, our univariate results provide evidence for a composition effect of new ProCredit branches: low-income households and self-employed households seem to benefit most from new ProCredit branches. While the magnitude of these composition effects is confirmed in a multivariate regression the corresponding estimates lack statistical significance.

4.3. Location effect

Table 10 presents the multivariate analysis of the location decision of ProCredit Bank. The dependent variable now is D.ProCredit close. As before, the analysis focuses on the subsample of households that were not close to a ProCredit branch in 2006 but close to a retail bank branch in 2006 and 2010. As the key explanatory variables we use the 2010 PSU averages of Self-employed, Wage income and Nightlight, as well as our measures of households' different income levels (2010 PSU averages of Lowest income tercile, Middle income tercile and Income) as indicators of the potential demand for bank accounts in a

region.[8] The economic rationale behind these variables follows from our theoretical model which suggests that the socioeconomic conditions in a PSU should affect the location decision of the microfinance bank. As we use average PSU indicators for 2010 we account for the expected future economic conditions in a region which should drive the banks location decision between 2006 and 2010.

[Table 10 here]

The results reported in Table 10 show that ProCredit is more likely to open a new branch in areas with a combination of high economic activity and a high share of low-income and middle-income households. The estimates reported in column (1) show that ProCredit opens new bank branches not only in areas with a high share of low-income households but also with a high share of middle-income households (as compared to high-income households). The positive and statistically significant parameter estimate of Nightlight per PSU in 2010 suggests that ProCredit opens bank branches especially in areas where economic activity is comparatively high in 2010. In column (2) we replace the share of low-income and middle-income households per PSU with average income per PSU. The estimates confirm that ProCredit opens new branches in areas with lower income levels. Moreover, in column (3) we examine whether ProCredit expands to areas with strong growth in economic activity between 2006 and 2010 or to areas which already displayed high activity in 2006. To this end we replace Nightlight per PSU in 2010 with Nightlight per PSU in 2006 and the change in Nightlight (D.Nightlight) between 2006 and 2010. The estimates reported in column (3) suggest that ProCredit expands to regions which already had strong economic activity in 2006 rather than those regions which experienced strong growth of activity. Overall, we find support for the location effect: ProCredit seems to open bank branches not only in areas with

[8] The averages are calculated for each individual household as the average of the respective variable across all other households in the same PSU.

strong economic activity, but also in areas with a high share of low-income and middle-income households.

5. Conclusions

In this paper we examine whether commercial microfinance banks expand the frontier of finance as compared to ordinary retail banks. Our results suggest that that they do. Examining the expansion of the branch network of ProCredit Bank in South-Eastern Europe between 2006 and 2010 and controlling for the presence of ordinary retail bank branches we show that the share of households with a bank account increases significantly in locations in which ProCredit opened a new branch compared to locations where it did not. This result is not driven by ProCredit only expanding to regions with stronger economic activity. On the contrary, ProCredit was more likely to open new branches in areas with low average household incomes. We also find indicative evidence that a new ProCredit branch leads to a stronger increase in account use among low-income and middle-income than among high-income households.

Our findings have important implications for policy makers who aim to foster access to financial services by supporting commercial microfinance banks. Our results suggest that public investment in microfinance banks seems warranted even in emerging markets that are served by large retail branch networks of international banking groups.

Our results also have implications for future research on mission drift in microfinance. To provide a comprehensive picture on this phenomenon it seems necessary to not only compare various types of microfinance institutions, commercial vs. non-profit, but also to study close competitors from outside the microfinance spectrum. Especially in the context of emerging markets a comparison with ordinary retail banks seems more suitable to assess the potential public benefits of commercial microfinance banks. In addition, it seems warranted to broaden

the focus of “mission drift” studies beyond credit activity to other financial services such as the provision of savings accounts and payment services.

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Table 2. Variable definitions and sources

Variable name	Definition	Source	Observation
	Access to finance		
Account	Dummy=1 if a household member has a bank account, =0 otherwise	LITS	2006; 2010
	Distances		
ProCredit close	Dummy =1 if ProCredit Bank branch is within 5km travel distance to household	Googlemaps; Bank websites	2006; 2010
Retail bank close	Dummy =1 if Retail Bank branch is within 5km travel distance to household	Googlemaps; Bank websites	2006; 2010
	Household characteristics		
Income	Natural logarithm of household expenses	LITS	2006; 2010
Lowest income tercile	Dummy =1 if household expenses are within the lowest/first income tercile per country and wave, =0 otherwise	LITS	2006; 2010
Middle income tercile	Dummy =1 if household expenses are within the middle/second income tercile per country and wave, =0 otherwise	LITS	2006; 2010
Highest income tercile	Dummy =1 if household expenses are within the highest/third income tercile per country and wave, =0 otherwise	LITS	2006; 2010
Wage income	Dummy =1 if the most important income source is wages in cash or in kind, =0 otherwise	LITS	2006; 2010
Self-employed	Dummy =1 if the most important income source is self-employment, own or family business or sales or bartering of farm products, =0 otherwise	LITS	2006; 2010
Other income	Dummy =1 if the most important income source is other income such as state or private transfers, =0 otherwise	LITS	2006; 2010
University degree	Dummy=1 if the respondent has a university degree, =0 otherwise	LITS	2006; 2010
Household size	Number of household members (adults & children)	LITS	2006; 2010
Age	Age of the household head in log years	LITS	2006; 2010
Female	Dummy =1 if the household head is female, =0 if household head is male	LITS	2006; 2010
Language	Dummy =1 if the respondent speaks an official national language, =0 otherwise	LITS	2006; 2010
Muslim	Dummy =1 if the respondent is Muslim, =0 otherwise	LITS	2006; 2010
Car	Dummy =1 if the respondend has a car, =0 otherwise	LITS	2006; 2010
Computer	Dummy =1 if the respondend has a computer, =0 otherwise	LITS	2006; 2010
Mobile phone	Dummy =1 if the respondend has a mobile phone, =0 otherwise	LITS	2006; 2010
Internet	Dummy =1 if the respondend has internet access, =0 otherwise	LITS	2006; 2010
	PSU characteristics		
Nightlight per PSU	Data values range from 0-63	U.S. National Oceanic and Atmospheric Administration Earth Observation Group	2006; 2010

Table 3. Use of bank accounts and bank branches by country in 2006 and 2010

This table reports summary statistics per country and year (2006 and 2010) of the *Share of households with account* at the PSU-level and the *Average distance between PSU and Banks* (ProCredit and Retail Bank), measured in travel distance by road in kilometers. Definition and sources of the variables are provided in table 2.

Panel A. Year 2006

		All countries	Albania	Bulgaria	Macedonia	Serbia
Share of households	Mean	0.28	0.19	0.18	0.20	0.55
with account	Minimum per PSU	0.00	0.00	0.00	0.00	0.00
	Maximum per PSU	0.90	0.70	0.70	0.90	0.90
ProCredit Bank	Number of branches	111	16	44	16	35
branches	Average distance to PSU (in km)	21.62	22.26	18.86	17.51	27.84
Retail Bank	Number of branches	352	78	59	48	167
branches	Average distance to PSU (in km)	10.54	7.51	17.55	7.83	9.24

Panel B. Year 2010

		All countries	Albania	Bulgaria	Macedonia	Serbia
Share of households	Mean	0.53	0.45	0.29	0.58	0.69
with account	Minimum per PSU	0.00	0.00	0.00	0.00	0.00
	Maximum per PSU	1.00	1.00	0.94	1.00	1.00
ProCredit Bank	Number of branches	254	42	87	42	83
branches	Average distance to PSU (in km)	10.51	11.46	9.85	10.44	10.39
Retail Bank	Number of branches	633	102	197	58	276
branches	Average distance to PSU (in km)	7.27	5.43	7.25	10.35	6.28

Table 4. Summary statistics of all variables in 2006 and 2010

This table reports summary statistics of all variables in the years 2006 and 2010. Definition and sources of the variables are provided in table 2.

	LITS 2006				LITS 2010			
Variable	**Mean**	**Std. Dev.**	**Minimum**	**Maximum**	**Mean**	**Std. Dev.**	**Minimum**	**Maximum**
Account	0.28	0.45	0	1	0.53	0.50	0	1
ProCredit close	0.36	0.48	0	1	0.57	0.50	0	1
Retail bank close	0.52	0.50	0	1	0.63	0.48	0	1
Income	7.53	0.69	1	10	8.02	0.62	4	10
Lowest income tercile	0.30	0.46	0	1	0.30	0.46	0	1
Middle income tercile	0.36	0.48	0	1	0.36	0.48	0	1
Wage income	0.44	0.50	0	1	0.45	0.50	0	1
Self-employed	0.14	0.34	0	1	0.20	0.40	0	1
Other income	0.43	0.49	0	1	0.35	0.48	0	1
University degree	0.16	0.36	0	1	0.16	0.37	0	1
Household size	3.44	1.74	1	12	3.18	1.65	1	12
Age	3.93	0.30	3	5	3.96	0.29	3	5
Female	0.21	0.41	0	1	0.24	0.43	0	1
Language	0.99	0.10	0	1	0.94	0.24	0	1
Muslim	0.26	0.44	0	1	0.27	0.44	0	1
Car	0.44	0.50	0	1	0.52	0.50	0	1
Computer	0.25	0.43	0	1	0.52	0.50	0	1
Mobile phone	0.74	0.44	0	1	0.85	0.36	0	1
Internet	0.14	0.34	0	1	0.41	0.49	0	1
Nightlight per PSU	29.68	21.37	0	63	38.28	21.62	0	63

Table 5. Synthetic panel dataset

Households in 2006 are matched with households in 2010 on *ProCredit close* in 2006, *Retail bank close* in 2006, *Nightlight* below median per wave, *Income* terciles by wave, *Self-employed* by wave, *Wage income* by wave. Household control variables include: *D.Female, D.University degree, D.Household size, D.Age, D.Language, D.Muslim, D.Car, D.Computer, D.Mobile phone, D.Internet*. Standard errors are clustered at PSU level and are reported in brackets. ***, **, * denote significance at the 0.01, 0.05 and 0.10-level. Definition and sources of the variables are provided in table 2.

Panel A. Number of matched households per dataset

Country	Year	Number of Households (unmatched dataset)	Number of Households (matched dataset)
Albania	2006	999	640
	2010	876	640
Bulgaria	2006	1000	746
	2010	917	746
Macedonia	2006	996	710
	2010	1001	710
Serbia	2006	997	842
	2010	1450	842
All countries	**2006**	**3992**	**2938**
	2010	**4244**	**2938**
Household pairs not close to ProCredit in 2006			1767
of which:			
close to Retail bank 2006 & 2010			534
not close to Retail bank 2006 & 2010			1105
Total synthetic panel sample (household pairs)			**1639**

Panel B. Type of pairs in synthetic panel

		Retail bank close	Retail bank not close
High Nightlight			
Lowest income tercile	Self-employed	8	2
	Wage income	32	4
	Other income	42	5
Middle income tercile	Self-employed	7	2
	Wage income	69	7
	Other income	41	5
Highest income tercile	Self-employed	15	4
	Wage income	60	6
	Other income	21	3
Low Nightlight			
Lowest income tercile	Self-employed	4	38
	Wage income	14	118
	Other income	29	235
Middle income tercile	Self-employed	6	77
	Wage income	50	165
	Other income	47	165
Highest income tercile	Self-employed	19	84
	Wage income	52	120
	Other income	18	65
	Total	**534**	**1105**

Table 6. Volume effect: Univariate analysis

Households in 2006 are matched with households in 2010 on *ProCredit close* in 2006, *Retail bank close* in 2006, *Nightlight* below median per wave, *Income* terciles by wave, *Self-employed* by wave, *Wage income* by wave. Household control variables include: *D.Female, D.University degree, D.Household size, D.Age, D.Language, D.Muslim, D.Car, D.Computer, D.Mobile phone, D.Internet*. Standard errors are clustered at PSU level and are reported in brackets. ***, **, * denote significance at the 0.01, 0.05 and 0.10-level. Definition and sources of the variables are provided in table 2.

		ProCredit close in 2010	**ProCredit not close in 2010**	**Difference in Difference (DiD)**
Retail bank close	**all households**	0.370***	0.055	0.315***
		(0.033)	(0.047)	(0.056)
		(N=335)	(N=199)	(N=534)
Retail bank not close	**all households**	0.575***	0.191***	0.384***
		(0.079)	(0.019)	(0.099)
		(N=40)	(N=1065)	(N=1105)

Table 7. Volume effect: Multivariate analysis

Households in 2006 are matched with households in 2010 on *ProCredit close* in 2006, *Retail bank close* in 2006, *Nightlight* below median per wave, *Income* terciles by wave, *Self-employed* by wave, *Wage income* by wave. Household control variables include: *D.Female, D.University degree, D.Household size, D.Age, D.Language, D.Muslim, D.Car, D.Computer, D.Mobile phone, D.Internet*. Standard errors are clustered at PSU level and are reported in brackets. ***, **, * denote significance at the 0.01, 0.05 and 0.10-level. Definition and sources of the variables are provided in table 2.

	1	2
Subsample	Retail bank close	
Dependant variable	D.Account	
D.ProCredit close	0.255**	0.256***
	[0.096]	[0.091]
D.Avg. Income per PSU		-0.011
		[0.072]
D.Share of Self-employed per PSU		-0.085
		[0.182]
D.Share of Wage income per PSU		0.077
		[0.178]
D.Nightlight per PSU		0.004*
		[0.002]
Country Dummies	YES	YES
Household Controls	YES	YES
Observations	534	534
R-squared	0.182	0.200
Number of Household Pairs	534	534
Method	OLS	OLS

Table 8. Composition effect: Univariate analysis

Households in 2006 are matched with households in 2010 on *ProCredit close* in 2006, *Retail bank close* in 2006, *Nightlight* below median per wave, *Income* terciles by wave, *Self-employed* by wave, *Wage income* by wave. Household control variables include: *D.Female, D.University degree, D.Household size, D.Age, D.Language, D.Muslim, D.Car, D.Computer, D.Mobile phone, D.Internet*. Standard errors are clustered at PSU level and are reported in brackets. ***, **, * denote significance at the 0.01, 0.05 and 0.10-level. Definition and sources of the variables are provided in table 2.

Panel A. Level of Income (Retail bank close)

	ProCredit close in 2010	**ProCredit not close in 2010**	**Difference in Difference**
Lowest income tercile	0.521***	0.121	0.400***
	(0.059)	(0.113)	(0.121)
	(N=96)	(N=33)	(N=129)
Middle income tercile	0.380***	0.064	0.316***
	(0.050)	(0.076)	(0.088)
	(N=142)	(N=78)	(N=220)
Highest income tercile	0.206***	0.023	0.183*
	(0.062)	(0.070)	(0.094)
	(N=97)	(N=88)	(N=185)

Panel B. Main other Income Source (Retail bank close)

	ProCredit close in 2010	**ProCredit not close in 2010**	**Difference in Difference**
Self-employed	0.375***	0.000	0.375**
	(0.117)	(0.107)	(0.160)
	(N=32)	(N=27)	(N=59)
Wage income	0.318***	-0.010	0.328***
	(0.045)	(0.071)	(0.080)
	(N=176)	(N=101)	(N=277)
Other income	0.441***	0.169**	0.272***
	(0.053)	(0.072)	(0.089)
	(N=127)	(N=71)	(N=198)

Table 9. Composition effect: Multivariate analysis

Households in 2006 are matched with households in 2010 on *ProCredit close* in 2006, *Retail bank close* in 2006, *Nightlight* below median per wave, *Income* terciles by wave, *Self-employed* by wave, *Wage income* by wave. Household control variables include: *D.Female, D.University degree, D.Household size, D.Age, D.Language, D.Muslim, D.Car, D.Computer, D.Mobile phone, D.Internet*. Standard errors are clustered at PSU level and are reported in brackets. ***, **, * denote significance at the 0.01, 0.05 and 0.10-level. Definition and sources of the variables are provided in table 2.

	1	2
Subsample	Retail bank close	
Dependent variable	D.Account	
D.ProCredit close	0.148	0.236*
	[0.113]	[0.136]
D.ProCredit close*Lowest income tercile	0.151	
	[0.153]	
D.ProCredit close*Middle income tercile	0.118	
	[0.135]	
D.ProCredit close*Self-employed		0.098
		[0.198]
D.ProCredit close*Wage income		0.001
		[0.176]
Country Dummies	YES	YES
PSU Controls	YES	YES
Household Controls	YES	YES
Observations	534	534
R-squared	0.226	0.221
Number of Household Pairs	534	534
Method	OLS	OLS

Table 10. Location effect: Multivariate analysis

Households in 2006 are matched with households in 2010 on *ProCredit close* in 2006, *Retail bank close* in 2006, *Nightlight* below median per wave, *Income* terciles by wave, *Self-employed* by wave, *Wage income* by wave. Household control variables include: *D.Female, D.University degree, D.Household size, D.Age, D.Language, D.Muslim, D.Car, D.Computer, D.Mobile phone, D.Internet*. Standard errors are clustered at PSU level and are reported in brackets. ***, **, * denote significance at the 0.01, 0.05 and 0.10-level. Definition and sources of the variables are provided in table 2.

	1	2	3
Subsample	Retail bank close		
Dependent variable	D.ProCredit close		
Share of Lowest income tercile per PSU in 2010	0.851***		
	[0.256]		
Share of Middle income tercile per PSU in 2010	0.929**		
	[0.415]		
Average income per PSU in 2010		-0.450**	-0.485**
		[0.170]	[0.212]
Share of Self-employed per PSU in 2010	-0.115	-0.663	-0.903*
	[0.530]	[0.514]	[0.502]
Share of Wage income per PSU in 2010	-0.446	-0.629	-0.637*
	[0.397]	[0.377]	[0.356]
Nightlight per PSU in 2010	0.024***	0.024***	
	[0.003]	[0.004]	
Nightlight per PSU in 2006			0.020***
			[0.004]
D.Nightlight per PSU			0.000
			[0.003]
Country Dummies	YES	YES	YES
Household Controls	YES	YES	YES
Observations	534	534	534
R-squared	0.636	0.611	0.592
Number of Household Pairs	534	534	534
Method	OLS	OLS	OLS

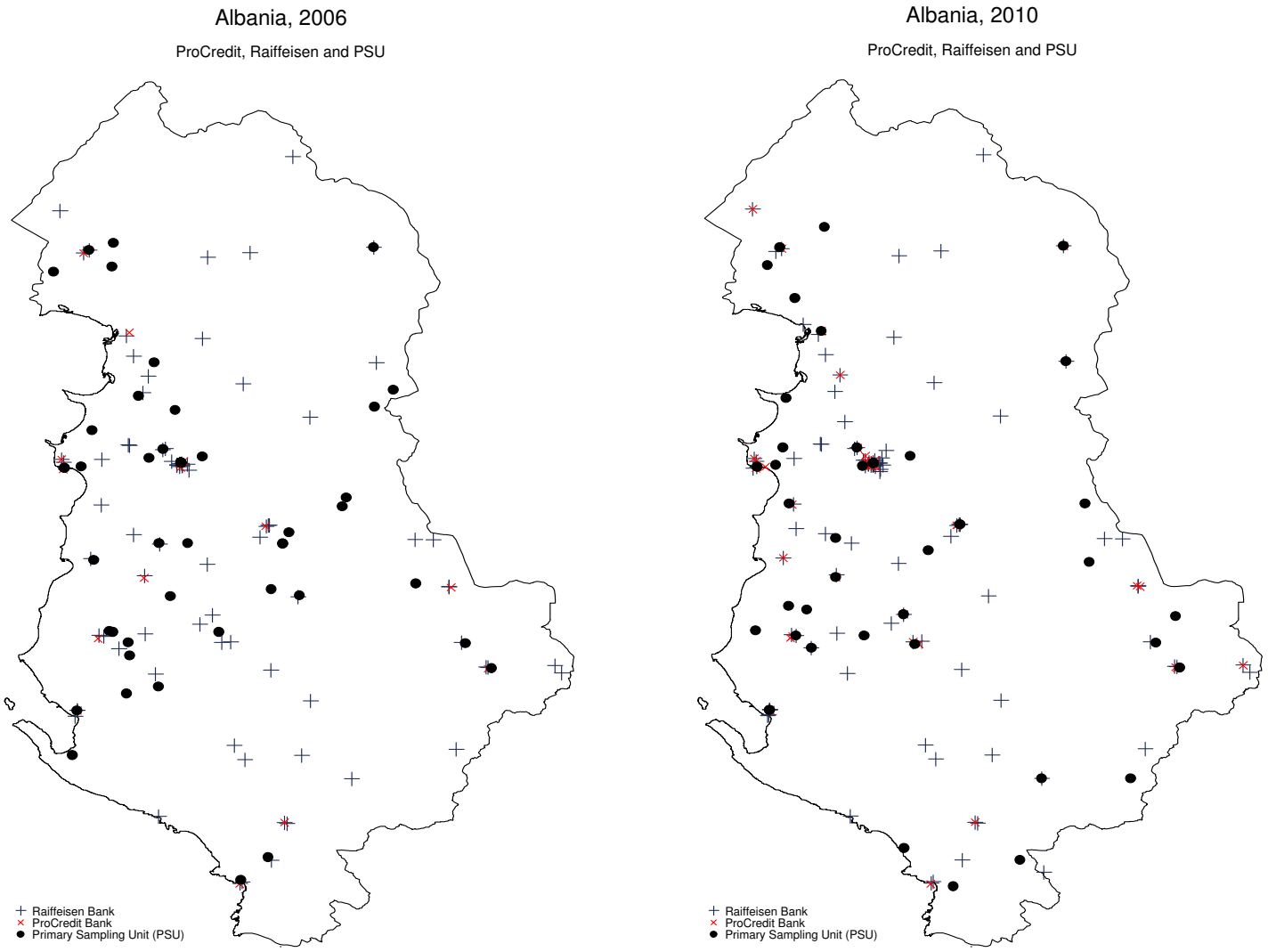
Appendix 1. Banks

This table provides information (name of the bank, origin, ownership structure) on the banks considered in the analysis. Information was obtained from the websites of the banks. Share of total assets and number of depositors are year end 2009.

Country		**Microfinance Bank**	**Retail Bank**
Albania	Bank Name	ProCredit Bank	Raiffeisen Bank
	Origin	founded (FEFAD) (by KfW) (since 1999)	Banka e Kursimeve (Government Savings Bank) (since 2004)
	Ownership structure	ProCredit Holding (80%), Commerzbank (20%)	Raiffeisen Bank International AG (100%)
	Assets/Total Assets	5%	29%
	Number of depositors	192840	n.a.
Bulgaria	Bank Name	ProCredit Bank	Raiffeisen Bank
	Origin	founded (since 2001)	founded (since 1994)
	Ownership structure	ProCredit Holding (80%), Commerzbank (20%)	Raiffeisen Bank International AG (100%)
	Assets/Total Assets	2%	10%
	Number of depositors	126000	n.a.
Macedonia	Bank Name	ProCredit Bank	Komercijalna
	Origin	founded (since 2003)	founded (since 1955)
	Ownership structure	ProCredit Holding (87.5%), EBRD (12.5%)	East Capital Explorer Investments AB (13%), EBRD (5%)
	Assets/Total Assets	5%	23%
	Number of depositors	134603	n.a.
Serbia	Bank Name	ProCredit Bank	Komercijalna
	Origin	founded (since 2001)	founded (since 1970)
	Ownership structure	ProCredit Holding (83%), Commerzbank (17%)	Republika Srbija (43%); EBRD (25%)
	Assets/Total Assets	3%	9%
	Number of depositors	450656	n.a.

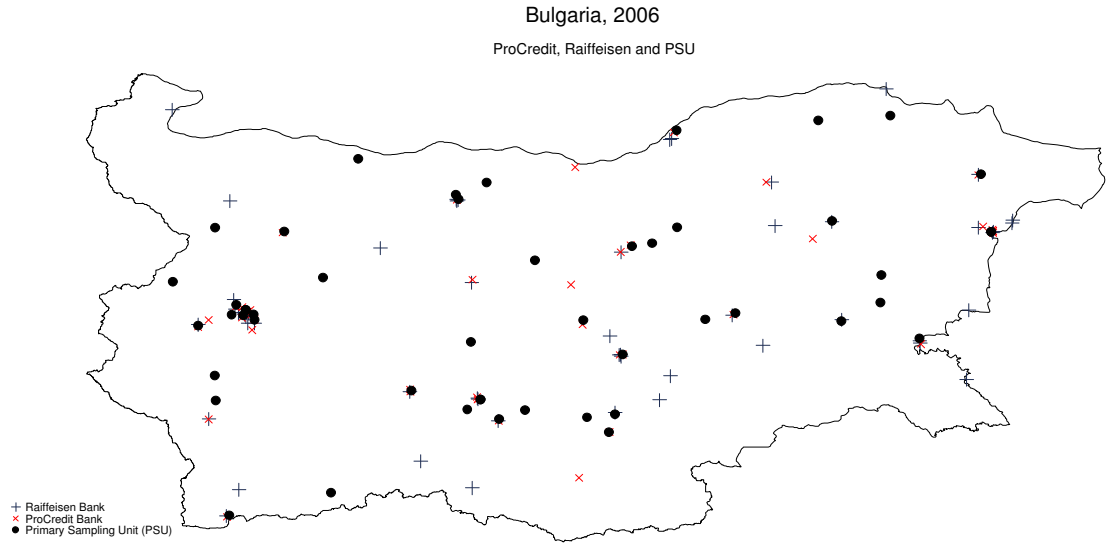
Appendix 2a. Albania: Bank and Household locations in 2006 and 2010

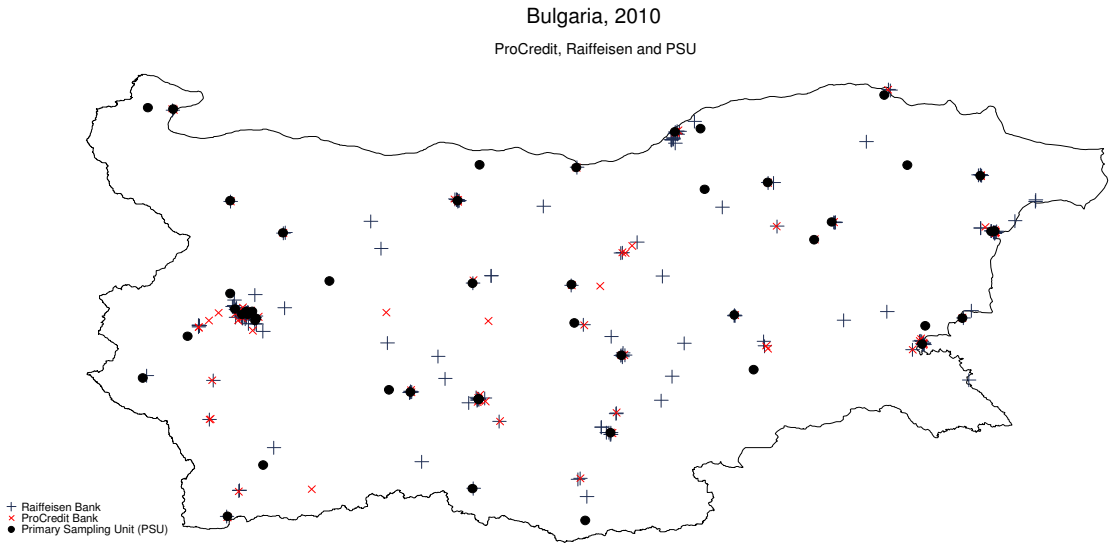
This graph shows the location of ProCredit Bank branches, retail bank branches and PSUs in Albania in 2006 and 2010.



Appendix 2b. Bulgaria: Bank and Household locations in 2006 and 2010

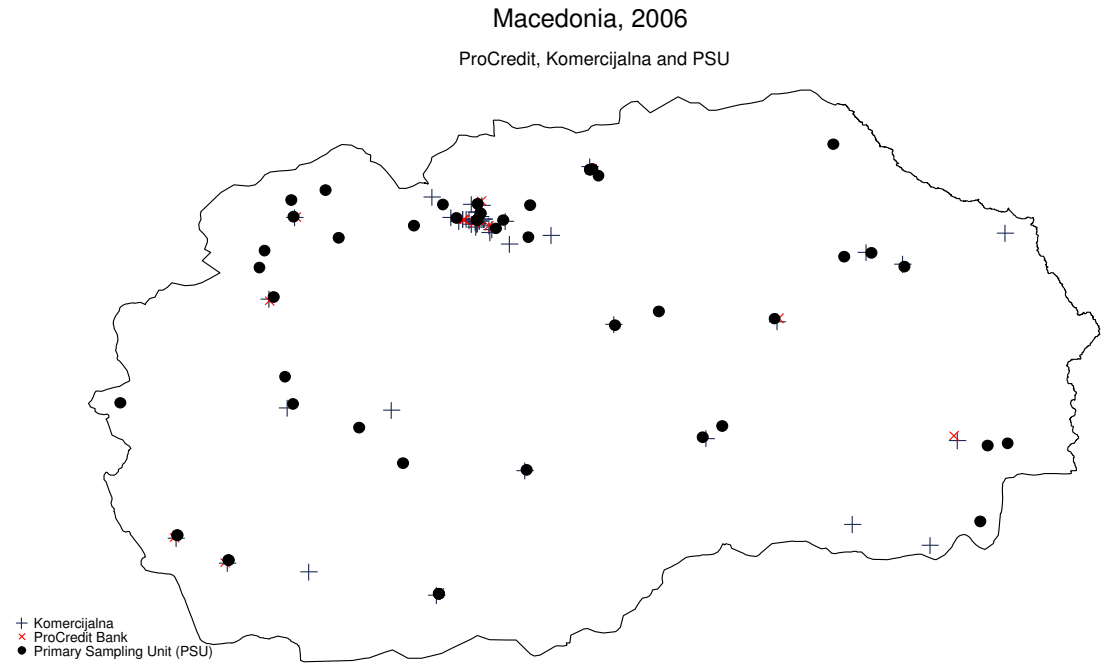
This graph shows the location of ProCredit Bank branches, retail bank branches and PSUs in Bulgaria in 2006 and 2010.

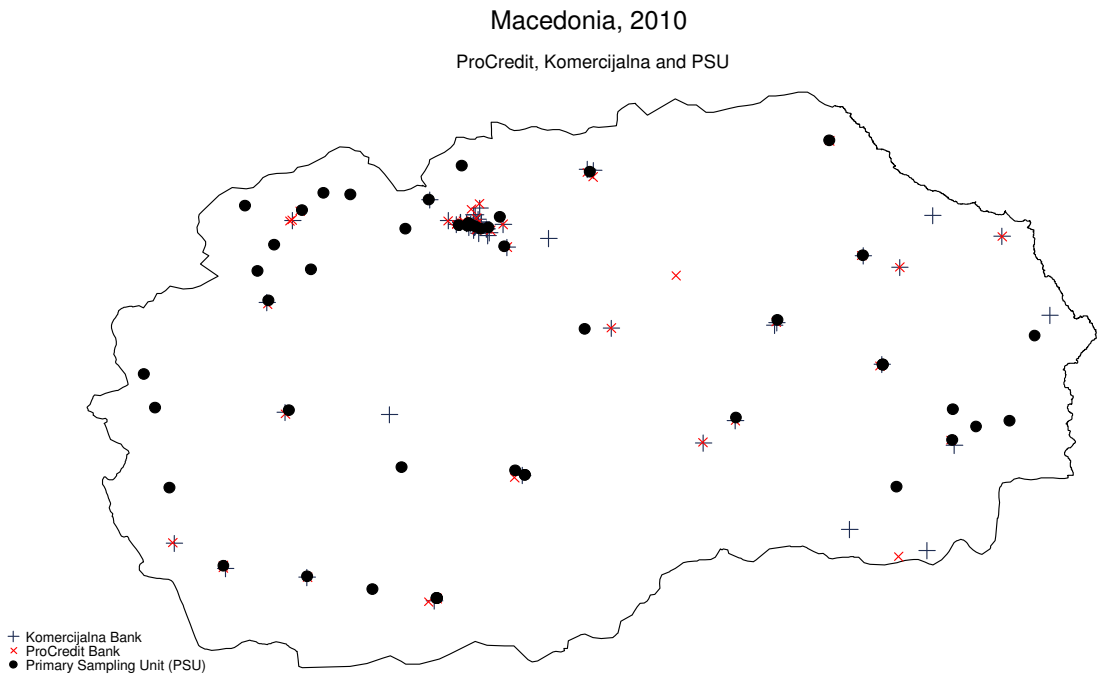




Appendix 2c. Macedonia: Bank and Household locations in 2006 and 2010

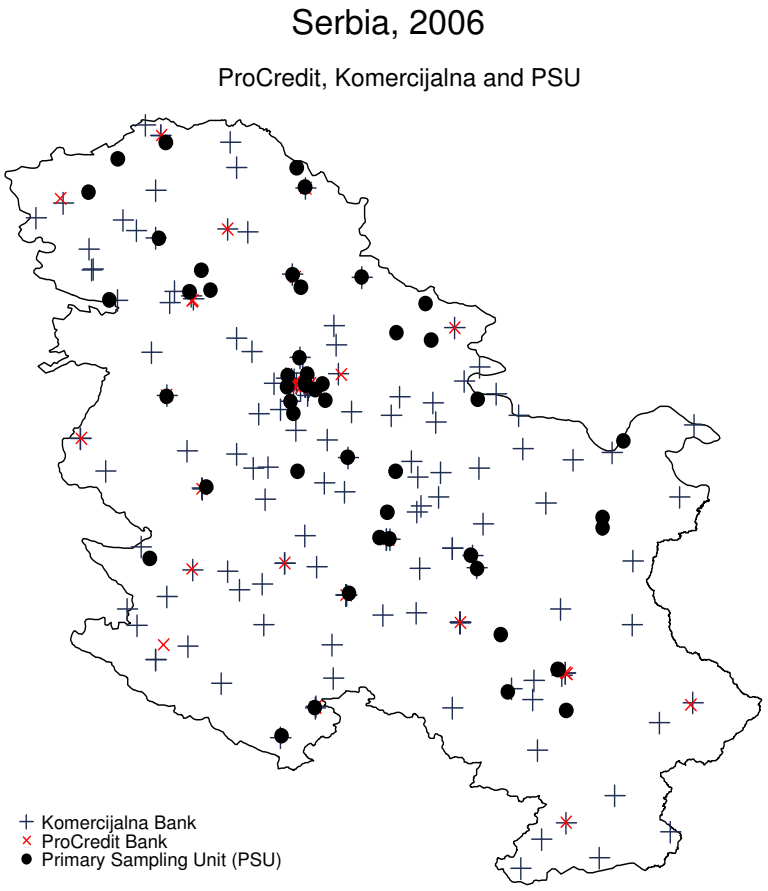
This graph shows the location of ProCredit Bank branches, retail bank branches and PSUs in Macedonia in 2006 and 2010.

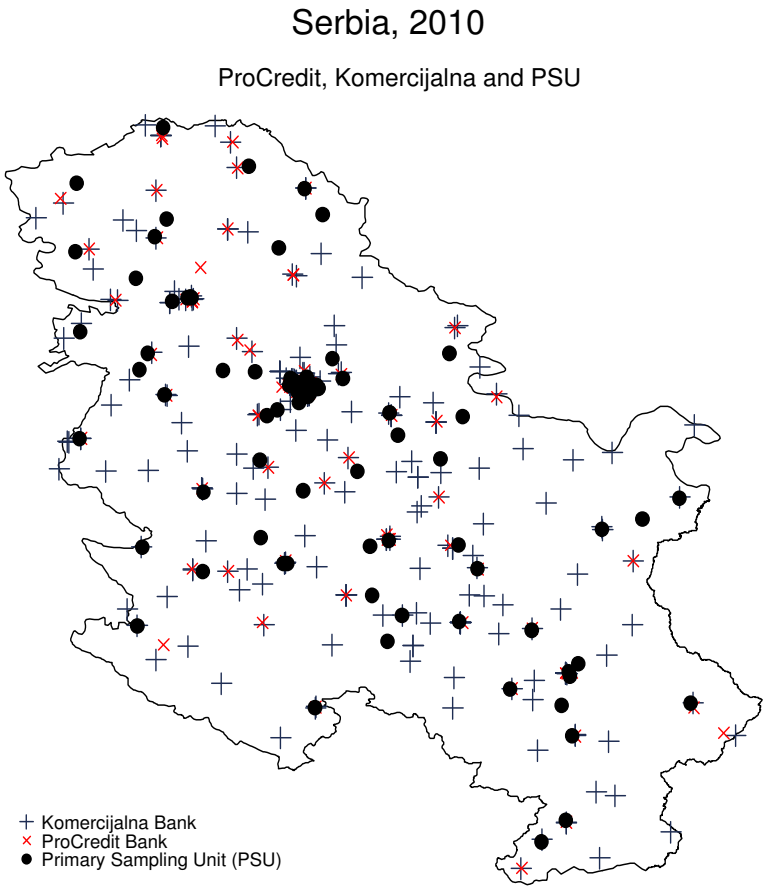




Appendix 2d. Serbia: Bank and Household locations in 2006 and 2010

This graph shows the location of ProCredit Bank branches, retail bank branches and PSUs in Serbia in 2006 and 2010.





Appendix 3. Volume effect: Robustness check

This table shows difference-in-difference estimates for account use (*Account*) for the subsample of those households that are not close to a ProCredit branch in 2006. Households in 2006 are matched with households in 2010 on *ProCredit close* in 2006, *Retail bank close* in 2006, *Nightlight* below median per wave, *Income* terciles by wave, *Self-employed* by wave, *Wage income* by wave. Standard errors and number of observations (N) are reported in brackets. ***, **, * denote significance at the 0.01, 0.05 and 0.10-level. Definition and sources of the variables are provided in table 2.

Panel A. Distance threshold: 10km

		ProCredit close in 2010	**ProCredit not close in 2010**	**Difference in Difference**
Retail bank close	**all households**	0.455***	0.145***	0.310***
		(0.035)	(0.041)	(0.053)
		(N=279)	(N=255)	(N=534)

Panel B. Distance threshold: 20km

		ProCredit close in 2010	**ProCredit not close in 2010**	**Difference in Difference**
Retail bank close	**all households**	0.359***	-0.045	0.405***
		(0.034)	(0.053)	(0.068)
		(N=370)	(N=111)	(N=481)