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F. ALLEN - E. CARLETTI - R. CULL - J."QJ" QIAN - L. SENBET - PATRICIO VALENZUELA

FACULTAD DE CIENCIAS FÍSICAS Y MATEMÁTICAS UNIVERSIDAD DE CHILE

Improving Access to Banking: Evidence from Kenya

FRANKLIN ALLEN, ELENA CARLETTI, ROBERT CULL, JUN "QJ" QIAN,
LEMMA SENBET, AND PATRICIO VALENZUELA*

ABSTRACT

Using household surveys and bank penetration data at the district-level in 2006 and 2009, this paper examines the impact of Equity Bank—a leading private commercial bank focusing on microfinance—on the access to banking in Kenya. Unlike other commercial banks in Kenya, Equity Bank pursues distinct branching strategies that target underserved areas and less privileged households. Equity Bank presence has a positive and significant impact on households' use of bank accounts and bank credit, especially for Kenyans with low income, no salaried job and less education, and those that do not own their own home. The findings are robust to using the district-level proportion of people speaking a minority language as an instrument for Equity Bank presence. It appears that Equity Bank's business model—providing financial services to population segments typically ignored by traditional commercial banks and generating sustainable profits in the process—can be a solution to the financial access problem that has hindered the development of inclusive financial sectors in many African countries.

JEL CODES: G2; O1; R2.

KEY WORDS: Equity Bank, bank penetration, bank account, minority language, microfinance.

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I. Introduction

Despite extensive economic and financial sector reforms over the last few decades, many Sub-Saharan African countries still face a severe financial development gap relative to not only the advanced economies but other peer developing economies (Allen, Carletti, Cull, Qian, Senbet, and Valenzuela, 2012; ACCQSV). A key obstacle to financial development is access of the disadvantaged to finance, which would promote economic growth at the broadest scales. Recent studies show that in Sub-Saharan Africa over eighty percent of the adult population lacked an account in the early 2000s, well above the world average of fifty percent (Chaia et al., 2011; Honohan, 2008).

The financial development issues cannot be ignored for the African countries in light of the ample empirical evidence for a positive linkage between financial development and economic development (Burgess and Pande, 2005; Levine, 2005; Rajan and Zingales, 1998) and of the widespread poverty in Africa. The positive relationship between financial development and economic development is in fact suggestive of a positive linkage between finance and poverty alleviation (Beck, Demirguc-Kunt and Levine, 2007; Clarke, Xu and Zhou, 2006).

The main question is how to spur access to finance, in particular among the disadvantaged. While the success of microfinance institutions (MFIs), such as Grameen Bank, has captured the attention of many economists and policy makers, some MFIs are now beset by non-repayment problems and high cost of financing. Meanwhile, most established commercial banks view the sectors targeted by MFIs as 'unbankable.' In fact, we are only beginning to understand the specific policies and institutions that best promote financial inclusion in environments endowed with asymmetric information, weak institutions and the absence of basic infrastructures necessary for banking. In this paper, we examine bank branch penetration and financial access in Kenya, a country which has made significant strides in financial inclusion and development. The study is important for several reasons. *First,* Kenya has experienced a significant bank branch expansion in recent years, but it is still characterized by an important latent demand for banking services (Dupas et al., 2012). Although informal savings mechanisms, such as rotating savings and credit groups (so-called ROSCAs) and savings in livestock are still prevalent, even rural poor respondents mention 'a commercial bank' as their preferred saving mechanism if they had access to all the alternatives. With robust economic growth it is not surprising to witness a strong bank branch expansion in recent years.

Second, Kenya provides an interesting 'laboratory' for financial access, given the emergence of Equity Bank, a pioneering institution that devised a banking service strategy targeting low income clients and traditionally under-served territories. Listed on the Nairobi Stock Exchange, it has no government ownership share and has played a key role in integrating microfinance with formal finance while being profitable in the process. Figure 1 shows that Equity Bank has experienced an explosive growth of its assets and a significant expansion of its banking services, becoming the fifth largest bank in Kenya in terms of share of gross assets and deposits of the whole system. The number of deposit and loan accounts of Equity Bank represents around 50% and 30% of the total number of deposit and loan accounts in Kenya, respectively. Its model is also expanding to other African countries, with Equity Bank ending the year 2010 with 5.4 million clients in Kenya, 474,000 in Uganda and 28,000 in South Sudan.

Third, we overcome the challenge of obtaining micro-level data, merging a new dataset on bank branch penetration of all the commercial banks across all parts of Kenya with nationally representative household surveys of financial usage conducted by the Financial Sector Deepening Trust of Kenya (FSD Kenya) in 2006 and 2009. This is important given that a major challenge for empirical research on financial access is the paucity of micro-level data, which is useful to address potential endogeneity biases stemming from the nonrandom nature of bank expansion (Burgess and Pande, 2005).

The use of micro-level data within a country has additional benefits. Because institutional and macroeconomic context tends to be more homogeneous within a single country, we avoid obstacles confronted in cross-country studies of financial development and inclusion regarding omitted (or poorly measured) variables. In addition, as emphasized by Beck et al. (2007), country-level measures of financial outreach assume a uniform distribution of bank outlets within a country's various areas and across its population, ignoring that bank branches are concentrated in urban areas and that bank expansions tend to target specific segments of the population.

We study two related questions. Do different types of banks pursue different branching strategies? And if so, do these different expansion strategies lead to different effects on households' access to banking services? In our *first* main set of results, we find that Equity Bank pursues different branching strategies from other banks. While banks of all ownership types (including Equity Bank) opened a greater number of branches in urban, highly populated and English speaking districts,

Equity Bank was more likely to expand to underserved districts than other types of banks between 2006 and 2009.

In our *second* main set of results, we find that the presence of Equity Bank branches has a strong positive impact on the residents' likelihood of having access to both bank accounts and credit. For example, our regressions imply that the penetration of Equity Bank into a new district increases the probability of a household having a bank account between 4 and 9 percentage points. Since the proportion of households that had a bank account rose from 14 percent in 2006 to 23 percent in 2009, the impact of Equity Bank on financial access appears to be economically meaningful. The positive effect of Equity Bank on financial access is particularly strong for individuals with low income and less education, without their own permanent house, and without a salaried job. These findings support the argument that the business model of Equity Bank, which targets underprivileged segments of the population *and* bring in sustainable profits, has paid off in terms of greater financial inclusion.

We also find that the presence of domestic private banks (including Equity Bank), government banks and foreign banks is positively related to use of bank accounts at the district level. Interestingly, the positive impact of the foreign banks is the smallest among the three groups of banks. A potential explanation for these differences is that foreign banks traditionally have targeted the high-income segment of the population. These strategies are reflected in the differential requirements for opening a bank account. For instance, Equity Bank only requires an ID and a photo (which can be taken in a bank branch) to open a bank account. By contrast, foreign banks, such as Barclays, require a minimum balance of 20,000 Ksh. (about US$ 222), a prohibitive amount for the lowest-income segment of the population.

We undertake a number of steps to ensure that our main results are not driven by alternative factors and potential endogeneity biases. We include individual and household characteristics to control for potential changes in (survey) sample composition between 2006 and 2009, and district fixed effects to control for time-invariant district characteristics. We also include the number of bank branches, which can be viewed as a parsimonious control for time-varying district characteristics, such as economic development and bank competition. The most important, potential endogeneity bias stems from the fact that banks' branch penetration is not a random event. In fact, we show that between 2006 and 2009 Equity Bank shifted its branching policy moving more toward less

developed districts as compared to other banks. We exploit this policy shift and use the district-level proportion of people speaking a minority language (*not* English or Swahili) as an instrument for Equity Bank presence. Importantly, the fraction of people from a *district* speaking a particular language should *not* be directly linked to whether a particular *individual* (who may speak the same or different language) has access to a bank account. Indeed, our tests confirm the validity of this instrument, and our instrumental variables (IV) regressions (Probit and GMM) confirm the positive and significant impact of Equity Bank presence on households' access to financial services.

This paper extends the emerging literature on financial access and inclusion in developing economies as well as contemporaneous studies that focus on Kenya. Several papers have recently attempted to identify policies, services, and innovations that have a causal impact on financial inclusion through experiments based on randomized controlled trials (RCTs) conducted in developing countries.[1] While RCTs represent an important breakthrough in the study of financial inclusion (and other topics in development economics), they may carry some limitations: sample sizes are small, contexts differ, and small variations in experimental design can affect results (Ravallion, 2009). Thus, assessing the external validity of results generated in a specific experimental setting is a thorny issue in developing policy advice. Moreover, important developments in financial inclusion, such as the one studied in this paper, are taking place without the aid of experiments and are not amenable to study via randomization. We, therefore, view our nationally-representative evidence on branch penetration and financial access as complementary to the experimental evidence from RCTs, which usually focuses on a small set of communities.[2]

Our study is closest to Burgess and Pande (2005) and Bruhn and Love (2009). Using state-level data and exploiting a shift in the branch licensing policy in India, Burgess and Pande (2005) investigate the impact of access to banking services. They find that bank branch expansion lowered rural poverty, and increased non-agricultural output. Bruhn and Love (2009) show that the entry of Mexico's Banco Azteca, which opened branches in the stores of Grupo Elecktra, a large retailer of consumer goods, in 2002, was associated with an increase in the start-up of small businesses and a 7

[1] Some recent papers using RCTs to study the impact of financial inclusion in developing economies are Banerjee et al. (2010), Brune et al. (2011), Dupas and Robinson (2009), Dupas et al. (2012), and Karlan and Zimmerman (2010, 2011).

[2] Our paper also expands international evidence on the determinants of access to financial services in less developed economies. Using survey data for 29,000 households from 29 transition economies, Beck and Brown (2011) investigate how access to financial services is related to household characteristics, bank ownership structure and the development of the financial infrastructure. Beck et al. (2010) and Beck et al. (2011) also use the same surveys that we do to describe aspects of financial inclusion in Kenya.

percent increase in income levels. The Kenyan episode that we investigate lacks the quasi-experimental characteristics of the Azteca study, because the increase in bank branch penetration was not random. However, the sheer magnitude of the increase in financial sector participation makes this an episode worthy of study. Moreover, similar in spirit to Burgess and Pande (2005), we exploit a shift in a bank branching strategy and use an IV approach to mitigate the potential endogeneity problems emerging from nonrandom branch expansions.

In addition to the emergence of Equity Bank, the Kenyan financial landscape has witnessed another innovation over the last decade that has gained global attention: the introduction of M-PESA, which operates through mobile telephones and greatly facilitates money transfer and remittance by the poor. With the same household surveys that we use, Mbiti and Weil (2011) show that M-PESA is primarily used for transferring money from individual to individual rather than as a vehicle for saving, and that its use increases the probability of being banked. M-PESA can, therefore, be seen as being complementary to the fuller set of financial services offered by large financial institutions, especially Equity Bank.

The remainder of the paper is organized as follows. Sections II and III describe the data and the methodologies, respectively. Section IV presents the empirical results stemming from baseline specifications and Instrumental Variables (IV) analyses, and a set of robustness checks and a discussion of those results. Finally, Section V concludes.

II. Data

Our dataset on bank presence is based on branch-level information that we aggregate to construct a district-level panel on the number of branches by bank. This data was constructed from multiple sources, including phone calls, official websites, banks' annual reports and government publications. The panel data set covers 45 commercial banks that operated in 65 Kenyan districts in the period between 2006 and 2009. This new dataset allows us to explore the relationship between bank expansion and access to banking services over time and to exploit within-district variation in bank presence.[3] In addition, this dataset set allows us to characterize the expansion of the whole banking

[3] Although Kenya is currently divided into 46 districts, we take advantage of a more disaggregated country division as of the 1999 census. In that census, Kenya comprised eight provinces (Central Coast, Eastern, Nairobi, North Eastern, Nyanza, Rift Valley, and Western) that were subdivided into 69 districts; the survey data cover 65 of those districts.

system as well as the expansion of specific banks (e.g., Equity Bank) and ownership characteristics of banks (e.g., private domestic banks, foreign banks and government banks).

As shown in Table 1, the Kenyan banking system expanded greatly in terms of the number of branches in recent years. Between 2006 and 2009, the total number of bank branches in Kenya increased from almost 600 to almost 1,000 (a 68 percent increase). The expansion involved all ownership categories of banks, especially domestic private banks, among which Equity Bank played an important role. The number of Equity Bank's branches increased from 44 to over 110 in the period 2006-2009, representing an expansion of 155 percent. No other bank experienced such expansion, in terms of the number of branches, in the same period. The number of bank branches of Barclays and Kenya Commercial Bank (i.e., the banks with the largest branch networks together with Equity Bank) grew only 92 percent and 44 percent, respectively. As Table 2 shows, the strong branch expansion in Kenya occurred not only in urban districts but also in rural, arid and semi-arid districts.

Our data on bank branches across districts is augmented by the FinAccess' households surveys. The 2006 surveys consist of 4,420 completed interviews, while the 2009 surveys consist of 6,598 completed interviews. The sample was constructed using a stratified three-stage design. In the first stage, the number of households to be allocated to each district was assigned. In the second stage, clusters were randomly selected from the district with each cluster comprising an equal sample of 10 households. Finally, in the third stage, individuals within the household were randomly selected based on a listing of all household members aged 16 years and above, using the Kish Grid-diagram.[4]

We use the FinAccess surveys in our analysis for a number of reasons. *First*, it captures important dimensions of financial inclusion as it was specifically designed to measure access to financial services in Kenya. *Second,* it also provides information on individual and household characteristics, such as education level, gender, asset ownership, income source, age group, language, location and household size. *Third,* it is a nationally representative household survey that covers the universe of districts in Kenya, alleviating potential sample selection bias problems. *Fourth,* its implementation over different years allows us to explore the within-district time variation in financial inclusion.

[4] The Kish Grid-diagram is a method that uses a pre-assigned table of random numbers for selecting individuals within a household to be interviewed.

Based on the surveys, we construct two measures of access to banking services. The first measure is a dummy variable indicating whether an individual has a bank account. The second is another dummy indicating whether an individual has a loan from a bank. Table 3 shows that the proportion of individuals having a bank account in Kenya increased considerably in the sample period, going from 14 percent in 2006 to almost 23 percent in 2009. The proportion of individuals having a loan from a bank showed a more modest increase from 3 percent to 4 percent. While 95 percent of the individuals that had a loan from a bank also had a bank account, the remaining 5 percent did not. Table 3 also reports descriptive statistics for the other individual and household-level variables that we employ from the FinAccess survey, and these will be used as controls in our tests below.

III. Methodologies

With data on bank branching and household surveys, we examine two related questions. Does Equity Bank pursue different branching strategies from other commercial banks in Kenya? And if so, do these different expansion strategies lead to different outcomes on households' access to banking services? For the first question, we relate the number of branches by districts to a number of district-level characteristics. Our baseline specification takes the form:

$$Branches_{dt} = \alpha + \mu_t + \beta X_d + \varepsilon_{dt}, \qquad (1)$$

where *Branches* is the number of bank branches in district *d* at time *t* for Equity Bank; for other banks it is the number of branches over the total number of banks in each group (based on ownership types) in district *d* at time *t,* to put them on a comparable basis with Equity Bank branches at the district level. μ_t is a dummy variable for 2009, and X_d is a set of district level control variables for 2006; these variables indicate whether the district is a rural or arid and semi-arid district, the population density of the district and the proportion of the population speaking a minority language or Swahili. We estimate this model by ordinary least square (OLS), and cluster standard errors by district for four types of banks: foreign (private) banks, government-owned and government-influenced banks, domestic private banks (*excluding* Equity Bank) and Equity Bank. Furthermore, to explore if the branch expansion of Equity Bank between 2006 and 2009 targeted more under-served districts, we augment our baseline specification with an interaction term between the district level proportion of people speaking a minority language and the 2009 indicator.

In order to study the second question, we estimate a Probit model of access to banking services. The dependent variable, $Bank_{idt}$, is a dummy indicating whether household *i* has a bank account in district *d* at the time *t*. Our main independent variables are, $Equity_{dt}$, a dummy variable indicating whether Equity Bank operates in district *d* at time *t*, and, $Branches_{dt}$, the total number of bank branches of *other* banks operating in district *d* at time *t*. The total number of bank branches can be viewed as a parsimonious control for time-varying district characteristics, such as economic development and bank competition.[5] The inclusion of this variable is fundamental to our identification strategy, given the nonrandom nature of bank expansion in which banks favored opening branches in more developed districts. All specifications include district fixed effects to control for time-invariant district heterogeneity. Thus, our baseline specification takes the form:

$$\Pr(Bank_{idt} = 1) = F(\alpha + \mu_d + \beta\, Equity_{dt} + \gamma\, Branches_{dt} + \phi\, z_{idt}), \qquad (2)$$

where Pr denotes probability, F is the standard normal cumulative distribution function, μ_d is a set of district dummies, and z_{idt} is a vector of control variables at the individual and household level. They indicate household size, education, gender, wealth (measured by an asset score), house ownership, type of job, age and language.[6] The parameters α, β, γ and ϕ are estimated by maximum likelihood, with error terms clustered at the district-year level to account for possible correlations in errors across households within districts for each specific year. We also augment our baseline regression with a time (2009) dummy and its interaction with $Equity_{dt}$ to test whether the impact of Equity Bank is part of a general trend or not.

However, Eq. (2) may still produce biased estimates of the impact of bank penetration on financial access due to potential endogeneity concerns. The source of endogeneity is that bank branch expansion is not a random event. More specifically, in the absence of a policy shift in Equity Bank's branch penetration, we would expect relatively greater branch penetration in more developed districts or in districts with more growth opportunities, as more growth and growth opportunities generate more *demand* for financial services. There can be greater demand for financial services even without organic growth in a region: for example, households in the region would like to use bank branches to receive remittances from their relatives working outside Kenya. To summarize, if

[5] Note that our results are very similar whether or not we include Equity Bank's branches in the calculation of the total number of branches.

[6] The asset score is higher if the individual owns a greater number of physical assets such as a mobile phone, television, or microwave. There are 20 asset categories and the ownership of each of them increases the asset score by one.

districts with more demand (or future demand) for financial services are more likely to provide access to finance, then β would be an *overestimate* of the true impact of Equity Bank branch expansion. That is, Equity Bank's presence could be more a feature of a relatively developed banking district than a cause of greater uptake of accounts. On the other hand, if Equity Bank succeeded in its policy of opening more branches in less developed districts or districts with less (perceived) growth opportunities than other banks, then the same logic above suggests that β would underestimate the true impact of Equity Bank branch expansion.

In order to alleviate the above endogeneity problems, we rerun our baseline regressions on the probability of having a bank account using an Instrumental Variables (IV) approach. Our goal is to identify the increase in bank accounts that occurred because of Equity Bank's shift in branching strategy. Specifically, we use the district-level proportion of people speaking a minority language (*not* English or Swahili) and its interaction with a 2009 dummy variable as instruments for Equity Bank branch expansion. These instruments are based on the fact that Equity Bank implemented a strategy of serving more vulnerable sectors of the population and underdeveloped areas from 2006 to 2009, and of speaking to clients in their native tongue.

District-level proportions of people speaking a minority language constitute valid instruments for Equity Bank branch expansion if these variables only affect the probability of having a bank account through bank expansion. It is reasonable to argue that the fraction of people from a district speaking a particular language should not be *directly* linked to whether a particular individual or household has access to a bank account, which is our outcome variable. However, it is important to note that this assumption does *not* imply that the language that an *individual* speaks is not an important determinant of having a bank account. In fact, we control in all our specifications for individual languages. With the instruments, we then estimate Eq. (2) with both an IV (linear) GMM model and an IV Probit model. With this empirical strategy, we try to identify the increase in account uptake that is attributable to Equity Bank's unique approach to attracting clients.

Next, we augment our baseline specification with interaction terms between $Equity_{dt}$ and a set of characteristics at the individual level (i.e., wealth, house ownership, education and type of job) to examine potential heterogeneities in the impact of Equity Bank presence on access to financial services. These heterogeneities allow us to assess whether Equity Bank has effectively increased

access to financial services by the poor and low income people and hence fostered financial inclusion of the disadvantaged.

We also examine the impact of Equity Bank presence on financial inclusion by estimating an Ordered Probit model of the usage of banking services. In this model, our dependent variable takes the value "0" when the individual has neither a bank account nor a loan from a bank, the value "1" when the individual has a bank account, and the value "2" when the individual has a loan from a bank.[7] Similar to our Probit model in Eq. (2), our main explanatory variables are $Equity_{dt}$ and $Branches_{dt}$.

Finally, as an additional robustness check, we apply a Difference-in-Differences (DD) estimation strategy to recover the treatment effect stemming from the possible shift of the Equity Bank branching policy that produced a sharp change in its penetration (see Table 1). Our exercise compares the difference in the probability of having a bank account before and after the entry of Equity Bank for districts affected by this branch expansion with the same difference for unaffected districts. In order to conduct our DD estimations, we restrict our sample to districts *without* any Equity Bank branch in 2006 and include time-fixed effects. Districts without any Equity Bank branch in 2006 and 2009 represent the control group and districts without an Equity Bank branch in 2006 but with at least one branch of Equity Bank in 2009 represent the treatment group. Using this subsample of districts, our specification takes the following form:

$$\Pr(Bank_{idt}=1) = F(\alpha + \mu_d + \mu_t + \beta\, Equity_{dt} + \gamma\, Branches_{dt} + \phi\, z_{idt}), \qquad (3)$$

where μ_t is a time dummy variable. This specification is the most basic DD setup (with two periods and two groups), which is valid under the assumption that changes in the probability of having a bank account over time would have been the same in individuals in both treatment and control districts in the absence of Equity Bank penetration.

IV. Empirical Results

The primary goal is to establish evidence that the supply-side factors as represented by the expansion of bank branches, and in particular of Equity Bank, has increased access to financial

[7] Note that 95.2 percent of the individuals who have a loan from a bank also have a bank account.

services. To do this, we first examine the branching strategies followed by Equity Bank and other banks in Kenya, and the results are reported in Table 4. Then, we evaluate the impact of Equity Bank presence and bank branch expansion on the use of bank accounts, and report the results in Tables 5 to 7. Tables 8 to 11 report additional results and robustness checks.

IV.1 Banks' Expansion Strategies

Different types of banks are likely to follow different expansion strategies. While foreign banks may cherry-pick a set of elite customers and prefer urban and developed areas, domestic banks may exploit their superior knowledge of culture, social norms, and local communities and have a comparative advantage in rural and underdeveloped areas. For example, as part of its expansion strategy, Equity Bank emphasized that local languages be spoken in its branches, which is important considering that 30-40 percent of the people in central Kenya cannot speak Swahili and only speak a minority language. In addition, government-owned banks may pursue non-profit goals in their branching and expansions.

As a first exploration of this issue, Figure 2 presents the number of bank branches in 2006 and 2009 for three bank groups: foreign (private) banks, government-owned and government-influenced banks, and domestic private banks.[8] The figure also splits the districts along different dimensions in terms of urbanization and demographics. The figure illustrates three stylized facts. *First*, between 2006 and 2009 all bank groups undertook substantial branch expansions. *Second,* all bank groups showed a higher penetration in urban, English speaking, and highly populated and educated districts. *Third*, domestic private banks had greater presence, in terms of branch numbers, in underdeveloped districts, while foreign banks had the least presence in those districts. These patterns suggest that domestic private banks, whose expansion has been led by Equity Bank (see Table 1), played a vital role in fostering banking services in underdeveloped districts.

The foregoing stylized facts motivate our formal estimation and analysis of the determinants of bank penetration in Kenya. Table 4 reports OLS estimates on the determinants of bank penetration by district (Eq. 1), comparing Equity Bank with all three groups of other banks (by their ownership structure) in the banking system. The dependent variable for regressions on Equity Bank is the

[8] Government-owned banks are those in which the government owns a majority of shares. In the (two) government-influenced banks the government maintains a large, but non-controlling ownership share. Throughout most of the paper, we refer to both groups collectively as "government banks."

number of branches by district. For other groups of banks, we divided the number of branches in a district by the number of banks in the group, to put them on a comparable basis with Equity Bank branches at the district level. Our independent variables indicate the degree of urbanization, the population density of the district and the proportion of non-English speaking Kenyans. In addition, we include a dummy variable for 2009 in order to explore the extent of branch expansion during the period 2006-2009.

The results suggest some similarities, as well as some disparities, between Equity Bank and the others in terms of their branching strategies. On the one hand, all types of banks including Equity Bank have greater branch penetration in urban and English speaking districts (Models 1 to 4). On the other hand, Equity Bank differs on several dimensions. *First,* the coefficients associated with rural and arid and semi-arid districts are either statistically insignificant or marginally significant at standard confidence levels for Equity Bank, while they are negative and highly significant for the other banks. *Second,* the expansion of Equity Bank, as indicated by the positive coefficient on the 2009 dummy variable, is highly significant. That coefficient is also significant for the rest of the banking system, but its size is only one-tenth to one-fifth that of the coefficient for Equity Bank. *Third*, the sensitivity of branch penetration to population density is lower for Equity Bank than for others. In fact, the coefficient for population density is negative and highly significant for Equity Bank in Model 4, indicating a preference for less densely populated districts (other factors held constant). This coefficient is also negative for other banks, but is not significant or only marginally significant. *Fourth*, the intercept/constant of the regression models remains much larger for Equity Bank's branching than for other bank types. This shows Equity Bank's greater general tendency to open branches regardless of district characteristics. Overall, the results in Models 1 to 4 suggest that Equity Bank has experienced a significant branch expansion relative to other banks between 2006 and 2009, particularly in underdeveloped non-urban districts.

The sensitivity of branch penetration to population density is particularly interesting in view of the African financial development gap observed at a macro level (ACCQSV, 2012). One of the major findings is that population density appears to be more important for banking sector development as measured by liquid liabilities and private credit (relative to GDP) in Africa than in other developing countries. More specifically, while population density affects financial development in all developing countries, the relationship is much steeper for Africa. It is challenging to resolve the African

financial development gap, but the evidence on Equity Bank is encouraging, since it points to the potential for financial institutions with novel strategies to foster financial inclusion and help promote convergence of the African financial development model with the rest of the developing world.

One component of Equity Bank's expansion strategy has been to target the segment of the population speaking local languages. There are two ways of doing this. The first one is penetrating districts characterized by a high proportion of the people speaking minority languages. The second way is to use minority language in the branches. We start by exploring whether Equity Bank has moved more than other banks to districts in which English or Swahili is not the predominant language.

By interacting the district-level proportion of people speaking Swahili or minority languages with the 2009 dummy variable, we get a better sense of the types of districts that Equity Bank was entering between 2006 and 2009. The interactions between the 2009 dummy variable and the language variables are positive and significant (Model 8). While the negative coefficients for minority dialects and Swahili speakers are larger (in absolute value) than the coefficients on the interactions, the positive coefficients on the interactions do indicate that Equity Bank moved toward serving non-English speakers from 2006 to 2009. A similar pattern holds for non-Equity Bank branches (Models 5 to 7), but: (a) the coefficients on the interactions between minority language and the 2009 dummy are not significant, (b) the coefficients on the interactions between Swahili and the 2009 dummy are much smaller than for Equity Bank, and (c) the ratio of the (absolute value of the) coefficient for the language dummies to the coefficient for the interactions is much larger for the non-Equity Bank sample. Therefore, it appears that Equity Bank moved *more* toward minority-language speakers than other banks between 2006 and 2009.

Thus, the overall evidence from Table 4 suggests that Equity Bank's branching strategies are distinct from those of other banks; such branching patterns suggest that Equity Bank was promoting financial inclusion during the period of 2006-2009.

IV.2 Bank Penetration and Financial Access: A Closer Look at Equity Bank

Our previous results suggest that Equity Bank has pursued different branching strategies from other commercial banks. Our next step is to explore whether its expansion strategy has led to different

effects on households' access to banking services. Table 5 reports the marginal effects when estimating our baseline Probit model of households' access to banking services (Eq. 2) by maximum likelihood with standard errors clustered by district and year (see Petersen, 2009). We report first a regression with individual/household characteristics, district level bank branch expansion by other banks and district fixed effects (Model 1). Next, we differentiate banks by their ownership structure (i.e. foreign banks, government banks and domestic private banks). We run these regressions with and without the dummy variable associated with Equity Bank presence (Models 2 and 3); note that the domestic banks category includes Equity Bank in those models. Finally, instead of using an indicator denoting the presence of a certain type of bank, we use the number of branches for each bank ownership type. Again, we run these regressions with and without the dummy variable associated with Equity Bank presence (Models 4 and 5), and again, the domestic banks' branches include those of Equity Bank.

Table 5 shows, *first,* that the presence of Equity Bank in a specific district is strongly positively related to the residents' probability of having a bank account, which goes beyond the effect of bank expansion and presence of other commercial banks (Models 1, 3 and 5). This effect is highly statistically significant regardless of the model specification. The coefficient in Model 1 suggests that the penetration of Equity Bank in a new district increases the probability of having a bank account by roughly 4 percentage points after controlling for the total number of other banks' branches. Model 3 also suggests that the impact of the presence of Equity Bank in a specific district goes beyond the impact of the presence of a standard domestic bank by around 2 percentage points. As noted, according to the FinAccess survey, the proportion of people having a bank account in Kenya was 14 percent in 2006 and 23 percent in 2009. Therefore, the magnitude associated with Equity Bank presence on financial access is also economically meaningful. This finding is consistent with the notion that the business model of Equity Bank, which targeted middle- and low-income segments of the population using such strategies as the local language requirement in its branches, has paid off in terms of greater financial inclusion.

Second, we find that the presence of domestic private banks (including Equity Bank), government banks or foreign banks all have a positive impact on access to bank accounts at the district level (Model 2). However, we find a hierarchy in the effects of different types of banks: the effect of foreign banks is 2.5 percent (and statistically insignificant), the effect of government banks is 3

percent, and the effect of domestic private banks is 4 percent. A potential explanation for these differences is that while domestic private banks have followed a strategy of targeting all segments of the population, foreign banks traditionally have targeted the high-income segment of the population. This is consistent with the finding in Beck and Brown (2011) that foreign banks may cherry-pick their clients among households in transition economies. These strategies are also reflected in the differential requirements for opening a bank account.

Third, the number of bank branches by district, a measure of banking sector outreach and competition, appears to be an important determinant of usage of banking services. The coefficient on the total number of bank branches is positive and highly statistically significant (Model 1). Perhaps surprisingly, the results suggest that the positive impact of a new branch is marginally stronger for foreign banks (Models 4 and 5).

Most of the control variables come in significantly in the expected directions. For example, individuals with large families and with no knowledge of English are less likely to have a bank account, while education, wealth (measured by an asset score), house ownership, age and income stability (i.e. salaried workers) are positively related to having a bank account. The overall fit of our model is good, with the Pseudo R^2 around 0.33 in all specifications.[9]

In Table 6, we test whether Equity Bank had a unique impact on the probability of having a bank account or whether the Equity Bank presence dummy variable is just picking up the effect of a larger (country-level) trend on bank expansion. Thus, Table 6 augments our main baseline regression (in Table 5) with a 2009 dummy and with its interaction with the bank penetration variables. Model 1 shows a systemic component increasing (of 6.4 percent), on average, a household´s probability of having a bank account in Kenya between 2006 and 2009. However, as shown in Models 2 to 4, the positive and highly significant coefficients on the interaction between Equity Bank presence and the 2009 dummy, and the insignificant coefficients on the other interaction terms as well as the 2009 dummy, suggest that the increased probability of having a bank account is mainly driven by the expansion of Equity Bank between 2006 and 2009.

[9] These results are also consistent with international evidence on the determinants of the use of bank services. See, for example, Beck and Brown (2011).

IV.3 Addressing Potential Endogeneity Problems

As discussed earlier, there are potential endogeneity problems arising from non-random bank branch expansion. We use an IV approach to address the endogeneity issue. Table 7 reports the results from our two-stage IV procedures; the instruments are the proportion of people speaking a minority language (not English or Swahili) in a given district and its interaction with the 2009 dummy. The appropriateness of our instruments is based on our previous results showing that the proportion of people speaking a minority language is directly associated with the penetration strategy of Equity Bank (Table 4), and the reasonable assumption that this variable does not directly affect the individuals´ likelihood of having a bank account. It is important to note that this assumption does not contradict that the language spoken for a specific individual can be an important determinant of her/his own probability of having access to banking services. In fact, all our regressions control for languages at the individual level.

We estimate IV GMM and IV Probit models for our baseline regression reported in Model 1 of Table 5.[10] The results from the second-stage (Models 1, 3 and 4 of Table 7) indicate that the impact of Equity Bank presence on the probability of having a bank account remains positive and highly statistically significant. The main difference with our baseline Probit estimator is that the magnitude of the coefficient increases from 0.04 (Table 5, Model 1) to 0.09 (Table 7, Models 1 and 3), which suggests an attenuation bias in our baseline Probit estimates. This is consistent with the premise that, if more underdeveloped districts are less effective at providing access to finance, the baseline Probit estimates would underestimate the true impact of Equity Bank branch expansion.

The results from the first-stage (Columns 2 and 5) suggest that Equity Bank altered its branching policy in the period 2006-2009. The negative coefficient on the district-level proportion of people speaking minority languages and the positive coefficient on the interaction between people speaking minority languages and a 2009 dummy variable suggest that Equity Bank moved toward serving more clients who speak a minority language. These results are similar to the ones obtained from Table 4 that indicates that Equity Bank moved toward serving minority language speaking districts. Table 7 also presents the *p*-values for the Partial R-squared of excluded instruments and Hansen's *J* test of over-identifying restrictions (Baum, Schaffer and Stillman, 2003). The *R*-squared of the

[10] In unreported regressions, we also conduct our IV approach for all of our specifications. The main results in this paper remain qualitatively unchanged regardless of the specification that we choose.

excluded instruments indicates that the instruments and endogenous variables are correlated, even after netting out the effects of all other exogenous variables. In addition, the *J* test cannot reject the null hypothesis that all the instruments are valid. These results are consistent with the validity of the instruments for Equity Bank's branching strategies. Overall, the results in Table 7 suggest that the positive impact of Equity Bank on access to banking services is robust to controlling for potential endogeneity bias.

IV.4 Some Extensions

a. Who Benefits from Banking Services?: The Case of Equity Bank

Until now we have presented evidence consistent with the propositions that Equity Bank's branch strategy has targeted under-served geographic areas and had a substantial impact on access to banking services in Kenya. Specifically, the results in our previous sections suggest that Kenyans residing in districts in which Equity Bank started operations have a higher probability of having a bank account. Since Equity Bank's business model is based, at least in part, on providing financial services to the rural poor, we would expect the impact of its presence to be stronger for the underprivileged segments of the population (in terms of physical and human capital and income stability).

With this idea in mind, Table 8 explores potential heterogeneities in the impact of Equity Bank presence on the probability of having a bank account. In particular, Models 1 to 4 augment our baseline regression in Table 5, Model 1 with four interaction terms respectively: the interaction of the Equity Bank presence dummy with a score for the ownership of a set of physical assets, a dummy indicating if the individual is a homeowner, a dummy indicating whether the individual has a secondary and/or tertiary education level and a dummy indicating whether the individual has a salaried job. All the coefficients associated with the interactions terms have a negative sign and are highly significant, suggesting that the impact of Equity Bank on access to banking services is, indeed, heterogeneous across individuals with different characteristics. It is stronger for Kenyans with less wealth, without own permanent house, without secondary and/or tertiary education and without a salaried job. Therefore, these results are consistent with Equity Bank's mission of extending financial services to the population segments generally ignored by traditional commercial banks. Finally, it is worth noting that all the main results and the signs of the coefficients associated with the new

interaction terms remain unchanged when all the interactions terms are included at the same time (Model 5).

In order to ensure that the interactions terms are not picking up the effects of a general bank expansion, we augment the specifications reported in Table 8 with new terms corresponding to the interactions between dummy variables indicating the presence of foreign banks, government banks and domestic banks (including Equity Bank) and the individual characteristics used in the interactions terms in Table 8. The results from unreported regressions indicate that our previous results are robust to the inclusion of the new interaction terms. On the one hand, the coefficients associated to the interactions between Equity Bank presence and individual/household characteristics remain qualitatively unchanged in eleven of our twelve new specifications. On the other hand, all coefficients associated with the new interaction terms (with the exception of one coefficient) are not statistically significant suggesting that the heterogeneous impact of Equity Bank is not necessarily part of a general trend in the banking system in Kenya.

b. Access to Credit

We expand our baseline results to consider the impact of Equity Bank presence and bank penetration on the probability of having a loan from a bank. Table 9 reports the coefficients and marginal effects from an Ordered Probit model of usage of banking services. Our dependent variable takes the value "0" if the individual has neither a bank account nor a loan from a bank, the value "1" if the individual has a bank account, and the value "2" if the individual has a loan from a bank. The results indicate that Equity Bank presence increases the probability of both having a bank account (Model 3) and a bank loan (Model 4). In line with our baseline results in Table 5, Equity Bank presence increases by almost 4 percentage points the probability of having a bank account, and by 1 percentage point the probability of having a bank loan.

IV.5 Robustness Checks

a. Rural and Arid and Semi-Arid Districts

Since bank expansions are likely to be nonrandom with banks favoring opening branches in more developed urban areas, we replicate our main results *excluding* urban districts (i.e., Nairobi and Mombasa) from the sample to ensure that the higher degree of development does not bias the

results. These regressions are reported in Table 10. The results remain qualitatively unchanged, with the impact of Equity Bank's presence on the probability of having a bank account still positive and highly statistically significant, though somewhat smaller than in our baseline results. However, given that the share of the population with bank accounts tends to be much lower outside Nairobi and Mombasa, the 2-3 percentage point increase in bank account usage in rural and arid and semi-arid districts still indicates a substantial impact of Equity Bank branching.

b. Difference-in-Differences Estimator

Table 11 presents the results from our difference-in-differences estimator for the probability of having a bank account. This table replicates the specifications in Models 1, 3 and 5 in Table 5, using only a subsample of districts *without* the presence of Equity Bank in 2006 and *including* time fixed effects in our baseline specification. Therefore, the coefficients reported in the table indicate the change in the probability of having a bank account in districts where Equity Bank started operations between 2006 and 2009 relative to districts without Equity Bank presence during the same period. The results suggest that the impact of the penetration of Equity Bank in a new district on the probability of having a bank account remains positive and highly statistically significant. The main difference with our baseline results is that the magnitude of the impact decreases slightly from 4 percentage points (Model 1 in Table 5) to 3 (Model 1 in Table 11) percentage points.[11]

IV.6 Interpretations and Limitations

A potential concern regarding the interpretation of our results is that Equity Bank might not have actively pursued financial inclusion by entering underdeveloped areas. Rather, our main result could be accounted for by either demand side factors (e.g., more developed areas have more demand for financial services) or by Equity Bank's anticipation of growth opportunities in certain areas that they hope to capture by opening new branches ahead of other banks. We note that even if such alternative interpretations hold, Equity Bank seems to have seized upon these opportunities more quickly than other banks and, regardless of Equity Bank's motivation, the end result has been greater financial inclusion.

[11] Again, smaller impact outside urban areas is partly driven by the low base usage rates in the districts included in the difference-in-differences analysis.

Throughout the paper we have also provided a series of checks to help rule out competing interpretations. *First,* we employ the IV approach to address the nonrandom branching decisions of Equity Bank with instruments that capture differences in branching strategies between Equity and other banks; we continue to find similar (in fact, stronger) results. *Second,* we find that Equity Bank presence not only increased the likelihood of a household having a bank account, but also the chances of obtaining a loan from a bank (though the effect on this latter banking service is weaker, as fractions of households having bank loans remain low in most underdeveloped areas).

We have limited ourselves to the question of whether Equity Bank's branch expansion led to greater financial inclusion. We acknowledge, however, that provision of financial services on the scale of Equity Bank raises a host of additional issues that we do not address. For example, having over half of all bank accounts in a country in the hands of a single institution could raise concerns about the stability of the Kenyan banking system. While the bank accounts are individually small, they are vital to account owners with limited means. Such a concentration of bank accounts is likely to pose challenges for the deposit insurance system. Even if the system has the funds to cover a potential Equity Bank failure, any delay in accessing deposits by account owners as the failure is resolved poses its own set of stability issues.

Equity Bank's expansion into other countries also raises the possibility that poor financial performance in other markets could jeopardize the safety of Kenyans' deposits. Encouraging competition for this market segment could help alleviate concerns about the concentration of deposits and accounts, but it raises additional issues. For example, it seems competition among micro-lenders in Andhra Pradesh and the over-indebtedness of many poor borrowers has contributed to the recent instability in Indian microfinance. All of these issues are worthy of investigation, but we leave this to future research.

This also leads to the question of what is the role of financial inclusion in promoting economic growth. Simply expanding banking services to poor areas and population does *not* guarantee that the funds will be used properly (e.g., in spawning entrepreneurial activities) and loans repaid. This has been shown by the uneven successes of many microfinance institutions in developing countries. To this point, the gains in financial inclusion spurred by Equity Bank have focused primarily on bank accounts. In the future, however, it seems likely that provision of credit on a wider scale will be more lucrative than expanding provision of savings services. Although Equity Bank has been

financially successful thus far (as reflected in their books and stock performance), it remains to be seen whether the bank's model is sustainable over the long term and whether it can be applied successfully in other African countries.

V. Conclusions

Most Sub-Saharan African countries face a financial development gap relative to other peer developing economies. A key obstacle to financial development is the access of the unprivileged segments of the population to finance, which would promote economic growth at the broadest scale. In view of the important role of financial inclusion in developing countries, in this paper we study the expansion strategies of Equity Bank and its impact on access to banking services in Kenya.

The experience of Equity Bank in Kenya offers an interesting 'laboratory.' The banking network in Kenya has experienced rapid growth in recent years, expansion that has been led by Equity Bank, a pioneering institution that devised a banking service strategy targeting low income clients and traditionally under-served districts. We find this branch expansion is strongly associated with greater access to banking services and that Equity Bank has had a significant effect in enhancing households' access to bank accounts and bank credit, especially for individuals in a vulnerable condition. These results highlight the importance of institutions, such as Equity Bank, with a business model focused on the provision of financial services to the population segments ignored by traditional commercial banks while generating sustainable profits in the process. Such institutions could be an important part of the solution to the financial access problem that has hindered the development of inclusive financial sectors in many developing countries.

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Table 1
Bank Branches over Time by Bank Name and Ownership Types

This table reports the number of Kenyan bank branches by bank name and ownership types for 2006 and 2009, based on various data sources, including phone calls, official websites, banks' annual reports and government publications.

No	Domestic private banks	2006	2009	Change	% Change
1	African Banking Corporation Ltd.	8	10	2	25
2	CharterHouse Bank Ltd.	10	10	0	0
3	Chase Bank Kenya Ltd.	2	12	10	500
4	City Finance Bank Ltd.	1	1	0	0
5	Commercial Bank of Africa Ltd.	19	20	1	5
6	Co-operative Bank of Kenya Ltd.	52	83	31	60
7	Credit Bank Ltd.	4	5	1	25
8	Diamond Trust Bank of Kenya Ltd.	8	32	24	300
9	Dubai Bank Ltd.	4	4	0	0
10	Equatorial Commercial Bank Ltd.	3	5	2	67
11	Equity Bank	44	112	68	155
12	Fidelity Commercial Bank Ltd.	5	7	2	40
13	FINA Bank Ltd.	6	14	8	133
14	First Community Bank	0	18	18	-
15	Giro Commercial Bank Ltd.	6	8	2	33
16	Guardian Bank Ltd.	6	7	1	17
17	Imperial Bank Ltd.	6	13	7	117
18	Investments and Mortgages	9	17	8	89
19	Middle East Bank Kenya Ltd.	2	3	1	50
20	National Industrial Credit Bank Ltd.	16	16	0	0
21	Oriental Commericial Bank Ltd.	4	8	4	100
22	Paramount Universal Bank Ltd.	4	7	3	75
23	Prime Bank Ltd.	9	14	5	56
24	Southern Credit Banking Corporation Ltd.	9	10	1	11
25	Trans-National Bank Ltd.	9	13	4	44
26	Victoria Commercial Bank Ltd.	1	1	0	0
	Sub-Total	**247**	**450**	**203**	**82**

No	Foreign banks	2006	2009	Change	% Change
1	Bank of Africa Kenya Ltd.	4	10	6	150
2	Bank of Baroda Kenya Ltd.	7	9	2	29
3	Bank of India Ltd.	4	5	1	25
4	Barclays Bank of Kenya Ltd.	62	119	57	92
5	Citibank N.A.	3	4	1	33
6	ECO BANK	9	19	10	111
7	Gulf African Bank Ltd	0	14	14	-
8	Habib Bank A.G. Zurich	4	5	1	25
9	Habib Bank Ltd.	4	4	0	0
10	K-Rep Bank Ltd.	22	30	8	36
11	Standard Chartered Bank Kenya Ltd.	31	35	4	13
12	UBA	0	4	4	-
	Sub-Total	**150**	**258**	**108**	**72**

No	Government and government-influenced banks	2006	2009	Change	% Change
1	CFC Stanbic Bank Ltd.	16	35	19	119
2	Consolidated Bank of Kenya Ltd.	12	13	1	8
3	Development Bank of Kenya Ltd.	1	2	1	100
4	Kenya Commercial Bank Ltd.	117	169	52	44
5	National Bank of Kenya Ltd.	33	43	10	30
	Sub-Total	**179**	**262**	**83**	46
	Total	**576**	**970**	**394**	**68**

Table 2
Descriptive Statistics, District Level

This table reports descriptive statistics at the district level, based on 2006 and 2009 FinAccess household surveys, 1999 Kenyan census; data sources on bank branches include phone calls, official websites, banks' annual reports and government publications.

District	Bank branches (2006)	Bank branches (2009)	Swahili (2006)	Minority Language (2006)	Urban	Rural	Arid and Semi-Arid	Area (km2)	Population (1999)
Baringo	3	4	0.65	0.27	0	0	1	8,646	264,978
Bomet	2	4	0.44	0.50	0	1	0	1,882	382,794
Bondo	0	2	0.10	0.88	0	1	0	987	238,780
Bungoma	8	12	0.64	0.29	0	1	0	2,069	876,491
Buret	1	3	0.52	0.42	0	1	0	955	316,882
Busia	3	6	0.68	0.32	0	1	0	1,124	370,608
Butere Mumias	1	4	0.70	0.27	0	1	0	939	476,928
Embu	6	8	0.34	0.58	0	0	1	729	278,196
Garissa	1	8	0.02	0.98	0	0	1	44,952	329,939
Gucha	0	0	0.33	0.59	0	1	0	661	460,939
Homa Bay	5	6	0.08	0.90	0	1	0	1,160	288,540
Isiolo	2	5	0.73	0.23	0	0	1	25,698	100,861
Kajiado	6	21	0.83	0.03	0	0	1	21,903	406,054
Kakamega	10	12	0.64	0.30	0	1	0	1,395	603,422
Keiyo	1	0	0.78	0.13	0	0	1	1,439	143,865
Kericho	7	9	0.59	0.39	0	1	0	2,111	468,493
Kiambu	10	19	0.17	0.66	0	1	0	1,324	744,010
Kilifi	5	11	1.00	0.00	0	1	0	4,779	544,303
Kirinyaga	5	9	0.01	0.96	0	1	0	1,478	457,105
Kisii	7	13	0.35	0.58	0	1	0	649	491,786
Kisumu	20	31	0.21	0.66	0	1	0	919	504,359
Kitui	3	7	0.22	0.78	0	0	1	20,402	515,422
Koibatek	0	1	0.40	0.57	0	0	1	2,306	138,163
Kuria	1	1	0.93	0.05	0	1	0	581	151,887
Kwale	4	8	1.00	0.00	0	1	0	8,295	496,133
Laikipia	7	13	0.54	0.26	0	1	0	9,229	322,187
Lamu	2	3	1.00	0.00	0	1	0	6,167	72,686
Lugari	0	0	0.50	0.35	0	1	0	670	215,920
Machakos	9	16	0.35	0.53	0	1	0	6,281	906,644
Makueni	4	7	0.29	0.71	0	0	1	7,966	771,545
Malindi	4	11	1.00	0.00	0	1	0	7,751	281,552
Mandera	0	2	0.00	1.00	0	0	1	26,744	250,372
Maragua	0	0	0.03	0.83	0	1	0	868	387,969
Marakwet	1	1	0.63	0.28	0	0	1	1,588	140,629
Marsabit	1	2	0.85	0.13	0	0	1	61,296	121,478
Mbeere	0	2	0.13	0.85	0	0	1	2,093	170,953
Meru	19	31	0.13	0.83	0	1	0	8,017	1,300,000
Migori	2	5	0.59	0.39	0	1	0	2,005	514,897
Mombasa	60	83	0.90	0.00	1	0	0	230	665,018
Moyale	1	3	0.73	0.27	0	0	1	9,390	53,479
Mt.Elgon	1	0	0.93	0.03	0	1	0	944	135,033
Murang'a	12	16	0.07	0.86	0	1	0	930	348,304
Mwingi	1	3	0.26	0.74	0	0	1	10,030	303,828
Nairobi	230	388	0.58	0.01	1	0	0	696	2,100,000
Nakuru	26	40	0.58	0.23	0	1	0	7,242	1,200,000
Nandi	4	7	0.83	0.16	0	1	0	2,899	578,751
Narok	4	6	0.90	0.04	0	0	1	15,098	365,750
Nyandarua	4	6	0.00	0.93	0	1	0	3,304	479,902
Nyando	0	0	0.10	0.88	0	1	0	1,168	299,930
Nyeri	17	20	0.06	0.89	0	1	0	3,356	661,156
Rachuonyo	0	0	0.06	0.90	0	1	0	945	307,126
Siaya	2	4	0.11	0.77	0	1	0	1,520	480,184
Suba	0	0	0.33	0.65	0	1	0	1,055	155,666
Taita Taveta	3	11	0.95	0.00	0	1	0	17,128	246,671
Tana River	2	1	0.98	0.00	0	0	1	38,446	180,901
Teso	0	1	1.00	0.00	0	1	0	559	181,491
Tharaka	0	0	0.03	0.97	0	0	1	1,570	100,992
Thika	12	22	0.18	0.69	0	1	0	1,960	645,713
Trans-Nzoia	9	15	0.96	0.01	0	1	0	2,487	575,662
Transmara	1	0	0.73	0.25	0	0	1	2,846	170,591
Turkana	2	3	0.94	0.06	0	0	1	68,388	450,860
Uasin Gishu	16	23	0.78	0.12	0	1	0	3,328	622,705
Vihiga	0	4	0.57	0.30	0	1	0	563	498,883
Wajir	2	4	0.02	0.98	0	0	1	55,501	319,261
West Pokot	1	1	0.66	0.34	0	0	1	9,064	308,086

Table 3
Descriptive Statistics, Household Level

This table reports descriptive statistics at the household level, based on the 2006 and 2009 FinAccess household surveys.

	2006					2009				
Variable	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
Bank account	4360	0.1420	0.3491	0	1	6562	0.227	0.419	0	1
Bank Loan	4360	0.0290	0.1680	0	1	6562	0.044	0.204	0	1
Household size	4360	4.4722	2.3382	1	16	6562	4.959	2.600	1	20
Education: Primary	4360	0.3172	0.4654	0	1	6562	0.186	0.389	0	1
Education: Secondary	4360	0.2289	0.4202	0	1	6562	0.124	0.329	0	1
Education: Tertiary	4360	0.0234	0.1512	0	1	6562	0.007	0.082	0	1
Female	4360	0.5585	0.4966	0	1	6562	0.419	0.493	0	1
Asset score	4360	2.2011	2.1053	0	15	6562	2.723	2.761	0	18
Own permanent house	4360	0.1298	0.3361	0	1	6562	0.186	0.389	0	1
Income type: Agriculture	4360	0.4165	0.4930	0	1	6562	0.417	0.493	0	1
Income type: Waged	4360	0.1729	0.3782	0	1	6562	0.152	0.359	0	1
Income type: Business	4360	0.2865	0.4522	0	1	6562	0.286	0.452	0	1
Age group: 18-24	4360	0.2032	0.4024	0	1	6562	0.178	0.383	0	1
Age group: 25-34	4360	0.2837	0.4509	0	1	6562	0.258	0.438	0	1
Age group: 35-44	4360	0.1982	0.3987	0	1	6562	0.208	0.406	0	1
Age group: 45-54	4360	0.1232	0.3287	0	1	6562	0.134	0.340	0	1
Age group: 55+	4360	0.1459	0.3530	0	1	6562	0.183	0.387	0	1
Language: Swahili	4360	0.4764	0.4995	0	1	6562	0.647	0.478	0	1
Language: Minority language	4360	0.4266	0.4946	0	1	6562	0.231	0.422	0	1
Urban	4360	0.1135	0.3173	0	1	6562	0.158	0.365	0	1
Rural	4360	0.6564	0.4750	0	1	6562	0.649	0.477	0	1
Arid and Semi-Arid	4360	0.2300	0.4209	0	1	6562	0.193	0.395	0	1
Total bank branches	4360	29.3475	67.4684	0	230	6562	61.189	124.190	0	388
Bank branches (excluding Equity Bank)	4360	27.7094	64.6335	0	220	6562	56.249	116.231	0	362
Equity ban branches	4360	1.6381	2.9712	0	10	6562	4.939	8.093	0	26
Equity bank presence	4360	0.477	0.50	0	1	6562	0.873	0.333	0	1

Table 4
Comparing Banks' Expansion Strategies

This table reports OLS estimates on the determinants of bank branching by districts. For Equity Bank, the dependent variable is the number of bank branches in a given district; for other bank groups, the dependent variable is the number of branches at district level over the number of banks in each group. Robust standard errors are in parentheses. Standard errors are clustered by district. ***, **, * indicate significance at the 1%, 5% and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable: Number of branches over number of banks	Foreign	Govern.	Domestic	Equity	Foreign	Govern.	Domestic	Equity
Rural	-4.032**	-4.368***	-2.958**	-6.440	-4.032**	-4.367***	-2.958**	-6.440
	(1.677)	(1.470)	(1.360)	(3.898)	(1.684)	(1.476)	(1.365)	(3.913)
Arid and Semi-Arid	-4.146**	-4.598***	-3.051**	-7.276*	-4.146**	-4.598***	-3.051**	-7.276*
	(1.681)	(1.478)	(1.362)	(3.929)	(1.688)	(1.484)	(1.368)	(3.945)
Minority language	-5.801**	-6.808***	-4.588**	-17.880***	-5.819**	-6.842***	-4.601**	-18.302***
	(2.691)	(2.474)	(2.192)	(6.334)	(2.692)	(2.465)	(2.192)	(6.311)
Swahili	-5.902**	-6.953***	-4.680**	-18.666***	-5.983**	-7.102***	-4.751**	-19.229***
	(2.741)	(2.512)	(2.232)	(6.452)	(2.783)	(2.574)	(2.267)	(6.618)
log(Density population)	-0.080	-0.102*	-0.063	-0.311**	-0.080	-0.102*	-0.063	-0.311**
	(0.052)	(0.057)	(0.043)	(0.134)	(0.052)	(0.058)	(0.043)	(0.135)
Dummy(2009)	0.118**	0.213***	0.102**	1.045***				
	(0.052)	(0.072)	(0.045)	(0.282)				
Minority language x Dummy(2009)					0.038	0.071	0.027	0.846***
					(0.038)	(0.062)	(0.031)	(0.295)
Swahili x Dummy(2009)					0.164*	0.305**	0.144*	1.129**
					(0.093)	(0.137)	(0.080)	(0.510)
Constant	10.054***	11.720***	7.711***	25.869***	10.112***	11.824***	7.761***	26.390***
	(2.858)	(2.595)	(2.329)	(6.585)	(2.893)	(2.632)	(2.358)	(6.722)
Observations	129	129	129	129	129	129	129	129
Adjusted R-squared	0.750	0.747	0.717	0.524	0.748	0.744	0.714	0.512

Table 5
Access to Banking Services and Bank Presence: Baseline Models

This table reports estimates from a Probit model of the probability of a household having a bank account. The data consists of 4,360 individuals interviewed in 2006 and 6,562 individuals in 2009. We include district fixed effects in all the models. Robust standard errors are in parentheses. Standard errors are clustered by district-year groups. ***, **, * indicate significance at the 1%, 5% and 10% levels, respectively.

Dep. variable: Bank account	(1)	(2)	(3)	(4)	(5)
Household size	-0.0060***	-0.0057***	-0.0058***	-0.0056***	-0.0060***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Education: Primary	0.0006	-0.0089	-0.0078	-0.0030	0.0017
	(0.012)	(0.013)	(0.014)	(0.012)	(0.013)
Education: Secondary	0.1181***	0.0964***	0.0981***	0.1123***	0.1193***
	(0.022)	(0.019)	(0.020)	(0.021)	(0.022)
Education: Tertiary	0.2886***	0.2144***	0.2168***	0.2762***	0.2895***
	(0.049)	(0.061)	(0.062)	(0.049)	(0.050)
Female	-0.0572***	-0.0564***	-0.0564***	-0.0576***	-0.0569***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Asset score	0.0283***	0.0295***	0.0294***	0.0286***	0.0282***
	(0.005)	(0.004)	(0.004)	(0.005)	(0.005)
Own permanent house	0.0531***	0.0498***	0.0499***	0.0533***	0.0520***
	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
Income type: Agriculture	0.0330**	0.0260*	0.0263*	0.0321**	0.0322**
	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)
Income type: Waged	0.2152***	0.2032***	0.2043***	0.2124***	0.2148***
	(0.025)	(0.027)	(0.027)	(0.025)	(0.025)
Income type: Business	0.1512***	0.1438***	0.1440***	0.1508***	0.1505***
	(0.019)	(0.017)	(0.017)	(0.019)	(0.019)
Age group: 18-24	0.1448**	0.1652**	0.1636**	0.1480**	0.1430**
	(0.066)	(0.064)	(0.064)	(0.066)	(0.065)
Age group: 25-34	0.3200***	0.3344***	0.3330***	0.3235***	0.3190***
	(0.072)	(0.072)	(0.072)	(0.072)	(0.071)
Age group: 35-44	0.4052***	0.4175***	0.4161***	0.4091***	0.4042***
	(0.082)	(0.083)	(0.082)	(0.082)	(0.082)
Age group: 45-54	0.4227***	0.4341***	0.4327***	0.4259***	0.4220***
	(0.082)	(0.082)	(0.082)	(0.082)	(0.082)
Age group: 55+	0.4056***	0.4135***	0.4122***	0.4083***	0.4047***
	(0.083)	(0.085)	(0.085)	(0.083)	(0.083)
Swahili	-0.1085***	-0.1051***	-0.1057***	-0.1080***	-0.1084***
	(0.014)	(0.015)	(0.015)	(0.014)	(0.014)
Minority language	-0.1345***	-0.1350***	-0.1340***	-0.1387***	-0.1341***
	(0.011)	(0.013)	(0.013)	(0.011)	(0.011)
Bank branches	0.0010***				
	(0.000)				
Equity Bank presence	0.0424***		0.0222**		0.0555***
	(0.011)		(0.009)		(0.011)
Foreign bank presence		0.0255	0.0273		
		(0.018)	(0.018)		
Gov. and gov.-influenced banks presence		0.0298**	0.0287*		
		(0.015)	(0.015)		
Domestic private banks presence		0.0392**	0.0216		
		(0.016)	(0.017)		
Foreign bank branches				0.0044	0.0103***
				(0.003)	(0.002)
Gov. and gov.-influenced bank branches				0.0019	-0.0019
				(0.003)	(0.004)
Domestic private bank branches				-0.0028	-0.0072***
				(0.003)	(0.002)
Observations	10,922	10,922	10,922	10,922	10,922
Pseudo R-squared	0.332	0.326	0.327	0.331	0.333
District Fixed Effects	YES	YES	YES	YES	YES

Table 6
Access to Banking and Bank Presence: Comparing 2009 and 2006

This table reports estimates from a Probit model of the probability of a household having a bank account. The data consists of 4,360 individuals interviewed in 2006 and 6,562 individuals interviewed in 2009. We include district and year fixed effects in all the models; we also include but do not report coefficients on individual/household controls. Robust standard errors are in parentheses. Standard errors are clustered by district-year groups. ***, **, * indicate significance at the 1%, 5% and 10% levels, respectively.

Dep. variable: Bank account	(1)	(2)	(3)	(4)
Dummy(2009)	0.0642***	0.0121	0.0169	0.0145
	(0.013)	(0.013)	(0.019)	(0.013)
Bank branches		0.0067***		
		(0.002)		
Equity Bank presence		-0.0129	-0.0472**	0.0006
		(0.015)	(0.021)	(0.015)
Foreign bank presence			0.0185	
			(0.020)	
Gov. and gov.-influenced banks presence			0.0126	
			(0.018)	
Domestic private banks presence			0.0175	
			(0.026)	
Foreign bank branches				0.0183**
				(0.008)
Gov. and gov.-influenced bank branches				0.0015
				(0.005)
Domestic private bank branches				-0.0074*
				(0.004)
Interaction Effects				
Bank branches x Dummy(2009)		-0.0024***		
		(0.001)		
Equity Bank presence x Dummy(2009)		0.0528***	0.0700**	0.0646***
		(0.016)	(0.035)	(0.017)
Foreign bank presence x Dummy(2009)			-0.0165	
			(0.022)	
Gov. and gov.-influenced banks presence x Dummy(2009)			-0.0180	
			(0.025)	
Domestic private banks presence x Dummy(2009)			0.0277	
			(0.041)	
Foreign bank branches x Dummy(2009)				-0.0060
				(0.006)
Gov. and gov.-influenced bank branches x Dummy(2009)				-0.0059
				(0.004)
Domestic private bank branches x Dummy(2009)				0.0029
				(0.003)
Observations	10,922	10,922	10,922	10,922
Pseudo R-squared	0.332	0.335	0.334	0.336
Individual / Household Controls	YES	YES	YES	YES
District Fixed Effects	YES	YES	YES	YES
Time Fixed Effects	YES	YES	YES	YES

Table 7
Access to Banking and Bank Presence: Instrumental Variables

This table reports estimates from IV GMM and IV Probit models of the probability of a household having a bank account. The data consists of 4,360 individuals interviewed in 2006 and 6,562 individuals interviewed in 2009. Equity Bank presence is instrumented with the district–level proportion of people speaking a *minority* language and its interaction with a 2009 dummy. Robust standard errors are in parentheses. Standard errors are clustered by district-year groups. ***, **, * indicate significance at the 1%, 5% and 10% levels, respectively.

	IV GMM		IV Probit		
			Marginal effects		
	Second stage	First stage	Second stage	Second stage	First stage
Dep. variable: Bank account	(1)	(2)	(3)	(4)	(5)
Household size	-0.0081***	0.0089***	-0.0068***	-0.0359***	0.0089***
	(0.0014)	(0.0009)	(0.0015)	(0.0078)	(0.0009)
Education: Primary	-0.0239***	-0.0112*	0.0068	0.0352	-0.0112*
	(0.0080)	(0.0061)	(0.0100)	(0.0512)	(0.0061)
Education: Secondary	0.1019***	-0.0247***	0.1284***	0.5465***	-0.0247***
	(0.0120)	(0.0069)	(0.0139)	(0.0502)	(0.0069)
Education: Tertiary	0.2298***	-0.0254*	0.3051***	1.0115***	-0.0253*
	(0.0320)	(0.0152)	(0.0622)	(0.1601)	(0.0151)
Female	-0.0473***	-0.0158***	-0.0558***	-0.2938***	-0.0158***
	(0.0065)	(0.0048)	(0.0070)	(0.0380)	(0.0048)
Asset score	0.0386***	-0.0013*	0.0281***	0.1469***	-0.0013*
	(0.0021)	(0.0008)	(0.0019)	(0.0095)	(0.0008)
Own permanent house	0.0573***	-0.0181***	0.0534***	0.2527***	-0.0181***
	(0.0106)	(0.0059)	(0.0106)	(0.0458)	(0.0059)
Income type: Agriculture	0.0314***	-0.0107	0.0333**	0.1712**	-0.0107
	(0.0091)	(0.0076)	(0.0144)	(0.0729)	(0.0075)
Income type: Waged	0.1847***	-0.0218***	0.2200***	0.8487***	-0.0218***
	(0.0132)	(0.0082)	(0.0234)	(0.0736)	(0.0082)
Income type: Business	0.1268***	-0.0048	0.1523***	0.6734***	-0.0047
	(0.0104)	(0.0075)	(0.0180)	(0.0697)	(0.0074)
Age group: 18-24	-0.0038	0.0339***	0.1389**	0.5900***	0.0339***
	(0.0120)	(0.0119)	(0.0541)	(0.1963)	(0.0119)
Age group: 25-34	0.1022***	0.0335***	0.3134***	1.2218***	0.0335***
	(0.0123)	(0.0120)	(0.0591)	(0.1955)	(0.0119)
Age group: 35-44	0.1349***	0.0266**	0.3986***	1.4130***	0.0266**
	(0.0129)	(0.0122)	(0.0657)	(0.1965)	(0.0122)
Age group: 45-54	0.1273***	0.0271**	0.4167***	1.3884***	0.0271**
	(0.0142)	(0.0129)	(0.0714)	(0.1987)	(0.0129)
Age group: 55+	0.1125***	0.0254**	0.3990***	1.3768***	0.0254**
	(0.0135)	(0.0129)	(0.0693)	(0.1998)	(0.0129)
Swahili	-0.1737***	-0.0058	-0.1095***	-0.5412***	-0.0058
	(0.0159)	(0.0067)	(0.0119)	(0.0550)	(0.0067)
Minority language	-0.2130***	-0.0102	-0.1280***	-0.7956***	-0.0103
	(0.0170)	(0.0085)	(0.0094)	(0.0676)	(0.0085)
Bank branches	0.0012***	-0.0000***	0.0010***	0.0052***	-0.0000***
	(0.0002)	(0.0000)	(0.0001)	(0.0007)	(0.0000)
Equity Bank presence	0.0939***		0.0984***	0.5989***	
	(0.0197)		(0.0187)	(0.1307)	
Minority language district		-0.9086***			-0.9069***
		(0.0224)			(0.0223)
Minority language district x Dummy(2009)		0.2313***			0.2333***
		(0.0187)			(0.0186)
Observations	10922	10923	10922	10922	10922
Centered R-squared	0.7585				
Uncentered R-squared	0.9311				
Probability of positive outcome (predict, p)			0.1128		
Partial R-squared of excluded instruments:		0.2822			
p-value of test of excluded instruments		0.0000			
p-value of Hansen J statistic	0.1924				
District Fixed Effects	YES	YES	YES	YES	YES

Table 8
Access to Banking and Bank Presence: More Interaction Effects

This table reports estimates from a Probit model of the probability of a household having a bank account. The data consists of 4,360 individuals interviewed in 2006 and 6,562 individuals interviewed in 2009. We include district fixed effects in all the models; we also include but do not report coefficients on individual/household controls. Robust standard errors are in parentheses. Standard errors are clustered by district-year groups. ***, **, * indicate significance at the 1%, 5% and 10% levels, respectively.

Dep. variable: Bank account	(1)	(2)	(3)	(4)	(5)
Equity Bank presence	0.0708***	0.0528***	0.0578***	0.0521***	0.0911***
	(0.0157)	(0.0115)	(0.0114)	(0.0115)	(0.0167)
Asset score x Equity Bank presence	-0.0153**				-0.0119*
	(0.0066)				(0.0067)
Permanent own house x Equity Bank presence		-0.0506***			-0.0431**
		(0.0191)			(0.0193)
Secondary-Tertiary Education x Equity Bank presence			-0.0515***		-0.0414**
			(0.0156)		(0.0163)
Salaried job x Equity Bank presence				-0.0416**	-0.0372**
				(0.0168)	(0.0175)
Observations	10922	10922	10922	10922	10922
Pseudo R-squared	0.333	0.333	0.333	0.333	0.335
Individual / Household Controls	YES	YES	YES	YES	YES
District Fixed Effects	YES	YES	YES	YES	YES

Table 9
Access to Credit and Bank Expansion

This table reports estimates from an Ordered Probit model of the probability of a household's access to bank services. Bank services take the value 0 if the individual has neither a bank account nor a bank loan; it takes the value 1 if the individual has a bank account; and it takes the value 2 if the individual has a bank loan. The data consists of 4,360 individuals interviewed in 2006 and 6,562 individuals interviewed in 2009. We include district fixed effects in all the models; we also include but do not report coefficients on individual/household controls. Robust standard errors are in parentheses. ***, **, * indicate significance at the 1%, 5% and 10% levels, respectively.

	(1)	(2)	(3)	(4)
	Ordered Probit	Average Marginal Effects		
		Financial Acces=0	Financial Acces=1	Financial Acces=2
Bank branches	0.0039***	-0.0007***	0.0005***	0.0002***
	(0.0006)	(0.0001)	(0.0000)	(0.0000)
Equity Bank presence	0.2637***	-0.0496***	0.0360***	0.0135***
	(0.0683)	(0.0128)	(0.0093)	(0.0035)
Observations	10922	10922	10922	10922
Pseudo R-squared	0.2918			
Individual / Household Controls	YES	YES	YES	YES
District Fixed Effects	YES	YES	YES	YES

Table 10
Access to Banking and Bank Presence: Rural and Arid and Semi-Arid Districts

This table reports estimates from a Probit model of the probability of a household having a bank account after dropping *urban districts*. We include district and year fixed effects in all the models; we also include but do not report individual/household controls. Robust standard errors are in parentheses. Standard errors are clustered by district-year groups. ***, **, * indicate significance at the 1%, 5% and 10% levels, respectively.

Dep. variable: Bank account	(1)	(2)	(3)	(4)	(5)
Bank branches	0.0042***				
	(0.0014)				
Equity Bank presence	0.0247***		0.0207***		0.0277***
	(0.0091)		(0.0072)		(0.0102)
Foreign bank presence		0.0200	0.0184		
		(0.0130)	(0.0131)		
Gov. and gov.-influenced bank presence		0.0289***	0.0221**		
		(0.0096)	(0.0103)		
Domestic private bank presence		0.0369**	0.0278*		
		(0.0144)	(0.0144)		
Foreign bank branches				0.0132***	0.0132***
				(0.0028)	(0.0026)
Gov. and gov.-influenced bank branches				0.0025	-0.0004
				(0.0024)	(0.0029)
Domestic private bank branches				-0.0046	-0.0043
				(0.0039)	(0.0041)
Observations	9388	9388	9388	9388	9388
Pseudo R-squared	0.316	0.315	0.316	0.317	0.317
Individual / Household Controls	YES	YES	YES	YES	YES
District Fixed Effects	YES	YES	YES	YES	YES

Table 11
Access to Banking and Bank Presence: Difference-in-Differences Estimator

This table reports estimates from a Probit model of the probability of a household having a bank account; only the districts *without* Equity Bank presence in 2006 (and with or without Equity Bank presence in 2009) are included in the regressions. We include district and year fixed effects in all the models; we also include but do not report individual/household controls. Robust standard errors are in parentheses. Standard errors are clustered by district-year groups. ***, **, * indicate significance at the 1%, 5% and 10% levels, respectively.

Dep. variable: Bank account	(1)	(2)	(3)
Bank branches	-0.0021		
	(0.0019)		
Equity Bank presence	0.0293**	0.0198**	0.0280**
	(0.0118)	(0.0092)	(0.0119)
Foreign bank presence		0.0038	
		(0.0109)	
Gov. and gov.-influenced banks presence		0.0181**	
		(0.0079)	
Domestic Private banks presence		0.0095	
		(0.0146)	
Foreign bank branches			-0.0026
			(0.0050)
Gov. and gov.-influenced bank branches			-0.0007
			(0.0028)
Domestic private bank branches			-0.0034
			(0.0067)
Observations	5314	5314	5314
Pseudo R-squared	0.348	0.348	0.348
Individual / Household Controls	YES	YES	YES
District Fixed Effects	YES	YES	YES
Year Fixed Effects	YES	YES	YES

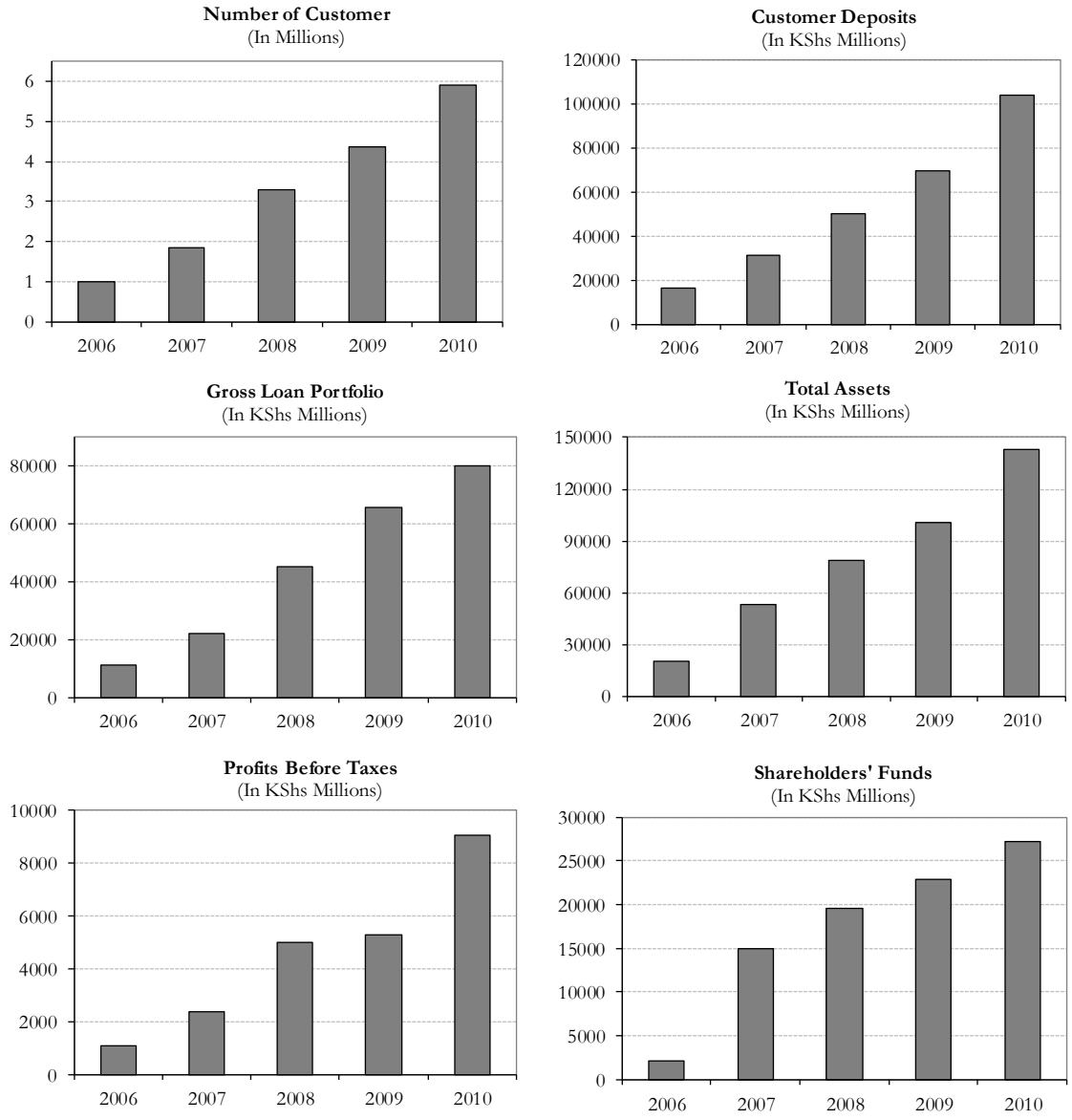

Figure 1. Equity Bank's performance indicators. This figure shows the evolution of the number of customers, deposits, gross loan portfolio, total assets, profits before taxes and shareholders' funds over the period 2006-2010. The source is Allen et al. (2012) based on data from the Equity Bank's Annual Reports and Financial Statements 2010.

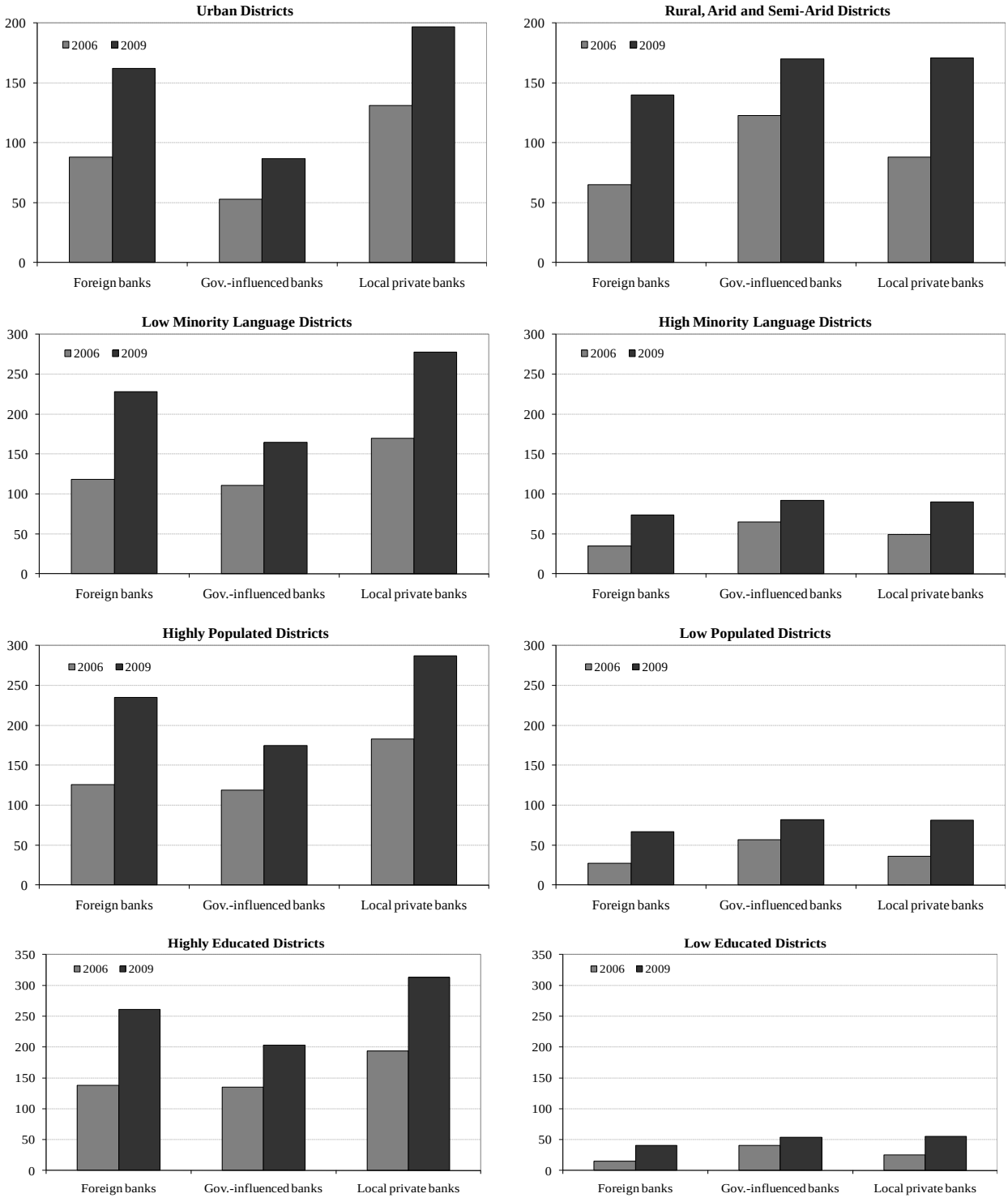

Figure 2. Bank Penetration in Kenya. This Figure shows the number of bank branches according to different ownership structures: Foreign banks, Government banks, and Domestic private banks. Urban districts include Nairobi and Mombasa districts. Low minority language districts are the ones where the share of the population speaking a minority language is smaller than the median. Highly populated districts are the ones where the density population is higher than the median. Highly educated districts are the ones where the share of the population with secondary or tertiary education is higher than the median.

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