Improving Access to Banking: Evidence from Kenya

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This version: July 22, 2011

ABSTRACT

Using datasets on household surveys and bank penetration at the district-level in 2006 and 2009, we explore the impact of Equity Bank—a leading private commercial bank, as well as other banks, on the use of banking services in Kenya. We find that the presence of domestic private banks (including Equity) government or government-influenced banks, or foreign banks has a positive impact on financial access at the district level. In particular, Equity Bank has a first order effect in enhancing households' access to bank accounts and bank credit. This effect is stronger for Kenyans with low income, without their own permanent house, with less education, and without a salaried job. Our results imply that Equity Bank's business model—providing financial services to the population sectors ignored by traditional commercial banks and generating sustainable profits in the process—can be an important solution to the financial access problem that has hindered the development of the financial sector in many African countries.

JEL CODES: G21; O16

KEY WORDS: Equity Bank, bank penetration, bank account, financial access.

* Allen is from the University of Pennsylvania, Carletti is from the European University Institute, Cull is from the World Bank, Qian is from Boston College, Senbet is from University of Maryland, and Valenzuela is from the European University Institute. We thank Financial Sector Deepening Trust Kenya (FSD Kenya), and in particular, David Ferrand, for providing the household surveys. We appreciate helpful conversations and useful comments from Samuel Makome and John Staley (from Equity Bank) and Moses Sichei (Central Bank of Kenya). We are grateful to the Gates Foundation, NBER, and the authors' respective institutions for financial support. We are responsible for all the remaining errors.

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. A key obstacle to financial development is access of the disadvantaged to finance, which would promote economic growth at the broadest scales. While the success of microfinance institutions (MFIs) such as Grameen Bank has captured the attention of many economists and policy makers, such success stories are difficult to come by—many MFIs are plagued by losses while 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 (e.g., access to roads). Recent studies (e.g., Chaia et al., 2011; Honohan, 2008) show that in the early 2000s, roughly 2.5 billion adults, or half of the world's adult population, lacked any bank account; in Sub-Saharan Africa, the setting for our study, over eighty percent of the adult population lacked an account.

In this paper, we focus on Kenya, a country whose financial development indicators are among the best in the Sub-Saharan Africa region. Focusing on one specific country avoids the pitfalls of cross-country studies that unobserved country-level factors can drive the empirical results and thus obstruct researchers from drawing clear implications. More specifically, Kenya offers an interesting 'laboratory' for the study of financial access as it has witnessed the emergence of Equity Bank, a pioneering institution that devised a banking service strategy targeting low income clients and traditionally under-served territories. This successful bank is listed on the Nairobi Stock Exchange (without any government ownership) and has played a role in integrating micro finance with formal finance.

A major challenge for empirical research on financial access is the paucity of micro-level data. In this regard, we obtain datasets on bank penetration and household surveys at the district-level in 2006 and 2009 for Kenya. The time dimension of our data allows us to exploit, as an identification strategy, within-district variation in Kenyans' access to banking

services. We find that Equity Bank has a first order effect in enhancing households' access to bank accounts and bank credit, especially for households with low income, without their own permanent house, with less education, and without anybody with a salaried job. These results are robust after controlling for individual characteristics, other banks' district branch expansion, and district fixed effects. Overall, our paper contributes to the growing literature on financial access and inclusion by providing large scale, micro-level evidence showing that Equity Bank's business model—providing financial services to the population sectors ignored by traditional commercial banks and generating sustainable profits in the process—can be an important solution to the financial access problem that has hindered the development of the financial sector in many developing countries.

We employ two data sets in our study. The first dataset on bank penetration is constructed based on branch-level information aggregated as a district-level panel on the number of branches by bank. The panel covers 45 commercial banks that operated in 65 Kenyan districts in the period between 2006 and 2009. Equity Bank is formally classified as a commercial bank. Despite its focus on the poor, its remarkable success has elevated it into becoming a peer with other large commercial banks. We differentiate institutions by their ownership characteristics (e.g. private domestic banks, foreign banks and government owned and/or influenced banks). All types of banks experienced significant expansion between 2006 and 2009, with Equity Bank leading the way. Moreover, banks established new branches not only in urban districts but also in rural (arid and semi-arid) districts.

Our second dataset comes from the FinAccess household surveys conducted by Financial Sector Deepening Trust Kenya (FSD Kenya) in 2006 (4,420 completed interviews) and 2009 (6,598 interviews) covering practically all districts in Kenya. In addition to providing information on the access to banking and financial services, these surveys provide information on individual and household characteristics, such as education level, gender, assets ownership, income source, age group, language, location and household size. Based on the surveys, we constructed two measures of access to banking services: 1) a dummy variable indicating whether an individual has a bank account; and 2) another dummy variable indicating whether an individual has a loan from a bank. Given the expansion of banks over the period, it is not surprising to see that the fraction of households having a bank account

increased from 14% in 2006 to 23% in 2009 and the proportion of households having a loan from a bank from 3% to 4%.

We examine two related questions. Does Equity Bank pursue different branching strategies from other commercial banks? If so, do these different expansion strategies lead to different effects on households' access to banking services? We obtain two sets of main results. *First*, we find important differences in branching strategies between Equity Bank and other banks. While all the bank groups (including Equity Bank) open a greater number of branches in urban, highly populated and English speaking districts, Equity Bank is more likely to expand to underdeveloped districts than other types of banks—rural, arid and semi-arid areas, less populated areas and areas where the dominant language is not English or Swahili. This is particularly important and encouraging for financial access development as population density has been identified as a major obstacle for financial sector development in Africa (Allen, Carletti, Cull, Qian and Senbet, 2011; ACCQS), in that the most underdeveloped countries are 'trapped' in low density areas with poor road coverage.

Second, we find that the presence of Equity Bank in a specific district has a positive and significant impact on the residents' likelihood of having access to both bank accounts and credit. For example, the penetration of Equity Bank in a new district increases the probability of having a bank account between 3% and 6%. Given the fact that the proportion of households having a bank account rises from 14% in 2006 to 23% in 2009, the impact of Equity Bank on financial access is economically significant. The positive effect of Equity Bank on financial access is particularly strong for households with low income, without their own permanent house, with less education, and without anybody with a salaried job. These findings support the argument that the business model of Equity Bank, which targets underprivileged segments of the population that can 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), government or government-influenced banks or foreign banks has a positive impact on the access to bank accounts at the district level. Interestingly, the positive impact of the foreign banks is the smallest among the three groups. A potential explanation for these differences is that foreign banks traditionally have only 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 the branch itself) 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. Finally, we find that bank competition, proxied by the number of all branches in an area, has a positive impact on the access to banking services.

Our paper extends the emerging literature on financial access and inclusion in developing economies. Several studies 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. While RCTs represent an important breakthrough in the study of financial inclusion, they carry important limitations: sample sizes are small, contexts differ, and small variations in experimental design can affect results (Ravallion, 2009). Assessing the external validity of results generated in a specific experimental setting is therefore a thorny issue in developing policy advice. Moreover, important developments in financial inclusion are taking place without the aid of experiments and are not amenable to study via randomization.

Our study is closest to Bruhn and Love (2009) who 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, informal businesses and a seven 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 (as we show below). However, the sheer magnitude of the increase in financial sector participation makes this an episode worthy of study.

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) have shown that M-Pesa has also contributed to financial inclusion by the poor. In contrast, we study banking services and provide direct evidence on the role of bank penetration in general, and Equity Bank in particular, on financial access. Moreover, Mbiti

and Weil find 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 banks, especially Equity Bank.

The remainder of the paper is organized as follows. Section II provides an overview of financial development and access in Africa, and related literature. Section III describes the data and methodologies, and Section IV presents the empirical results. Finally, Section V concludes.

II. Overview of Financial Development and Access in Africa

Most countries in Africa have gone through extensive economic and financial sector reforms over the last three decades. There is substantial evidence that these reforms have paid off both in terms of economic growth and financial performance. These payoffs have accelerated in recent years. In the aggregate, Africa began growing at the start of the 21st century and had, in fact, experienced, what amounted to a growth renaissance before it was adversely affected by the negative shocks of the global crisis. The GDP growth for the five year period (2002-2007) prior to the crisis averaged over 5%, outpacing population growth and hence experiencing a significant increase in GDP per capita (Allen, Otchere, and Senbet, 2011).

Yet, serious challenges remain with regard to financial development and financial inclusion in Africa. Despite the growing evidence for the role of finance in economic development, at a macro level, the bulk of the countries in Sub-Saharan Africa face a severe financial development gap relative to not only the advanced economies but other peer developing economies. The *pre-crisis* 2007 financial development indicators for Sub-Sahara Africa are particularly telling. The liquid liabilities of financial sectors averaged about 30 percent of GDP for Sub-Saharan Africa; in contrast, none of the other developing regions averaged less than 40 percent (ACCQS, 2010). Things get even worse when it comes to financial depth based on private credit provision. The average level of credit extended to the private sector was 16.6 percent of GDP in 2007, whereas for the other developing regions, the financial development indicator ranged from 32.5 to 43.9 percent.

The low levels of financial development raise a natural question as to whether Africa faces a development model that is different from the rest of the world. ACCQS build a financial development benchmark line that is based on the experience of low income and middle income countries outside Africa. A stark financial development gap emerges in that most African countries have lower levels of financial development than would be predicted based on their fundamentals. In particular, for the financial development indicator based on liquid liabilities, the average country is positioned 13 percentage points below the predicted level (based on the benchmark models) and 12 percentage points below the predicted level for the financial development indicator based on private credit provision.

African countries cannot ignore the serious financial development issues, since there is now ample empirical evidence for a positive linkage between financial development and economic development (Levine, 2005; Rajan and Zingales, 1998). This issue is particularly important in the face of widespread poverty in Africa, since the positive relationship between financial development and economic development is suggestive of a positive linkage between finance and poverty alleviation. This link has been confirmed by recent papers (Beck, Demirguc-Kunt, and Levine, 2007; Clarke, Xu, and Zou, 2006). Unfortunately an economic environment, such as that in Africa is characterized by informational asymmetries, transaction costs, contract enforcement problems and a host of other market imperfections. These disadvantage the poor in terms of financial inclusion, since they tend to lack collateral, credit histories, and connections (Levine, 2005; World Bank, 2007; Ncube and Senbet, 1997). In such a context it is then particularly important to analyze the elements affecting financial development and financial inclusion.

Studies based on macro financial development data cannot fully capture the forces at the micro level that directly affect access of the disadvantaged to finance, and local developments that inhibit or encourage financial inclusion. In fact, promoting financial inclusion, especially in developing countries, would appear to be a high priority for policy makers. We need to understand the specific institutions and policies that best promote financial inclusion. In terms of data collection, the recent push beyond standard measures of financial depth (e.g., the ratio of credit to GDP) has made it possible to study more

systematically the breadth of outreach of financial sectors. For example, Beck, Demirguc-Kunt, and Martinez Peria (2007, 2008) collect information on the aggregate number of deposit and loan accounts from bank regulators in 99 countries. They also collect information on the number of bank branches and ATMs in each country as a proxy for physical access to financial services. While cross-country measures based on accounts are useful for framing issues regarding financial access, they are not well-suited for identifying how to promote financial inclusion.

As already mentioned, several recent studies have attempted to identify policies, services, and innovations that have a causal impact on financial inclusion through experiments based on randomized controlled trials (RCTs). However, the results of these studies have been mixed so far, in particular with regard to access to credit. For example, Banerjee et al. (2010), who exploit the randomized expansion of a microfinance institution in urban India, find a modest increase in borrowing in neighborhoods where a branch was introduced. In the treated areas, existing business owners increased their expenditures on durable goods and the number of firm start-ups increased, but the expansion in credit left most people unaffected. In the Philippines, Karlan and Zimmerman (2010, 2011) find that randomized access to credit (to somewhat richer people and at substantially higher interest rates than in the Indian experiment) had no effect on business investment, though they find some evidence consistent with improved risk mitigation.

Recent evidence from RCTs involving savings products seems more promising. For example, Dupas and Robinson (2009) find that in Kenya low-cost, but interest-free savings accounts had large positive effects on the savings and investment of female shopkeepers. Ashraf, Karlan and Yin (2006) find surprisingly high levels of uptake for a structured contractual savings product in the Philippines that committed users to restrict access to their savings over a certain time period. Access to a similarly structured savings device that was randomly offered to tobacco farmers in Malawi led to improved saving across seasons, greater investment, higher profit, and increased household consumption (Brune et al. 2011). These results also conform well with the fine-grained evidence from the 'financial diaries' of households in Bangladesh, India, and South Africa that shows that even very poor families

can and do save, often outside of the formal financial sector presumably due to a lack of appropriate product offerings (Collins et al., 2009).

The result of greater effectiveness for savings products in RCTs in improving the lives of the poor partly motivates our focus on the uptake of bank accounts in our analysis. The core of our analysis is the emergence of Equity Bank, an institution that shifted to providing banking services to low-income clients throughout Kenya (described in more detail below). This enables us to benchmark the effects of Equity's presence relative to the rest of the banking system in a manner similar to that used in other studies (e.g., Berger et al., 2005).

III. Data and Methodology

To explore the strategies behind the process of bank expansion in Kenya and its impact on the access to banking services, we combine in our study a novel dataset on bank presence at the district-level with household-level survey 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. The data were constructed by alternative data sources, including phone calls, official websites, banks' annual reports and government publications. The panel covers 45 commercial banks that operated in 65 Kenyan districts in the period between 2006 and 2009.[1] 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. In addition, this dataset set allows us to characterize the expansion of the whole banking 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 influenced banks).

As shown in Table 1, the Kenyan banking system expanded significantly 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% increase). The expansion involved all ownership categories of banks, namely domestic private banks,

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

foreign banks and government-influenced banks. However, the expansion was particularly driven by domestic private banks, among which Equity Bank played a very 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%. No other bank experienced such a growth in the same period. The number of bank branches of Barclays and Kenya Commercial Bank (i.e., the banks with the largest branch network after Equity Bank) grew only 92% and 44% respectively. As Table 2 shows, the strong branch expansion in Kenya occurred not only in urban districts but also in rural and arid and semi-arid districts.

Our household-level data is from the FinAccess surveys conducted by Financial Sector Deepening Trust Kenya (FSD Kenya) in 2006 and 2009. The 2006 survey consisted of 4,420 completed interviews, while the 2009 survey consisted 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 selected from the district with each cluster considering 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.

We use the FinAccess survey 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, in addition to providing information on access to banking and financial services, it 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.

Based on the FinAccess survey, 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 measure is a dummy variable 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 23 percent in

2009. The proportion of individuals having a loan from a bank had a more modest increase from 2.9 percent to 4.3 percent, respectively. While 95.2 percent of the individuals having a loan from a bank had a bank account, the remaining 4.8 percent of the individuals having a loan did not. Finally, Table 3 also reports descriptive statistics for the other individual and household-level variables that we employ from the FinAccess survey.

Methodology

As we noted earlier, while RCTs represent an important breakthrough in the study of financial inclusion, they are not suited to studying all topics of interest and carry limitations in terms of small sample sizes, diversity of contexts, robustness of results to small variations in the experimental design. Moreover, important developments in financial inclusion are taking place without the aid of experiments and are not amenable to study via randomization. We focus on one such episode – the rapid increase from 14 to 23 percent in the share of Kenyan adults that had a bank account from 2006 to 2009 – and try to explain it by exploring the expansion strategies by banks operating in Kenya, and in particular by Equity Bank, during the period 2006-2009.

In this paper we explore specifically two related questions. Does Equity Bank pursue different branching strategies from other commercial banks? If so, do these different expansion strategies lead to different effects on households' access to banking services? In order to examine the first question, we relate the number of branches by districts to a number of district-level characteristics. Our baseline specification takes the form

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

where *Branches* is the number of bank branches over the total number of banks in each group in district *d* at time *t*, μ is a time dummy and *X* is a set of variables at the district level. These variables indicate whether the district is a rural or arid and semi-arid district, the density population of the district, and the proportion of the population speaking a minority language or Swahili. We estimate this model by ordinary least square (OLS) for two samples: one excluding Equity Bank and one including only Equity Bank. Furthermore, to explore if the branch expansion of Equity Bank between 2006 and 2009 targeted the most underdeveloped

districts, we also augment our baseline specification with interaction terms between X and the 2009 dummy variable.

In order to answer our second question, we examine the impact of Equity Bank presence on financial inclusion. Specifically, we estimate an access to banking services Probit model in which our dependent variable, *Bank*, is a dummy variable indicating whether the individual *i* has a bank account in district *d* at the time *t*. Our main independent variables are, *Equity*, a dummy variable indicating whether Equity Bank operates in district *d* at time *t,* and *Branches*, the total number of bank branches of other banks operating in district *d* at time *t*. We apply district fixed effects to control for endogeneity arising from time-invariant district heterogeneity. For instance, they control for the initial level of development across districts. Thus, our baseline specification takes the form

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

where Pr denotes probability, *F* is the standard normal cumulative distribution function, μ is a set of district dummies, and z is a vector of control variables at the individual and household level. The control variables indicate household size, education, gender, wealth (measures by an asset score), house ownership, type of job, age, and language.[2] The parameters *a*, *β* and γ are estimated by maximum likelihood.

Next, we augment our baseline specification with interaction terms between *Equity* and a set of characteristics at the individual level (i.e., asset ownership, education and type of job) to examine potential heterogeneities in the impact of Equity Bank presence on access to financial services. These heterogenieties allow us to examine 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.

Finally, we examine the impact of Equity Bank presence on financial inclusion by estimating an access to banking services Ordered Probit model. In this model, our dependent variable takes the value 0 when the individual does not have either a bank account or a loan from a

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

bank, the value 1 when the individual has a bank account, and the value 2 when the individual has a loan from a bank.[3] Similar to our Probit model, our main dependent variables are *Equity* and *Branches*. Districts fixed effects are also considered in order to alleviate potential endogeneity problems.

IV. Results

This section presents our main results. The main goal is to establish evidence that the supply-side episode as represented by the expansion of bank branches, and in particular of Equity Bank, has actually increased access to financial services by the poor and low income people and hence fostered financial inclusion of the disadvantaged. To do this, we first examine the branching strategies followed by Equity Bank and other commercial banks in Kenya. Then, we evaluate the impact of Equity Bank presence and bank branch expansion on the use of bank accounts. Finally, we explore whether this impact has exhibited strong individual-specific patterns, with this effect being more important for the most vulnerable individuals.

a. Bank 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 areas, domestic private banks may exploit their superior knowledge of the culture and have a comparative advantage in rural 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 there are 30-40% people in central Kenya who cannot speak Swahili and only speak a minority language.

As a first exploration of this issue, Figure 1 presents the number of bank branches in 2006 and 2009 for three bank groups: foreign banks, government and government-influenced banks, and domestic private banks. In addition, the figure splits the districts according to different dimensions in terms of urbanization and demographics. The figure presents at least three stylized facts. First, between 2006 and 2009 all bank groups exhibited a significant branch expansion. Second, all bank groups showed a higher penetration in urban, English

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

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), play 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 (equation 1), comparing Equity Bank with all others in the banking system. Our dependent variable is the number of branches by district. For banks other than Equity, we divided the number of branches in a district by the number of banks, so that comparisons with Equity are made on a comparable basis. 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 and the others. On the one hand, other banks and Equity have greater branch penetration in urban and English speaking districts (models 1 and 2). On the other hand, Equity Bank differs on at least two dimensions. *First,* the coefficients associated with rural and arid and semi-arid districts are either not significant or marginally significant at standard confidence levels for Equity, while they are highly significant for 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 that of the coefficient for Equity. Overall, the results in models 1 and 2 suggest that Equity Bank has experienced an important branch expansion relative to other banks, in particular in underdeveloped non-urban districts.

Table 4 also indicates that the sensitivity of branch penetration to population density is lower for Equity Bank than others. In fact, the coefficient for population density is negative and significant for Equity Bank in model 2, indicating a preference for less densely populated districts (other factors held constant). This is particularly interesting in view of the African financial development gap observed at a macro level, in that most African countries tend to

have lower levels of financial development than would be predicted based on their fundamentals (ACCQS, 2010). 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.

As noted from Figure 1, all types of banks increased branch penetration in urban, English-speaking areas. The distinctions between Equity's branching strategy and that of other banks are better seen, therefore, by focusing on rural, semi-arid, and arid districts as we do in models 3-10. Equity does have a stronger tendency than other banks to enter rural markets as opposed to arid and semi-arid ones (models 3 and 4). Controlling for that tendency, however, population density is negatively and significantly associated with branching for Equity but not for other banks. This is similar to the result for the full sample of districts and again indicates that Equity was more willing to serve sparsely populated areas than other banks.

Models 3 and 4 also indicate that Equity's branch expansion into non-urban districts was more forceful than that for other banks. For Equity, the coefficient for the 2009 dummy variable is almost as large for the non-urban sample (model 4) as it is for the full sample (model 2). For other banks, the coefficient for the 2009 dummy variable is much smaller for the non-urban sample (model 3) than for the full sample (model 1). The constant remains much larger for Equity's branching than for other banks, even in non-urban areas (models 1-4). This shows Equity's greater general tendency to open branches regardless of district characteristics. Moreover, the ratio of Equity's constant to that of the others in the non-urban areas is 7-8, much larger than the same ratio for the full sample (2-3). This too shows that Equity went more heavily into non-urban districts than other banks.

By interacting the district characteristics with the 2009 dummy variable, we get a better sense of the types of districts that Equity Bank was entering from 2006 to 2009, and also indications that this was a shift from the pre-2006 branching strategy. The interactions between the 2009 dummy variable and the language variables are positive and significant (model 9). While the negative coefficients for minority dialect and Swahili speakers are larger (in absolute value) than the coefficients on the interactions, the positive coefficients on the interactions indicate that Equity moved toward serving non-English speakers from 2006 to 2009. A similar pattern holds for non-equity branches (model 6), but (a) the coefficients on the interactions are much smaller than for Equity, and (b) 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 sample. Therefore, it appears that Equity moved more toward non-English speakers than other banks.

The interaction between the 2009 dummy variable and population density is positive and significant for Equity Bank (model 8), but it is smaller in absolute value than the coefficient for population density, and the joint effect is not significantly different from zero indicating that Equity does not favor densely populated districts. Also, when we include the interactions for the language variables and population density together (model 10), the population density interaction is no longer significant, indicating that the negative relationship between population density and branching still holds for Equity from 2006 to 2009. In the non-Equity sample, there is never a significant negative relationship between population density and branching, regardless of the specification.

Thus, the overall evidence suggests that Equity Bank's branching has played a substantial role in promoting financial inclusion and, in addition, helping bridge the gap in financial development relative to other countries outside Africa. Below we will take a closer look at the role of Equity Bank in bank penetration and access to banking services.

b. Bank Penetration and Access: A Closer Look at Equity Bank

Our previous results suggest that Equity Bank has indeed pursued a different branching strategy from other commercial banks. Our next step is, therefore, to explore whether its expansion strategy has led to different effects on households' access to banking services. In

particular, this sub-section examines the impact of the presence of Equity Bank on the use of bank accounts at the district level. Table 5 reports the value of the marginal effects when estimating our access to banking services Probit model (equation 2) by maximum likelihood with clustering of the errors by district and year for robustness (see Petersen, 2009). We report first a regression with household characteristics, district level bank branch expansion by other banks and district fixed effects (model 1). Next, we also consider the presence of banks according to their ownership structure (i.e. foreign banks, government and government-influenced banks, and domestic private banks). We run these regressions with and without the dummy variable associated with Equity Bank presence (models 2 and 3). Finally, instead of a presence dummy variable, we consider the number of bank branches of banks according their ownership structure. Again, we run these regressions with and without the dummy variable associated with Equity Bank presence (models 4 and 5).

Table 5 shows some notable findings. *First,* we find that the presence of Equity Bank in a specific district has a positive impact on the residents' probability of having a bank account, which goes beyond the effect of bank expansion and presence of traditional commercial banks (models 1, 3, and 5). This effect is statistically significant at the 1% level regardless of the model specification and its magnitude reveals that Equity Bank presence has a first-order impact on financial access on households. The results suggest that the penetration of Equity Bank in a new district increases the probability of having a bank account between 3% and 6%. According to the FinAccess survey, the proportion of people having a bank account in Kenya was 14% in 2006 and 23% in 2009. Therefore, the magnitude associated with Equity Bank presence is economically significant. This finding is consistent with the fact that the business model of Equity Bank, which targeted middle- and low-income segments of the population using such strategies as local language requirement in its branches, had paid off in terms of greater financial inclusion.

Second, we find that the presence of domestic private banks (including Equity), government and government-influenced banks or foreign banks has a positive impact on the access to bank accounts at the district level (model 2). However, we find a hierarchy in these effects: the effect of foreign banks is around 3%, the effect of government and government-influenced banks is around 4%, and the effect of domestic private banks is around 5%.

Interestingly, the positive impact of the foreign banks is the smallest among the three groups. 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. 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 the branch itself) 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.

Third, the number of bank branches by district, a measure of banking sector outreach and competition, is an important determinant in the access to banking services. The coefficient on the total number of bank branches is positive and highly statistically significant (model 1). Moreover, the results suggest that the impact of each branch is stronger in foreign banks (model 5 and 6).

It is noteworthy that all control variables have strong explanatory power in the expected directions. On the one hand, females and individuals with large families and with no knowledge of English are less likely to have a bank account. On the other hand, 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 reasonably good, with Pseudo R^2 around 0.33 in all our specifications.

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

Until now we have presented evidence that Equity Bank's branch strategy has targeted under-served territories and had a first-order impact on access to banking services in Kenya. Specifically, the results in our previous section suggest that Kenyans residing in districts in which Equity Bank has started operations are likely to exhibit a higher probability of having a bank account. In view of the fact that the Equity Bank's business model is based on providing financial services to the rural poor, we would expect the impact of Equity Bank 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 6 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 with four interaction terms respectively: the interaction of the Equity Bank presence dummy with a score of the ownership of a set of physical assets, a dummy indicating if the individual is the homeowner, the education level, and the type of job. All the coefficients associated with the interactions terms have a negative sign and are highly significant at the 1% level, suggesting that the impact of Equity Bank on access to banking services is indeed heterogeneous across individuals with different characteristics. It is stronger in Kenyans with less wealth, without their 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 sectors generally ignored by traditional commercial banks. Finally, it is worth noting that all the main results and the sign of the coefficients associated with the new interaction terms remain unchanged even when all the interactions terms are included at the same time (model 5).

V. Robustness Checks and Extensions

We now wish to carry out additional robustness checks and extensions. Given that bank expansions are likely to have a nonrandom nature 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 7. All in all, the results remain qualitatively unchanged, with the main difference being a decrease in the impact of Equity Bank presence, from 4.2% to 2.5% (model 1). The coefficients remain highly significant at the 1% level.

Finally, 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 8 reports the coefficients and marginal effects from an access to banking services Ordered Probit model. Our dependent variable takes the value "0" whether the individual does not have either a bank account or a loan from a bank, the value "1" whether the individual has a bank account, and the value "2" whether the individual has a loan from a bank. The results

indicate that Equity Bank presence increases the probability of both having a bank account (column 3) and a bank loan (column 4). In line with our previous results, Equity Bank presence increases by almost 4% and 1.5% the probability of having a bank account and a bank loan respectively. This effect is statistically significant even after controlling for individual characteristics, district fixed effects and bank expansion of other banks at the district level. As reported by Table 8, bank penetration also has a positive and significant effect on access to credit.

VI. Conclusions

Although Sub-Saharan African countries have implemented an extensive package of economic and financial sector reforms over the last few decades, many of these countries still face a severe financial development gap relative not only to the advanced economies but also to other peer developing economies. A key obstacle to financial development is the access of the unprivileged sectors 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 other banks, and their impact on access to banking services in Kenya.

We emphasize the experience of Equity Bank in Kenya for two reasons. *First*, Kenya is a country whose financial development indicators are among the best in the Sub-Saharan Africa region and which has experienced a substantial growth in bank presence in recent years. *Second*, the branch banking network in Kenya has experienced rapid growth in recent years. This bank expansion has been led by Equity Bank, a pioneering institution that devised a banking service strategy targeting low income clients and traditionally under-served territories. Therefore, Kenya offers an interesting 'laboratory' for the study of financial access in the emergence of Equity Bank.

Taking advantage of the time dimension of our dataset, as an identification strategy, we exploit the within-district variation in Kenyans' access to banking services. This strategy avoids the pitfalls of cross-country studies that unobserved country-level factors can drive the empirical results and thus obstruct researchers from drawing clear implications.

This paper finds that branch expansion in the period 2006-2009 has led to greater financial access in Kenya. Most importantly, the analysis has shown that Equity Bank has had a first order effect in enhancing households' access to bank accounts and bank credit, especially for households with low income, without their own permanent house, with less education, and without anybody with a salaried job. These results highlight the importance of developing institutions such as Equity Bank with a business model focused on the provision of financial services to the population sectors ignored by traditional commercial banks and generating sustainable profits in the process. Such institutions can be an important solution to the financial access problem that has hindered the development of the financial sector in many developing countries.

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Table 1
Bank Branches over Time by Bank Name and Ownership

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

No	Local 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	25
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 for all variables used in this study at the district level, based on 2006 and 2009 FinAccess surveys, 1999 Kenyan census and alternative data sources, including 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 for all variables used in this study at the household level, based on 2006 and 2009 FinAccess surveys.

	2006					2009				
Variable	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
Bank account	4360	0.142	0.349	0	1	6562	0.227	0.419	0	1
Bank loan	4360	0.029	0.168	0	1	6562	0.044	0.204	0	1
Household size	4360	4.472	2.338	1	16	6562	4.959	2.600	1	20
Education: Primary	4360	0.317	0.465	0	1	6562	0.186	0.389	0	1
Education: Secondary	4360	0.229	0.420	0	1	6562	0.124	0.329	0	1
Education: Tertiary	4360	0.023	0.151	0	1	6562	0.007	0.082	0	1
Female	4360	0.558	0.497	0	1	6562	0.419	0.493	0	1
Asset score	4360	2.201	2.105	0	15	6562	2.723	2.761	0	18
Own permanent house	4360	0.130	0.336	0	1	6562	0.186	0.389	0	1
Income type: Agriculture	4360	0.417	0.493	0	1	6562	0.417	0.493	0	1
Income type: Waged	4360	0.173	0.378	0	1	6562	0.152	0.359	0	1
Income type: Business	4360	0.286	0.452	0	1	6562	0.286	0.452	0	1
Age group: 18-26	4360	0.203	0.402	0	1	6562	0.178	0.383	0	1
Age group: 25-36	4360	0.284	0.451	0	1	6562	0.258	0.438	0	1
Age group: 35-46	4360	0.198	0.399	0	1	6562	0.208	0.406	0	1
Age group: 45-56	4360	0.123	0.329	0	1	6562	0.134	0.340	0	1
Age group: 55+	4360	0.146	0.353	0	1	6562	0.183	0.387	0	1
Language: Swahili	4360	0.476	0.499	0	1	6562	0.647	0.478	0	1
Language: Minority language	4360	0.427	0.495	0	1	6562	0.231	0.422	0	1
Urban	4360	0.114	0.317	0	1	6562	0.158	0.365	0	1
Rural	4360	0.656	0.475	0	1	6562	0.649	0.477	0	1
Arid and Semi-Arid	4360	0.230	0.421	0	1	6562	0.193	0.395	0	1
Total bank branches	4360	29.347	67.468	0	230	6562	61.189	124.190	0	388
Bank branches (excluding Equity Bank)	4360	27.709	64.634	0	220	6562	56.249	116.231	0	362
Equity Bank branches	4360	1.638	2.971	0	10	6562	4.939	8.093	0	26
Equity Bank presence	4360	0.477	0.500	0	1	6562	0.873	0.333	0	1

Table 4
Bank Expansion Strategies

This table reports OLS estimates from a model of the number of bank branches over number of banks in each group against the variables listed below. 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)	(9)	(10)
	Whole Sample		Rural and Arid and Semi-Arid Districts							
Dep. variable: Number of branches over number of banks	Equity Bank excluded	Equity Bank	Equity Bank excluded	Equity Bank	Equity Bank excluded	Equity Bank excluded	Equity Bank excluded	Equity Bank	Equity Bank	Equity Bank
Rural	-3.403**	-6.440	0.101***	0.835***	0.101***	0.101**	0.101**	0.835***	0.834***	0.834**
	(1.413)	(3.898)	(0.038)	(0.312)	(0.038)	(0.038)	(0.038)	(0.312)	(0.313)	(0.315)
Arid and Semi-Arid	-3.504**	-7.276*								
	(1.415)	(3.929)								
log(Density population)	-0.068	-0.311**	-0.015	-0.166**	-0.021	-0.015	-0.019	-0.248***	-0.166**	-0.191**
	(0.045)	(0.134)	(0.013)	(0.076)	(0.013)	(0.013)	(0.013)	(0.078)	(0.076)	(0.084)
Language: Minority language	-4.961**	-17.880***	-1.115**	-7.328***	-1.115**	-1.137**	-1.119**	-7.329***	-7.817***	-7.685***
	(2.283)	(6.334)	(0.493)	(2.735)	(0.493)	(0.495)	(0.492)	(2.735)	(2.731)	(2.718)
Language: Swahili	-5.047**	-18.666***	-1.130**	-7.921***	-1.130**	-1.161**	-1.146**	-7.922***	-8.299***	-8.194***
	(2.325)	(6.452)	(0.489)	(2.684)	(0.489)	(0.492)	(0.490)	(2.685)	(2.768)	(2.762)
Dummy (2009=1)	0.101**	1.045***	0.053***	0.828***						
	(0.046)	(0.282)	(0.008)	(0.152)						
log(Density population)					0.011***		0.007	0.164***		0.049
					(0.002)		(0.005)	(0.031)		(0.077)
Language: Minority language						0.045***	0.009		0.971***	0.708**
						(0.014)	(0.028)		(0.258)	(0.310)
Language: Swahili						0.064***	0.035		0.745***	0.539
						(0.016)	(0.026)		(0.275)	(0.484)
Constant	8.567***	25.869***	1.167**	7.948***	1.194**	1.194**	1.193**	8.362***	8.366***	8.364***
	(2.425)	(6.585)	(0.490)	(2.676)	(0.491)	(0.493)	(0.495)	(2.712)	(2.720)	(2.731)
Observations	129	129	125	125	125	125	125	125	125	125
Adjusted R-squared	0.748	0.524	0.230	0.219	0.229	0.223	0.217	0.211	0.209	0.204

Table 5
Access to Banking Services and Bank Presence

This table reports estimates from a Probit model of the probability of having a bank account against the variables listed below. The data consists of 4,360 individual interviewed in 2006 and 6,562 individual in 2009. 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***
	(0.0017)	(0.0017)	(0.0017)	(0.0017)	(0.0017)
Education: Primary	0.0006	-0.0086	-0.0072	-0.0004	0.0030
	(0.0124)	(0.0135)	(0.0138)	(0.0122)	(0.0127)
Education: Secondary	0.1181***	0.0971***	0.0992***	0.1158***	0.1210***
	(0.0217)	(0.0192)	(0.0197)	(0.0215)	(0.0224)
Education: Tertiary	0.2886***	0.2161***	0.2198***	0.2787***	0.2896***
	(0.0490)	(0.0619)	(0.0628)	(0.0489)	(0.0496)
Female	-0.0572***	-0.0565***	-0.0564***	-0.0574***	-0.0568***
	(0.0069)	(0.0074)	(0.0074)	(0.0069)	(0.0069)
Asset score	0.0283***	0.0295***	0.0294***	0.0283***	0.0281***
	(0.0047)	(0.0041)	(0.0040)	(0.0047)	(0.0046)
Own permanent house	0.0531***	0.0499***	0.0499***	0.0522***	0.0516***
	(0.0155)	(0.0157)	(0.0157)	(0.0157)	(0.0156)
Income type: Agriculture	0.0330**	0.0264*	0.0266*	0.0320**	0.0324**
	(0.0143)	(0.0141)	(0.0141)	(0.0142)	(0.0142)
Income type: Wage	0.2152***	0.2032***	0.2045***	0.2136***	0.2158***
	(0.0254)	(0.0266)	(0.0269)	(0.0249)	(0.0253)
Income type: Business	0.1512***	0.1446***	0.1446***	0.1509***	0.1510***
	(0.0191)	(0.0174)	(0.0174)	(0.0190)	(0.0190)
Age group: 18-26	0.1448**	0.1649**	0.1630**	0.1451**	0.1418**
	(0.0655)	(0.0644)	(0.0641)	(0.0651)	(0.0648)
Age group: 25-36	0.3200***	0.3340***	0.3323***	0.3211***	0.3180***
	(0.0716)	(0.0723)	(0.0722)	(0.0710)	(0.0710)
Age group: 35-46	0.4052***	0.4171***	0.4153***	0.4067***	0.4032***
	(0.0819)	(0.0826)	(0.0825)	(0.0813)	(0.0813)
Age group: 45-56	0.4227***	0.4340***	0.4323***	0.4239***	0.4211***
	(0.0817)	(0.0824)	(0.0823)	(0.0810)	(0.0811)
Age group: 55+	0.4056***	0.4127***	0.4113***	0.4060***	0.4035***
	(0.0833)	(0.0854)	(0.0852)	(0.0828)	(0.0827)
Language: Swahili	-0.1085***	-0.1051***	-0.1056***	-0.1090***	-0.1095***
	(0.0137)	(0.0148)	(0.0148)	(0.0135)	(0.0135)
Language: Minority language	-0.1345***	-0.1356***	-0.1341***	-0.1374***	-0.1336***
	(0.0115)	(0.0128)	(0.0130)	(0.0110)	(0.0113)
Bank branches	0.0010***				
	(0.0000)				
Equity Bank presence	0.0424***		0.0233**		0.0434***
	(0.0108)		(0.0093)		(0.0116)
Foreign bank presence		0.0298*	0.0278*		
		(0.0161)	(0.0162)		
Gov. and gov.-influenced banks presence		0.0381***	0.0302**		
		(0.0127)	(0.0136)		
Domestic private banks presence		0.0467**	0.0364**		
		(0.0183)	(0.0185)		
Foreign bank branches				0.0115***	0.0122***
				(0.0032)	(0.0031)
Gov. and gov.-influenced bank branches				0.0011	-0.0020
				(0.0037)	(0.0035)
Domestic private bank branches				-0.0124***	-0.0119***
				(0.0036)	(0.0036)
Observations	10922	10922	10922	10922	10922
Pseudo R-squared	0.332	0.327	0.327	0.332	0.333
District Fixed Effects	YES	YES	YES	YES	YES

Table 6
Interaction Effects

This table reports estimates from a Probit model of the probability of having a bank account against the variables listed below. The data consists of 4,360 individual interviewed in 2006 and 6,562 individual in 2009. 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 x Equity Bank presence			-0.0515***		-0.0414**
			(0.0156)		(0.0163)
Wage 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
Control Variables	YES	YES	YES	YES	YES
District Fixed Effects	YES	YES	YES	YES	YES

Table 7
Rural and Arid and Semi-Arid Districts

This table reports estimates from a Probit model of the probability of having a bank account against the variables listed below. The data consists of 4,360 individual interviewed in 2006 and 6,562 individual in 2009. 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	-0.0039***	-0.0037***	-0.0038***	-0.0036***	-0.0039***
	(0.0013)	(0.0013)	(0.0013)	(0.0014)	(0.0013)
Education: Primary	0.0125	0.0070	0.0086	0.0123	0.0144*
	(0.0087)	(0.0081)	(0.0083)	(0.0085)	(0.0086)
Education: Secondary	0.1110***	0.1009***	0.1038***	0.1101***	0.1138***
	(0.0150)	(0.0133)	(0.0138)	(0.0152)	(0.0155)
Education: Tertiary	0.2862***	0.2714***	0.2788***	0.2710***	0.2846***
	(0.0967)	(0.0944)	(0.0955)	(0.0961)	(0.0989)
Female	-0.0432***	-0.0428***	-0.0428***	-0.0430***	-0.0427***
	(0.0067)	(0.0065)	(0.0065)	(0.0067)	(0.0066)
Asset score	0.0314***	0.0320***	0.0318***	0.0314***	0.0312***
	(0.0026)	(0.0026)	(0.0026)	(0.0026)	(0.0026)
Own permanent house	0.0493***	0.0496***	0.0495***	0.0482***	0.0477***
	(0.0135)	(0.0133)	(0.0133)	(0.0136)	(0.0135)
Income type: Agriculture	0.0217	0.0201	0.0205	0.0209	0.0213
	(0.0136)	(0.0136)	(0.0136)	(0.0136)	(0.0136)
Income type: Wage	0.1868***	0.1818***	0.1838***	0.1854***	0.1873***
	(0.0303)	(0.0297)	(0.0300)	(0.0301)	(0.0303)
Income type: Business	0.1018***	0.0998***	0.0999***	0.1017***	0.1016***
	(0.0196)	(0.0194)	(0.0194)	(0.0196)	(0.0196)
Age group: 18-26	0.1971**	0.2072**	0.2027**	0.1974**	0.1920**
	(0.0877)	(0.0902)	(0.0894)	(0.0867)	(0.0858)
Age group: 25-36	0.3732***	0.3822***	0.3780***	0.3749***	0.3696***
	(0.1020)	(0.1036)	(0.1034)	(0.1009)	(0.1006)
Age group: 35-46	0.4738***	0.4821***	0.4776***	0.4760***	0.4702***
	(0.1079)	(0.1094)	(0.1093)	(0.1068)	(0.1067)
Age group: 45-56	0.5018***	0.5098***	0.5054***	0.5036***	0.4983***
	(0.1148)	(0.1158)	(0.1159)	(0.1136)	(0.1137)
Age group: 55+	0.4874***	0.4949***	0.4912***	0.4882***	0.4835***
	(0.1098)	(0.1111)	(0.1111)	(0.1088)	(0.1087)
Language: Swahili	-0.0795***	-0.0764***	-0.0771***	-0.0805***	-0.0807***
	(0.0143)	(0.0144)	(0.0145)	(0.0142)	(0.0143)
Language: Minority language	-0.0981***	-0.1009***	-0.0995***	-0.0997***	-0.0974***
	(0.0110)	(0.0110)	(0.0111)	(0.0106)	(0.0108)
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)
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
District Fixed Effects	YES	YES	YES	YES	YES

Table 8
Access to Credit

This table reports estimates from a ordered Probit model of the probability of access to bank services against the variables listed below. 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; it takes the value 2 if the individual has a bank loan. The data consists of 4,360 individual interviewed in 2006 and 6,562 individual in 2009. 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
Household size	-0.0236***	0.0044***	-0.0032***	-0.0012***
	(0.0075)	(0.0014)	(0.0010)	(0.0003)
Education: Primary	0.0102	-0.0019	0.0013	0.0005
	(0.0481)	(0.0090)	(0.0065)	(0.0024)
Education: Secondary	0.4613***	-0.0867***	0.0631***	0.0236***
	(0.0453)	(0.0084)	(0.0061)	(0.0024)
Education: Tertiary	0.8370***	-0.1574***	0.1145***	0.0428***
	(0.1105)	(0.0207)	(0.0153)	(0.0057)
Female	-0.2897***	0.0544***	-0.0396***	-0.0148***
	(0.0352)	(0.0065)	(0.0048)	(0.0018)
Asset score	0.1339***	-0.0251***	0.0183***	0.0068***
	(0.0075)	(0.0013)	(0.0010)	(0.0004)
Own permanent house	0.2188***	-0.0411***	0.0299***	0.0112***
	(0.0416)	(0.0078)	(0.0057)	(0.0021)
Income type: Agriculture	0.1406**	-0.0264**	0.0192***	0.0072***
	(0.0672)	(0.0126)	(0.0092)	(0.0034)
Income type: Wage	0.8507***	-0.1600***	0.1164***	0.0435***
	(0.0667)	(0.0123)	(0.0089)	(0.0037)
Income type: Business	0.643***	-0.1209***	0.0880***	0.0329***
	(0.0636)	(0.0118)	(0.0086)	(0.0034)
Age group: 18-26	0.5530***	-0.104***	0.0756***	0.0283***
	(0.1766)	(0.0332)	(0.0241)	(0.0091)
Age group: 25-36	1.1742***	-0.2208***	0.1606***	0.0601***
	(0.1749)	(0.0327)	(0.0239)	(0.0092)
Age group: 35-46	1.3964***	-0.2626***	0.1911***	0.0715***
	(0.1756)	(0.0328)	(0.0239)	(0.0093)
Age group: 45-56	1.3846***	-0.2604***	0.1895***	0.0709***
	(0.1778)	(0.0332)	(0.0242)	(0.0094)
Age group: 55+	1.3174***	-0.2477***	0.1803***	0.0674***
	(0.1786)	(0.0334)	(0.0244)	(0.0094)
Language: Swahili	-0.5212***	0.0980***	-0.0713***	-0.0267***
	(0.0489)	(0.0091)	(0.0066)	(0.0026)
Language: Minority language	-0.8039***	0.1512***	-0.1100***	-0.0411***
	(0.0610)	(0.0113)	(0.0083)	(0.0034)
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			
District Fixed Effects	YES	YES	YES	YES

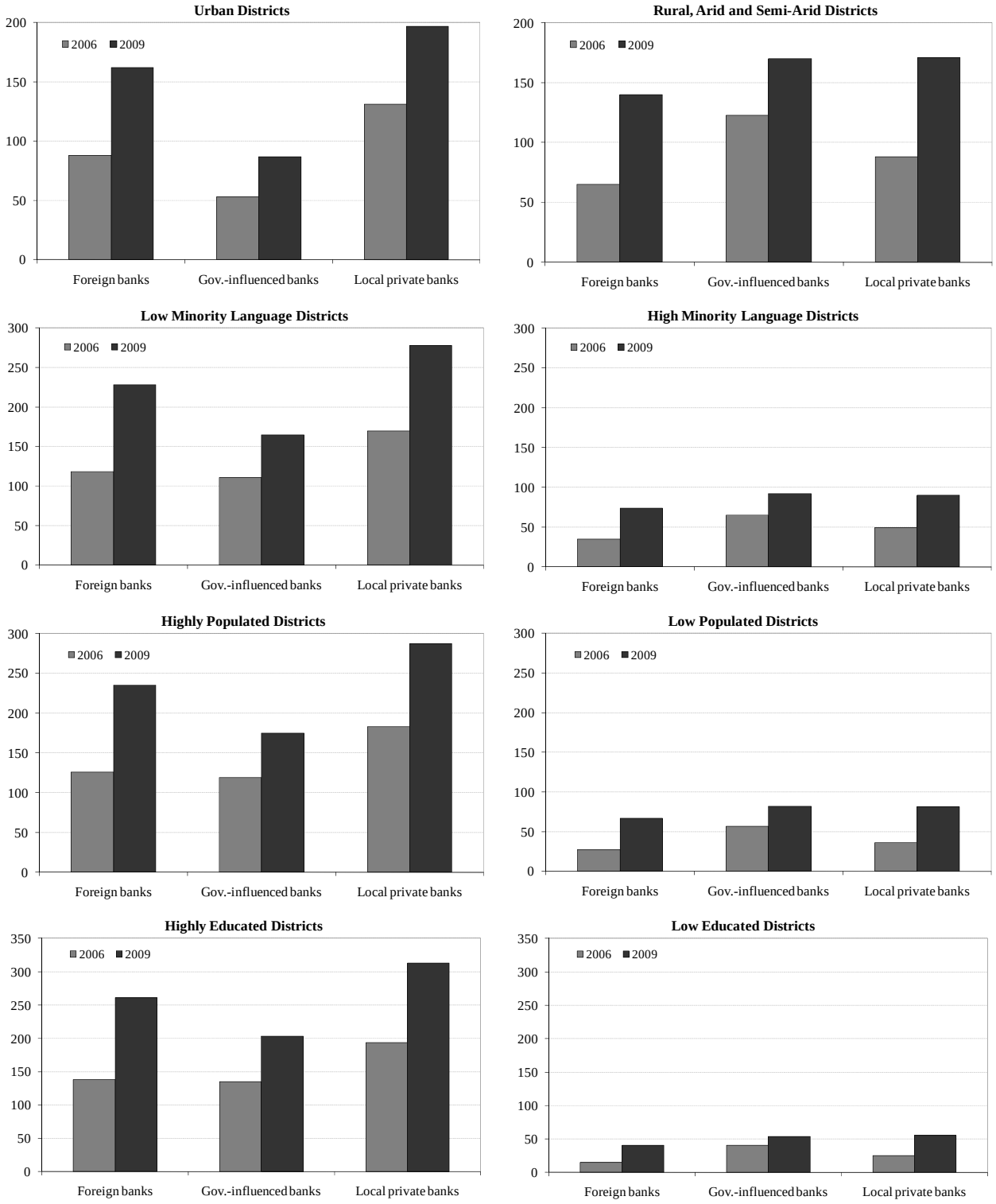


Figure 1. Bank Penetration in Kenya. This Figure shows the number of bank branches according to different ownership structures: Foreign banks, Government banks, and Domestic private banks. Urban districts include Nairobi and Mombasa districts. Low minority language districts are the ones where the share 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.