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Improving Access to Banking: Evidence from Kenya

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ABSTRACT

We explore the relationship between bank branch expansion, financial inclusion and profitability for Equity Bank. Unlike traditional banks in Kenya, Equity Bank pursues branching strategies that target underserved territories and less privileged households. Its presence has a positive and significant impact on households’ access to bank accounts and credit. It increased financial inclusion by 31 percent of the adult population between 2006 and 2015. Access is especially improved for Kenyans who are less educated, do not own their own home and live in less-developed areas. Equity Bank’s business model proves to be profitable both at bank and branch level.

JEL CODES: G2; O1; R2.

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

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1. Introduction

Despite extensive economic and financial sector reforms over the last few decades, many Sub-Saharan African countries still face severe financial development gaps in terms of access to financial services relative to not only the advanced economies but also other peer developing ones (Allen, Carletti, Cull, Qian, Senbet and Valenzuela, 2014, 2016).¹ A key issue is access of the disadvantaged to finance, which would promote economic growth at the broadest level. In fact, 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, Dalal, Goland, Gonzalez, Morduch and Schiff, 2013; Honohan, 2008). In light of the ample empirical evidence of a positive linkage between access to finance and economic development (Burgess and Pande, 2005; Levine, 2005), a fundamental question is how to spur access to finance among the disadvantaged. While the success of microfinance institutions (MFIs) such as Grameen Bank has captured the attention of economists and policy makers, the provision of microfinance to low-income market segments in a financially self-sustaining way continues to be a major challenge.² In addition, some MFIs have, at times, been beset by non-repayment problems (for example, in Andhra Pradesh) and high costs of financing, and financial alternatives for the poor are few. Given the high transaction costs of lending small amounts, most commercial banks are incapable of extending credit profitably and, therefore, view the sectors targeted by MFIs as ‘unbankable,’ while moneylenders generally charge usurious rates of interest. In view of these issues, Bubna and Chowdhry (2010) propose a model of financial inclusion based on the use of information available within the local population, a model that is being exploited by domestic banks like Equity Bank in Kenya.

The understanding of which specific policies and institutions best promote financial inclusion

¹ Gaps in access to financial services for some market segments are an indication of financial exclusion. Financial inclusion refers to the use of formal financial services at affordable costs by all the segments of the population.

² Although there was a period when the microfinance practice focused on group lending, an emerging literature documents the gradual shift toward individual liability lending, especially among commercial banks that have moved into microfinance. See, for example, Ahlin and Suandi (2018), de Quidt, Fetzer and Ghatak (2018a, 2018b), Giné and Karlan (2014), and Cull, Demircuc-Kunt and Morduch (2018).

in environments plagued by asymmetric information, weak institutions and the absence of basic infrastructures necessary for banking is still limited. Allen, Demirguc-Kunt, Klapper, and Martinez Peria (2016) explore the barriers to financial inclusion and the policies that are effective in promoting inclusion among the most vulnerable individuals. Using data for 123 countries, they find that financial inclusion is associated with greater proximity to bank branches, lower banking costs, stronger legal rights and more politically stable environments. Geographic proximity also appears important in single country studies. Nguyen (2018) shows that bank branch closings in the U.S. led to a sharp and persistent decline in credit supply to local small businesses.

One important question is the role played by financial institutions in spurring access to finance, through their expansion strategies.³ One complication in this study is the lack of suitable data in most contexts. Data collected from financial institutions are often aggregated at the country level, which makes it impossible to assess the causal effects of bank expansion on financial inclusion across geographical areas within a country as well as on banks' profitability.⁴ We take one step further in studying the relationship between bank branch penetration policies, financial inclusion and bank profitability by examining the case of Equity Bank, a pioneering institution that devised a banking service strategy targeting low income clients and underserved geographic areas in Kenya. Equity Bank's record in improving financial inclusion has been impressive. In 2006, it had 1 million customers, representing 5 percent of the population aged 15 and over. By 2015 the number of customers had risen to 10 million representing 36 percent of the adult population (Equity Bank, 2015).

Studying Equity Bank's branching strategies and profitability can shed light on the literature and practice of financial inclusion in several dimensions. First, Kenya has made strides in financial

³ Meidan (1984) distinguishes between three categories of bank marketing strategies: defensive, offensive and rationalization. Banks that follow an offensive strategy, like Equity Bank, attempt to penetrate new areas, expand geographically and seize market opportunities to become leaders in their markets. Banks that follow a defensive strategy attempt to maintain the present market share, by concentrating in a specific niche or by being a market follower. Banks that follow a rationalization strategy focus on cost reduction, by closing bank branches and by reducing expensive services.

⁴ 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 (Beck, Demirguc-Kunt and Martinez Peria, 2007).

inclusion, but without commensurate progress in the quality of the formal institutions that support provision of financial services (Kaufmann, Kraay and Mastruzzi, 2010). Despite these limitations, the country has witnessed a notable expansion in its network of financial services touch points, such as bank branches, bank agents and mobile money agents compared to its African peers.⁵ However, Kenya is still characterized by latent demand for banking services, especially outside urban areas (Dupas, Keats, Green and Robinson, 2016). Second, and perhaps most importantly, the focus on Equity Bank and its branch expansion policy allows us to study the relationship between bank branch penetration, financial inclusion and bank profitability in depth. To overcome the typical lack of suitable data, we obtain micro-level data on bank branch networks for all commercial banks in Kenya and merge it with nationally representative household surveys of financial usage. We also collect branch-level data on the profitability, credit quality and financial structure of all branches of Equity Bank, and conduct analyses to benchmark its profitability relative to that of other banks in Kenya. These various data sources are key in evaluating the effects of Equity Bank's expansion into underserved markets on financial inclusion and its own profitability, both at the bank and at the branch level.

We investigate three related questions. Did Equity Bank pursue a different branching strategy than other banks in Kenya, one that placed greater emphasis on serving the economically disadvantaged? If so, what effect did this expansion strategy have on households' usage of banking services? Finally, was Equity Bank's branch expansion and emphasis on underserved clienteles profitable? In our *first* set of results, we find that Equity Bank pursued a different branching strategy 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 expanded significantly more to underserved districts between 2006 and 2009 than other banks. In our *second* set of results, we find that the presence of Equity Bank branches is strongly positively linked to the

⁵ The proportion of the population living within a 3 kilometer distance of a financial access touch point is 59 percent for Kenya, 44 percent for Uganda, 43 percent for Nigeria and 28 percent for Tanzania. In terms of financial access touch points per 100,000 people, Kenya has 162, Uganda 63, Tanzania 49 and Nigeria 11 (<http://www.fspmmaps.com>).

likelihood of residents having both bank accounts and loans, especially for Kenyans who are less educated, do not own their own home and live in rural and arid (semi-arid) areas. In our *third* set of results, we find that the business model of Equity Bank was profitable at both the bank and branch levels. In particular, our branch level analysis shows that the expansion of Equity Bank into arid and semi-arid areas was more profitable than its expansion into urban and rural areas as it allowed the bank to pursue an aggressive pricing schedule, reduce its delinquency rates and secure stable, inexpensive funding from retail deposits in those areas. These findings suggest that the business model followed by Equity Bank played a key role in the provision of basic financial services to population segments typically ignored by traditional banks while generating higher profits than those of other banks operating in Kenya.

Several papers have attempted to identify policies and innovations that have a causal impact on financial inclusion through randomized controlled trials (RCTs).⁶ Although RCTs represent an important breakthrough in the study of financial inclusion, they typically have 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 are taking place without the aid of experiments and are not amenable to study via randomization. We view our nationally-representative evidence on financial access, branch penetration and performance as complementary to the evidence from RCTs, which usually focuses on a small set of communities.⁷ While not relying on a RCT, we develop an identification strategy that can gauge an aggregate impact.

Our study is close in spirit to Brown, Guin and Kirschenmann (2016) and Bruhn and Love (2014). Brown et al. (2016) find similar gains as ours in bank account usage associated with the

⁶ See, for example, Banerjee, Duflo, Glennerster and Kinnan (2015), Brune, Giné, Goldberg and Yang (2016), Dupas and Robinson (2013), Dupas et al. (2016), and Karlan and Zinman (2011).

⁷ Our paper also expands international evidence on the determinants of access to financial services in less developed economies (Beck and Brown, 2011) and in Kenya (Beck, Cull, Fuchs, Getenga, Gatere, Randa and Trandafir 2010; Beck, Maimbo, Faye and Triki, 2011).

expansion of a microfinance provider (ProCredit) in Albania, Bulgaria, Macedonia, and Serbia. Similarly to our study, that paper finds that ProCredit was more likely to enter areas with relatively poor households and that the increase in account usage was more pronounced among low- and middle-income households. Bruhn and Love (2014) show that the entry of Mexico's Banco Azteca, which opened a large number of branches in retail stores of the *Grupo Elektra* in 2002, played an important role in raising the incomes of the poor. Like Equity Bank, Banco Azteca is a bank for low-income individuals, which has reduced transaction costs, acquired effective information and enforced loan repayment. Although the Kenyan episode that we study lacks the quasi-experimental characteristics of Azteca, the expansion of Equity Bank's business model to other countries in the region, its financial performance and the sheer magnitude of the increase in its customers from 5% of the adult population in 2006 to 36% in 2015 eclipses any of the other banks and our investigation of the drivers of profitability across geographic areas make this an episode worthy of study. This case is also interesting as the business model of Equity Bank has coincided with an outstanding financial performance. From August 2006 to December 2015, Equity's stock price increased by 900 percent compared to 160 percent for Kenya Commercial Bank, 27 percent for Barclays Bank of Kenya, and 122 percent for the FTSE/JSE Africa Banks Index (see Figure 1).

In sum, our work provides a deeper investigation of bank branching strategies targeting poorer households and areas largely ignored by traditional commercial banks as well as the drivers of profitability across geographic areas. Despite a large body of research that explores branching strategies and the determinants of bank profitability, most of this empirical work has followed individual banks, in part because no meaningful statistics at the branch level are usually reported publicly. In contrast to the previously mentioned papers, in this paper we are able to combine data on branch expansion and financial inclusion with Equity Bank's internal data at the branch level to understand the elements of the bank business strategy and the associated drivers of its profitability.

2. Equity Bank: Institutional Background

Kenya has emerged to be at the frontier of financial inclusion in several ways. Among them is the advent of an innovative and entrepreneurial bank, Equity Bank, which has devised a business strategy to tap into the traditionally underserved populations among the most geographically neglected areas of the country. Equity Bank has played a key role in fostering financial inclusion in Kenya and in the neighboring countries in East Africa while remaining profitable in the process. By 2013, Equity Bank became the largest bank in Africa in terms of customers. At the same time, according to the *Financial Times*' 2014 ranking of the world's Top 1,000 banks, Equity Bank generated the highest rate of return in Africa with a return on assets of 7 percent and a return on capital of 55 percent. In 2006, Equity Bank was listed by introduction on the Nairobi Securities Exchange (NSE) where it has become the largest bank by market capitalization with roughly 28,000 shareholders, with an impressive annual stock price appreciation of 28 percent from 2006 to 2015 (Figure 1).⁸ Given its success, Equity Bank has been expanding its business to other countries, such as Uganda, Tanzania, Rwanda and South Sudan.

Equity Bank's business model was the result of a turnaround process that started in 1993. Originally known as Equity Building Society (EBS), and founded as a family-run business in 1984, the institution specialized in providing mortgage loans and targeted low-income Kenyans. Narrow specialization and lack of proper governance brought little success. A period of poor performance led to an accumulation of non-performing loans which, by 1993, accounted for more than 50 percent of the EBS portfolio (Beim and Low, 2010). At that point, the EBS was declared technically insolvent by the Central Bank of Kenya. Given its potential and its focus on serving the poor, however, the

⁸ The listing by introduction implied that the bank neither issued new shares nor raised any capital through the listing. The purpose of the listing was to offer its shareholders the benefits of stock market liquidity and price discovery. In December 2007, Helios (a private equity investing firm) completed the \$179 million acquisition of a 24.99% interest in Equity Bank that generated significant proceeds for the bank. However, most of the proceeds were used to upgrade the bank's software and credit risk management systems as well as to expand abroad (<https://www.heliosinvestment.com/equity-bank>). The expansion that Equity Bank started in 2006 in Kenya relied on retained earnings and retail deposits (Equity Bank, 2006).

institution was allowed to continue its operations conditional on a capital injection.

In 2004 Equity obtained the status of a fully regulated commercial bank and James Mwangi became the Chief Executive Officer. Under his leadership, the bank went through a major transformation process, including the restructuring of the governance system, the expansion of the distribution network, a greater focus on corporate culture and employee development that includes acquiring local knowledge and expertise, and a diversification beyond mortgages to microcredit offerings tailored to its target market segment.⁹ To this end, the bank implemented a polycentric management approach, in which local professionals are recruited for managerial positions, to guarantee that each branch manager speaks local languages.

Starting from just 13 regular branches in 2002, that number increased more than ten-fold by 2009 when Equity Bank was operating 155 branches in Kenya (Equity Bank, 2009). Its branch expansion enabled Equity Bank to secure stable, inexpensive funding by attracting retail deposits. Importantly, the bank was willing to reach out to the distant and relatively unsafe areas largely ignored by its competitors. Hence, in addition to permanent locations, it also exploited mobile branches—trucks with armed guards and chaser cars driving to the sites that did not have enough customers to support a permanent branch. By 2006, the ordinary branches became overcrowded: Equity Bank had an average of 24,238 customers per branch compared to an industry average of 6,383 clients (Saloner et al., 2007). To manage its growing client base, the bank invested in alternative distribution channels including an ATM network and point of sale services (Equity Bank, 2009). At the same time, the bank started to operate through mobile and internet banking channels. Finally, Equity Bank put much effort into retaining its clients as they became wealthier by the introduction of its ‘prestige’ branches.

Equity Bank targeted low-income customers who were previously considered ‘unbankable’ by

⁹ Between 2002 and 2005, Equity Bank’s governance system experienced a progressive evolution to its current situation, which is now similar to best global practices. Our results are unlikely to be driven by changes in governance as they occurred before our period of study and cannot explain heterogeneities across geographic areas, the focus of the paper.

major competitors.¹⁰ The target groups included micro entrepreneurs, salaried workers, small-scale farmers, small and medium enterprises and private individuals. A major part of this segment had neither trust in banks nor much understanding of financial products. To induce them to become bankable, potential clients were offered a range of products tailored to their personal needs, including loans as small as 500 Ksh (about US\$ 5.81) at a time when the average size of a loan was 16,000 Ksh.¹¹ By tailoring their offerings in this way, rejected loan applications were kept to a minimum, and rejected customers received detailed guidance on the requirements for a successful application. To make the products even more attractive and accessible, Equity Bank expanded its range of eligible collateral, required only a National ID card to complete a loan application, waived the minimum balance requirements and maintenance fees for deposit accounts that were pervasive in the industry and charged withdrawal fees that were ten times lower than the industry average (Saloner et al., 2007).¹²

Expansion to previously unbankable areas, soft eligibility requirements and major efforts to retain its clients allowed the bank to maintain an aggressive pricing schedule reflected in higher lending-deposit interest rate spreads, a measure of market power (Saloner et al., 2007). In 2006 Equity Bank kept its deposit rate at 1.25 percent while competitors' rates reached 6 percent. However, for many of their customers, a bank account with Equity Bank was the only viable option for keeping money safe. The average lending rates charged by Equity Bank were also somewhat higher than the industry average (18 percent versus 14 percent). Such rates were sustainable given limited competition from other players for the low-income market segment focused on microcredit.

¹⁰ In the mid-1990s following a recession in Kenya a number of international banks (ABN Amro, Standard Chartered and Barclays) abruptly stopped their activities in rural areas, giving their customers little notice. This offered an opportunity for Equity Bank. It estimated an active labor force in Kenya of 15 million people, mostly small-scale farmers (50 percent) and workers engaged in the informal sector (40 percent); at that time, the total number of bank accounts held in Kenya was less than 3 million, implying that the majority of the labor force was 'unbanked.' In view of these facts, Equity Bank planned its expansion to target this unexploited market (Equity Bank, 2006).

¹¹ See "Kenya's Biggest Bank: The Cult of Equity," *The Economist* December 8th, 2012.

¹² Equity Bank demanded some client loyalty. Customers were prohibited from having an account at any other bank.

3. Bank Expansion Strategies in Kenya

Different types of banks are likely to follow different expansion strategies. While foreign banks may target a set of elite customers and prefer urban areas, domestic banks may exploit their superior knowledge of local communities 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 only speak a minority language. In addition, government-owned banks may pursue non-profit goals in their branching and expansions.

To characterize bank branch expansions, we construct a new dataset based on bank branch locations, which we aggregate to construct a district-level panel on the number of branches by bank.¹³ The panel data set covers 45 commercial banks that operated in 65 Kenyan districts in the period between 2006 and 2009.¹⁴ As shown in Table 1, the Kenyan banking system expanded greatly in terms of number of branches. Between 2006 and 2009, the total number of bank branches in Kenya increased from 576 to 970. 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 112. No other bank expanded by this many branches in the same period, making it difficult to attribute the magnitude of the expansion of Equity Bank exclusively to an improvement in growth opportunities. The strong branch expansion in Kenya occurred not only in urban districts but also in rural, arid and semi-arid districts (see Table A.1 in the Appendix).

To explore whether Equity Bank pursued distinct branching strategies from other banks in Kenya, we relate the number of branches of Equity and other banks (or groups of banks) by district to a number of district-level characteristics. Our baseline reduced-form model takes the form:

¹³ Data sources on bank branches include official websites, Central Bank of Kenya publications and banks' annual reports.

¹⁴ 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 that were subdivided into 69 districts; the survey data we use in this study cover 65 of those districts.

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

where the dependent variable *Branches* is the number of bank branches in district *d* at time *t* for Equity Bank and other individual banks, while for groups of banks it is the number of branches over the total number of banks in each group (based on ownership types). Thus, for each ownership type, this is a measure of average branches per bank, to put them on a comparable basis with Equity Bank branches at the district level. Among the explanatory variables, A_t is a fixed effect for 2009 and X_d is a set of district-level control variables for 2006. The control 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.¹⁵ Table A.1 in the Appendix reports descriptive statistics for all the variables used in the analysis by district.

We separately estimate this model by ordinary least square (OLS) for Equity Bank, three types of banks (foreign private banks, government-influenced banks and domestic private banks *excluding* Equity Bank) and three other individual banks (Co-operative, Barclays and Kenya Commercial Bank).¹⁶ We cluster standard errors by district. Furthermore, to explore if the branch expansion of Equity Bank between 2006 and 2009 targeted more underserved districts, we augment our baseline specification with the interactions of our 2009 dummy variable with the district-level proportion of people speaking a minority language and an arid and semi-arid dummy variable, respectively.

Table 2 reports our estimates of the correlates of the number of bank branches per district in year *t* (Equation 1), comparing Equity Bank with the previously mentioned three groups of banks in the banking system. 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,

¹⁵ The Financial Sector Deepening (FSD) Kenya FinAccess questionnaire and the household survey asked respondents to indicate that their primary language was one of 10 different options: English, Swahili, Kikuyu, Luo, Meru, Kisii, Luhya, Kalenjin, Kamba and Somali. We have district-level data on the proportion of people speaking a minority language for both 2006 and 2009, as we constructed this variable from the 2006 and 2009 FSD surveys. We use this variable only for the baseline year 2006 to make the effect comparable to the other control variables that are all time-invariant.

¹⁶ Co-operative Bank is the second largest domestic bank in terms of its branch network after Equity Bank, Barclays is the largest foreign bank and Kenya Commercial Bank is the largest government-influenced bank (see Table 1).

including Equity Bank, have greater branch penetration in urban and English speaking districts (Models 1 to 4), which is consistent with the fact that all banks initially located their first branches in urban and English-speaking districts. 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.¹⁷ *Third*, the sensitivity of branch penetration to population density is much lower for Equity Bank than for the others, indicating a preference for less densely populated districts.¹⁸ *Fourth*, the intercept of the regression models is 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. These results suggest that Equity Bank exhibited significantly greater branch expansion relative to other banks between 2006 and 2009, particularly in underdeveloped districts.

One important component of Equity Bank's expansion strategy has been to target previously unbanked areas. We start by exploring whether Equity Bank has expanded more than other banks to districts in which English or Swahili is *not* the predominant language (Models 5 to 8). Then, we explore whether Equity Bank has expanded more than other banks to arid and semi-arid districts (Models 9 to 12). In Models 5 to 8, the positive and negative coefficients associated with the 2009 dummy variable and its interaction with the proportion of people speaking minority languages, respectively, suggest that the expansions of Equity Bank and other banks were greater in districts where minority

¹⁷ We conduct tests to compare the coefficients associated with the 2009 dummy variable across different banks. The tests reject the null hypothesis that the coefficient for Equity Bank is equal to the coefficients for foreign banks (Chi2=15.79; p-value=0.000), government banks (Chi2=13.54, p-value=0.000), and other domestic banks (Chi2=16.01, p-value= 0.000). This confirms that recently Equity Bank has exhibited significantly greater branch expansion than other banks in Kenya.

¹⁸ The sensitivity of branch penetration to population density is particularly interesting in view of the African financial development gap observed at a macro level (Allen et al., 2013, 2016). One robust finding is that population density is more strongly associated with banking sector development in Africa than in other developing regions.

languages were not predominant. However, the magnitudes of the coefficients suggest that Equity Bank, in contrast to the other banks, was the only bank that reached districts where neither English nor Swahili were the most common language. To analyze the magnitude and significance of the expansion of each type of bank across different types of districts, Figure 2 shows the marginal effect of the 2009 dummy variable conditional on values of minority languages.¹⁹ The figure indicates that all banks expanded less into the districts where minority languages were predominant than those where minority languages were less spoken. But, it also indicates that Equity Bank was the only bank that significantly expanded between 2006 and 2009 into all districts, including those where minority languages were predominantly spoken.²⁰

The results reported in Models 9 to 12 indicate that, during the 2006-2009 period, Equity Bank also expanded more than other banks into arid and semi-arid districts. To see this, it is necessary to compare the coefficient for the 2009 dummy variable (equal to 1.209 for Equity Bank) with that for the interaction between the 2009 dummy and the arid and semi-arid dummy variable (equal to -0.482, which is insignificant). The net result, as shown by the marginal effect at the bottom of Table 2 (marginal effect 0.727, p -value 0.011) indicates that Equity Bank showed a significant expansion into arid and semi-arid districts from 2006 to 2009. Note that the values of the marginal effect for foreign and private domestic banks are also positive and statistically distinguishable from zero, but they are small (0.05 and 0.04, respectively) as compared to the value (0.727) of Equity. The results for those two groups of banks therefore indicate increased entry into arid and semi-arid areas from 2006 to 2009, but at a rate *much slower* than that of Equity Bank.

Finally, to rule out the possibility that our results are driven by the fact that we are comparing a precisely measured individual-bank effect with an inaccurately measured average effect across banks,

¹⁹ To construct Figure 2, we employed the STATA Code created by Berry, William, Golder, and Milton (2012).

²⁰ Table 2 also reports the marginal effects and F-tests' p -values of the 2009 dummy, conditional on two values for the district-share of people speaking a minority language in 2006: 0.85 and 1. The F-tests indicate whether those marginal effects are statistically distinguishable from zero. The reported p -values confirm that the branch expansion into districts where minority languages represented more than 85% of the population is only statistically significant for Equity Bank.

Figure A.1 in the Appendix compares Equity Bank's branch expansion into areas characterized by different sets of languages with that of three other large banks: Co-operative, Barclays and Kenya Commercial Bank. The results confirm our previous findings from Table 2 (especially Models 5 through 8) that Equity Bank was the only bank that expanded significantly into districts where minority languages are predominantly spoken.²¹

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

Our previous results suggest that Equity Bank has pursued distinct branching strategies from other banks. Our next step is to explore whether the presence of Equity Bank improved access of households to banking services. To do this, we augment our data on bank branches across districts with the Financial Sector Deepening (FSD) Kenya's FinAccess household surveys. The 2006 surveys consist of 4,420 completed interviews, while the 2009 surveys consist of 6,598 completed interviews.²² We use the FSD FinAccess surveys in our analysis for a number of reasons. *First*, they capture important dimensions of financial inclusion as the survey was specifically designed to measure access to financial services in Kenya. *Second*, it provides information on individual and household characteristics that are helpful in exploring potential heterogeneities. *Third*, it is a nationally representative household survey that covers the universe of districts in Kenya. *Fourth*, its

²¹ The point estimates show that Barclays had an expansion similar to Equity Bank's in districts where few people spoke a minority language. However, in districts where the majority of the population spoke a minority language, Equity expanded by roughly one branch whereas Barclays expanded by only 0.5 branches. Also, the confidence interval for Barclays' point estimate encompasses negative values in districts where over 85 percent of the population spoke a minority language, while the confidence interval for Equity remains in positive territory through almost the entire range of the share of the population speaking a minority language. Similar comparisons in Figure A.1 show that Co-operative Bank and Kenya Commercial Bank expanded substantially less into predominantly minority speaking districts than Equity (or Barclays). In unreported regressions, we also compare Equity Bank's branch expansion with that of the other three large banks based on Equation (1), and find similar results to the ones reported in Table 2.

²² The sample was constructed using a stratified three-stage design. In the first stage, the number of households to be allocated to each district is assigned. In the second stage, clusters are randomly selected from the district with each cluster comprising an equal sample of 10 households. In the third stage, individuals aged 16 years and above within the household are randomly selected to interview, using a pre-assigned table of random numbers through the Kish Grid-diagram.

implementation over different years allows us to explore the within-district time variation in financial inclusion.

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 A.2 in the Appendix reports descriptive statistics for all the individual and household-level variables. The proportion of individuals having a bank account in Kenya increased considerably in the sample period, going from 14 percent to 23 percent in the 2006-2009 period. The proportion of individuals having a loan from a bank showed a more modest increase from 2.9 percent to 4.4 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.

We estimate a Linear Probability Model (LPM) of having a bank account to explore the impact of Equity Bank presence on financial inclusion:²³

$$Bank_{idt} = A_d + B_t + \beta Equity_{dt} + \gamma Branches_{dt} + \delta z_{idt} + \varepsilon_{idt}, \quad (2)$$

where the dependent variable, $Bank_{idt}$, is a dummy indicating whether individual 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. 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.²⁴ We also control for a comprehensive set of variables at the individual and household level (z_{idt}). They indicate household size, education and gender of the individual, wealth (measured by an asset score), house and mobile phone ownership, the individual's type of job and age, and the language spoken within the

²³ All our results on access to banking services are robust to estimation via probit models. We report LPMs because estimating probit models with many fixed effects may introduce an incidental parameter problem.

²⁴ Our results are very similar whether or not we include Equity Bank's branches in the total number of branches.

household.²⁵ $\mathcal{A}_d$ is a set of district fixed effects to control for time-invariant district heterogeneity and B_t is a fixed effect for 2009 to control for time-variant macro-level factors directly affecting financial inclusion in Kenya.

Table 3 reports the results from estimating Equation (2) by OLS, with error terms clustered at the district-year level. We first restrict our sample to districts that did not have any Equity Bank branch in 2006 to estimate a standard two time periods difference-in-differences estimator. Model 1 reports a regression with individual/household characteristics, district level bank branch expansions, and district and time fixed effects. Next, Model 2 considers the presence of different types of banks by their ownership structure (i.e., foreign banks, government banks and domestic private banks). Finally, for robustness purposes, instead of using an indicator denoting the presence of a certain type of bank, Model 3 uses the number of branches for each bank ownership type. Note that the domestic banks category includes the branches of Equity Bank in those models, which provides a stricter test of whether Equity's presence increases the likelihood of having a bank account beyond the effect that a typical branch of a private domestic bank would have.

The results show 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. This effect is highly statistically significant regardless of the model specification. The coefficient associated with Equity Bank in Model 1 suggests that the presence of Equity Bank in a new district increases the probability of having a bank account by roughly 5 percentage points after controlling for the total number of other banks' branches, a comprehensive set of variables at the individual and household level, and both district and time fixed effects. Models 2 and 3 also suggest 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. The magnitudes are in line with

²⁵ The asset score is higher if the household owns a greater number of physical assets such as a television or a microwave. There are 20 asset categories and the ownership of each of them increases the asset score by one.

our baseline specification. As noted, according to the FinAccess survey, the proportion of household members aged 16 years and above 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 low- and middle-income segments of the population using such strategies as the local language requirement in its branches, has contributed to greater financial inclusion.

Although it is possible that other banks in Kenya could have replicated the strategies of Equity Bank, the implementation of those strategies involves substantial costs. Our results suggest that these costs should be smaller for domestic banks that can exploit their superior knowledge of local communities and underdeveloped areas. Equity Bank seems to have expanded and seized upon these opportunities more quickly than other banks, and, regardless of its motivation, the end result has been greater financial inclusion. Going forward, other banks may pursue strategies similar to that of Equity Bank, but during the period that we study Equity Bank was clearly at the forefront of this movement, as reflected in the extraordinarily rapid growth in its number of clients relative to other banks.

Finally, it is noteworthy that 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, age, income stability (i.e. salaried workers), and house and mobile phone ownership are positively related to having a bank account.²⁶

4.1. Addressing Potential Endogeneity Problems

Given that bank branch expansions are not random events, the estimation of Equation (2) may still produce biased estimates of the impact of bank penetration on financial access due to potential endogeneity concerns. In order to alleviate the above endogeneity problems, we re-estimate

²⁶ These results are also consistent with international evidence on the determinants of the use of bank services (see, e.g., Beck and Brown, 2011).

our LPM of having a bank account using an Instrumental Variables (IV) approach. Our IV regressions employ the district-level proportion of people speaking a minority language (i.e., “District minority language share”) as our instrument for the presence of Equity Bank.²⁷ This instrument also enters our model interacted with a 2009 dummy variable to exploit the fact that, as previously documented, between 2006 and 2009 Equity Bank shifted its branching policy, moving more toward less developed districts as compared to other banks. For parallelism with the other analyses in the paper, in some specifications Equity Bank presence is additionally instrumented with the interaction between the arid and semi-arid district dummy variable and a 2009 dummy variable.

District minority language share constitutes a valid instrument for Equity Bank presence if this variable affects the probability of having a bank account only through bank branch 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 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.²⁸

We examine the use of the district-level proportion of people speaking a minority language as a valid instrument by estimating pre-trends on wage employment (a proxy for economic development and demand), several years before 2006, for districts with low and high 2006 levels for multiple potential instruments. In order to do this, we obtained a data set on wage employment by district from the Central Bureau of Statistics of Kenya (Central Bureau of Statistics, 2001). The data covers 38

²⁷ Note that “District minority language share” varies from 2006 to 2009, and, therefore, it is not absorbed by the district fixed effects. We constructed this variable from the 2006 and 2009 FSD FinAccess surveys.

²⁸ For robustness, we also explore the proportion of people having a cell phone as a valid instrument, by arguing that it is not obvious that the primary objective of the major cell phone providers across Kenya was the expansion of bank accounts or credit. According to Oteri, Kibet and Edward (2015), cell phone penetration in Kenya registered an exponential growth from 0.053 percent to 79 percent between 1999 and 2013. The magnitude of this cell phone penetration has not been synchronized with the penetration of traditional banking services, which suggests that the primary objective of the major cell phone providers across the country was not access to traditional banking. Our results are largely qualitatively similar using that instrument.

districts from 1994 through 1999. Table 4, Panel A reports panel data regressions of wage employment by district on district fixed effects, year dummies and interactions between year dummies and a dummy variable indicating high district minority language share. This latter variable takes the value of one for districts in which the proportion of people who spoke a minority language was greater than that for the median district and zero otherwise. We also explore high district own mobile phone share and an arid and semi-arid dummy variable as potentially valid instruments.²⁹

The results reported in Model 1 of Panel A show that district wage employment increased, on average, from 1994 to 1999. However, the insignificant coefficients associated with the interaction terms in Model 2 indicate that we cannot reject the hypothesis of parallel trends on wages between districts where minority languages were predominant and districts where minority languages were not predominant. By contrast, the results reported in Models 3 and 4 reject the hypothesis of parallel trends between districts with high versus low penetration of mobile phones, and between arid and semi-arid districts and urban and rural districts.³⁰ Thus, these results suggest that we can treat “District minority language share” as a valid instrument and they mitigate potential concerns about our main results on financial inclusion being attributable to demand side factors.

Table 4, Panel B reports the results from the first and second stages of our IV regressions. We report four different models. In Models 1 and 2, Equity Bank presence is instrumented with the district-level proportion of people speaking a minority language and its interaction with a 2009 dummy variable. In Models 3 and 4, for parallelism with the other analyses in the paper, Equity Bank presence is additionally instrumented with the interaction between the arid and semi-arid district dummy variable and a 2009 dummy variable. Models 1 and 3 do not control for the dummy variables associated with the presence of other banks, while Models 2 and 4 do control for the presence of other banks.

²⁹ High district own mobile phone share takes the value of one for districts in which the share of people who owned a mobile phone was greater than the median district and zero otherwise.

³⁰ In unreported regressions, we obtain qualitatively very similar results using the natural logarithm of district wage employment as our dependent variable and without controlling for district fixed effects.

Our IV estimations confirm the positive and significant impact of Equity Bank presence on households' access to financial services. The main difference with our baseline LPM is that the magnitude of the coefficients associated with Equity Bank presence increases regardless of the specification. The coefficients associated with Equity Bank in our IV regressions suggest that the penetration of Equity Bank into a new district increases the probability of having a bank account by roughly 9 percentage points. Therefore, the results from our IV regressions suggest an attenuation bias in our baseline LPM estimates, which is consistent with the premise that, if more underdeveloped districts are less effective at providing access to finance, a model that does not correct for potential endogeneity would underestimate the true impact of Equity Bank branch expansion.³¹ Finally, in Table A.3 in the Appendix, we estimate placebo IV regressions in which we treat the presence of *other* banks as endogenous. None of the coefficients associated with the presence of other banks are statistically significant in the second stage regressions.

4.2. Equity Bank's Expansion and Financial Inclusion

To explore whether the transformation undergone by Equity Bank between 2006 and 2009 contributed to greater financial inclusion, we now consider all districts (those with and without Equity Bank branches in 2006) and augment our main baseline regressions with a dummy variable, Equity Bank presence (2009), that takes the value of one for Equity Bank presence in the year 2009 and zero otherwise. Thus, the Equity Bank presence (2009) dummy variable is equivalent to the product between Equity Bank presence and a 2009 dummy variable, and captures the differential effect on banking inclusion of an Equity Bank branch in the year 2009 versus an Equity Bank branch in the year

³¹ F-tests of excluded instruments and p -values of Hansen's J tests of over-identifying restrictions are also reported in the table. The F-tests of excluded instruments reject the null hypothesis of weak instruments and, therefore, indicate that the instruments and endogenous variables are correlated, even after netting out the effects of all other exogenous variables. The p -values of Hansen's J test cannot reject the null hypothesis that our instruments are valid. Our results are also robust to use of the district-level own mobile phone share as a valid instrument. While we acknowledge the fragility of this instrument based on the results reported in Table 4, Panel A, the fact that we obtain qualitatively similar results using alternative instruments enhances the plausibility that endogeneity biased the effect of Equity Bank's branch expansion downward in our baseline LPM models.

2006.³² This is an important distinction given the expansion and transformation process undergone by Equity Bank between 2006 and 2009. We also created the corresponding variables for the presence and number of branches of other banks in 2009.

Table 5 reports the results of our analysis. The negative and generally insignificant coefficients on Equity Bank presence and the positive and highly significant coefficients on Equity Bank presence (2009) suggest that the increased probability of having a bank account is mainly driven by the expansion and transformation process undergone by Equity Bank between 2006 and 2009. Specifically, Model 1 suggests that the presence of Equity Bank in a district in the year 2009 increases the probability of having a bank account by 4.78 (-1.76+6.54) percentage points, while the results also indicate that the presence of Equity Bank in a district in 2006 did not have a significant effect on the probability of having a bank account.³³ The results from Models 2 and 3 are qualitatively very similar to Model 1 (and each other). Again, note that the domestic banks category includes the branches of Equity Bank in those models, which provides a stricter test of whether Equity's presence increases the likelihood of having a bank account beyond the effect that a typical branch of a private domestic bank would have. Overall, these results confirm that the branch expansion by Equity Bank between 2006 and 2009 contributed to greater financial inclusion.

4.3. The Beneficiaries of Equity Bank's Banking Services

To this point we have presented evidence consistent with the propositions that Equity Bank's branch strategy targeted underserved geographic areas *and* had a substantial impact on access to banking services in Kenya. Specifically, the results in our previous sections suggest that Kenyans

³² Note that both Equity Bank presence and Equity Bank presence (2009) vary over time and thus are not absorbed by the district fixed effects. To make the identification of the coefficients associated with these variables clearer, Table A.4 in the Appendix displays the structure of the data and how Equity Bank presence, Equity Bank presence (2009) and the district fixed effects were constructed. The identification of the coefficient associated with the Equity Bank presence dummy variable comes from districts with presence of Equity Bank *only* in 2006, which comprise only a few cases. However, in this analysis our main focus is in the coefficient associated with Equity Bank presence (2009). Our results are very similar whether we control separately for Equity Bank presence (in 2006) or not.

³³ The insignificant coefficient for 'Equity Bank Presence' (-1.76 percentage points) summarizes the 2006 effect.

residing in districts in which Equity Bank started operations had 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 expansion to be stronger for the underprivileged segments of the population (in terms of physical and/or human capital).

With this idea in mind, we augment our baseline specification with interaction terms between the Equity Bank presence (2009) dummy variable and home ownership, education and urban area to examine potential heterogeneities in the impact of Equity Bank presence in the year 2009 on access to financial services. These heterogeneities allow us to assess whether the expansion of Equity Bank effectively increased usage of financial services among traditionally unbanked people and hence fostered financial inclusion for the disadvantaged.

Table 6 explores potential heterogeneities in the impact of Equity Bank presence in the year 2009 on the probability of having a bank account. Models 1 to 3 augment our previous baseline regression with the three interaction terms described above, respectively: the interaction of the 2009 Equity Bank presence dummy variable with (a) a dummy indicating if the individual is a homeowner, (b) a dummy indicating whether the individual has a secondary and/or tertiary education level, and (c) a dummy indicating whether the individual lives in an urban area. In these regressions, we include all our control variables but, for space considerations, we only report the coefficients associated with the variables in the interaction terms.³⁴ All of the coefficients associated with the interaction terms have a negative sign and are highly significant, suggesting that the impact of the Equity Bank expansion between 2006 and 2009 on access to banking services was, indeed, heterogeneous across individuals with different characteristics. The effect was stronger for Kenyans who did not own a permanent house, who lacked secondary/tertiary education and who lived in rural areas. Therefore, these results are consistent with Equity Bank's expressed mission of extending financial services to the population

³⁴ We cannot control for an urban dummy variable, however, because it is a time-invariant district-level variable and thus it is absorbed by the district fixed effects.

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 in the same specification (Model 4).³⁵

To further mitigate concerns about potentially omitted district-level time-varying factors (for example, related to the local business cycle and other factors affecting local demand), we control for district-time fixed effects in the specifications that exploit within-district variation. Specifically, Models 5 to 7 include district-time fixed effects in the specification with the interactions of the 2009 Equity Bank presence dummy variable with a dummy indicating if the individual is a homeowner and with a dummy indicating whether the individual has a secondary and/or tertiary education level. Our previous findings remain largely unchanged. Another concern may be associated with the fact that the conversion of Equity Bank to a fully regulated commercial bank in 2004 yielded important benefits in terms of the provision of a diversified set of banking products and services (Equity Bank, 2006), which may be driving our main results. However, we can rule out product diversification as an explanation for our previously reported results, since the gains in usage of banking services that we observe are concentrated in poorer, previously underserved areas where product offerings were not expansive.

4.4. Access to Credit

Next, we estimate an Ordered Probit model to consider the impact of Equity Bank presence on the probability of having a bank account and/or a loan from a bank. Table 7 reports the coefficients and marginal effects from an Ordered Probit model of usage of banking services. Column 1 of the table presents coefficients from the Ordered Probit model while the next three columns present the associated average marginal effects of the bank branching variables for each level of financial access. Our dependent variable takes the value of zero if the individual has neither a bank account nor a loan

³⁵ In unreported regressions, we find that our results are robust to the inclusion of interactions with the presence of other banks.

from a bank, the value of one if the individual has a bank account and the value of two if the individual has a loan from a bank. As in our LPMs, we consider our comprehensive set of control variables and both district and time fixed effects.

The results indicate that the presence of Equity Bank increases the probability of both having a bank account (column 3) and a bank loan (column 4). The results suggest that Equity Bank presence increases the probability of having a bank account by almost 2.4 percentage points, a slightly smaller magnitude than in our baseline OLS and IV regressions, and the probability of having a bank loan by 1 percentage point. As reported in Table A.2, according to the FinAccess survey, the proportion of household members aged 16 years and above that had a loan from a financial institution in Kenya was 2.9 percent in 2006 and 4.4 percent in 2009. Therefore, the magnitude associated with Equity Bank presence on access to credit is also economically meaningful.

In unreported regressions, we replicate our previous model *excluding* urban districts (i.e., Nairobi and Mombasa) and find practically identical results. These results suggest that Equity Bank is expanding access to bank accounts and credit everywhere and that Equity Bank is not just obtaining funding in the form of retail deposits from less developed areas to expand credit in more developed ones. Given that credit is scarce in non-urban areas and an important source for funding investment and growth, this higher level of financial access through the provision of credit may significantly relax the financial constraints of firms and households in areas typically ignored by traditional banks.

5. The Profitability of Equity Bank's Business Model

In this section, we use bank and branch level data to explore whether the business model of Equity Bank has been profitable and to understand the mechanisms that explain the profits of the bank at a more granular level. Specifically, we first compare the profitability of Equity Bank with other

banks in Kenya using a bank-level panel dataset that covers all the commercial banks in Kenya. Then we compare the profitability, credit quality and financial structure of Equity Bank branches.

5.1. Bank Profitability

We compare the profitability of Equity Bank with other Kenyan banks using bank level data drawn from the Bankscope database, provided by Bureau van Dijk. To measure the profitability of a bank, we use return on average assets (ROAA). Data from 41 Kenyan banks are available from 2004 to 2013. Table A.5 in the Appendix reports descriptive statistics for the variables used in this analysis. We estimate two different models. The first model explores whether Equity Bank has been, on average, more profitable than other banks in Kenya. We start by estimating:

$$ROAA_{it} = \alpha + A_t + \beta Domestic_i + \gamma Government_i + \delta Equity_i + \varepsilon_{it}, \quad (3)$$

where $ROAA_{it}$ denotes the return on average assets (in percentage points) of bank i at time t , A_t is a vector of yearly fixed effects, $Domestic_i$ is a dummy variable that takes the value of one for domestic private banks (including Equity Bank), $Government_i$ is a dummy variable that takes the value of one for government-owned/influenced banks and $Equity_i$ is a dummy variable that takes the value of one for Equity Bank. The omitted category in the regressions is foreign-owned banks. ε_{it} is the error term.

Model 1 of Table 8 reports the results from estimating the Equation (3) by OLS, with standard errors clustered at the bank level. The results show that Equity Bank has been significantly more profitable than other domestic private banks in Kenya, an advantage that is also economically meaningful. The coefficient for the Equity Bank dummy variable indicates that its ROAA was, on average, 264 basis points higher than for foreign banks in Kenya. The difference in profitability between foreign banks and the rest of the banks in Kenya (except Equity Bank) is not statistically significant.

The second model that we estimate examines how the profitability of Equity Bank has evolved over time as compared to the average profitability of the banking sector in Kenya. The specification takes the form:

$$ROAA_{it} = A_t + B_i + \gamma_t Equity_i + \varepsilon_{it}, \quad (4)$$

where A_t and B_i denote year and bank fixed effects. $Equity_i$, our dummy variable for Equity Bank, enters the regression interacted with year dummies, with γ_t denoting the year-specific effects.

Model 2 in Table 8 reports the results from estimating Equation (4) by OLS, with standard errors clustered at the bank level. The model shows that the profitability of Equity Bank improved over time and that the increase in profitability coincided with its period of expansion into previously unbanked areas (from 2006 onwards), which is the period of time explored in this study. The results on financial inclusion and profitability presented so far suggest that the branching strategies followed by Equity Bank played a key role in the provision of financial services to the population segments typically ignored by traditional banks while generating sustainable profits at a level higher than for other Kenyan banks in the process.

5.2. Evidence for Branch Profitability

We have shown that the expansion of Equity Bank has been profitable at the bank level. The next step is to provide evidence on how those profits were generated. We use branch-level panel data from Equity Bank on the financial performance and expansion of the bank to identify whether its expansion into the less-served arid and semi-arid areas has been more profitable than its expansion into urban and rural areas. Additionally, we use the branch-level data to better understand the sources of the profits Equity Bank obtained from its expansion into areas largely ignored by its competitors.

Our branch-level dataset contains financial information on the profitability, credit quality and financial structure of 112 Equity Bank branches in 48 counties for the period 2004 to 2015. We analyze

four measures related to profitability. We use return on assets, the ratio of income from interest on loans to assets, the ratio of deposits interest expense to assets and the lending-deposit interest rate spread.³⁶ We measure the quality of the loan portfolio using the delinquency rate (i.e., the proportion of delinquent to total loans). Finally, as measures of financial structure, we rely on the ratio of income from interest on loans to total income and the ratio of customer deposits to total liabilities. It is important to note that each branch is considered a profit center with independent accountability, branches compete among themselves, and branch managers are designated as “Mini CEOs” and thus are granted some autonomy.

To minimize the influence of outliers on our results and to eliminate potential coding errors, we clean the data in two ways. First, we exclude all observations in which the value of our variable exceeds the sample mean by more than five standard deviations. Second, we exclude observations from the year the branches opened to guarantee that all observations for our financial performance indicators are based on a full year of data and to make certain that misleading or poorly measured values for our financial indicators are not driving our results. Table A.6 in the Appendix provides descriptive statistics for all the branch-level financial indicators used in this analysis.

We consider all the branches that Equity Bank opened between 1986 and 2009, splitting them into two categories: new and old.³⁷ New branches are those that opened from 2006 to 2009, which is the period that coincides with the expansion of the bank explored in our previous analyses. Old branches are, therefore, those that opened in the period between 1986 and 2005. We first estimate

³⁶ The lending-deposit interest rate spread is the difference between the average yield the branch receives from loans and the average rate it pays on deposits. We calculate the yield the bank receives from loans by dividing the income from interest on loans by total loans. We calculate the average rate the bank pays on deposits by dividing deposits interest expense by total deposits.

³⁷ It is possible that the loans of the new branches look better than they would eventually become. Table A.7 in the Appendix explores the time variation in profitability and delinquency rates of the new branches (those opened from 2006 through 2009). Models 1 to 4 explore profitability of the branches, while Models 5 to 8 explore their delinquency rates. All models include branch fixed effects. The results show that the profits and delinquency rates of the new branches generally tended to increase in the short-term, but they stabilized in the medium-term. With that in mind, our specification distinguishes between new and old branches and compares the effects of new branches across different types of geographic areas. As previously mentioned, we have also excluded the observations from the year the branches opened.

branch-level regressions that explore whether Equity Bank's branch expansion from 2006 to 2009 was more profitable in arid and semi-arid areas than in urban and rural areas. Our specification takes the following form:

$$y_{ict} = A_{ct} + \alpha New_i + \beta New_i x ASA_c + \varepsilon_{it}, \quad (5)$$

where y_{ict} denotes measures of profitability, credit quality or financial structure of branch i in county c at time t , New_i is a dummy variable that takes the value of one for branches that opened between 2006 and 2009, ASA_c is a dummy variable that takes the value of one for arid and semi-arid counties, A_{ct} denotes county-year effects that control for time-varying, county-level factors such as the local business cycle and demand.

Table 9 reports the results from estimating Equation (5) by OLS, with standard errors clustered at the county level. Model 1 indicates that the expansion of Equity Bank into arid and semi-arid areas was more profitable than its expansion into urban and rural areas. There are several factors that explain the higher profitability associated with the expansion of Equity Bank into arid and semi-arid areas. Models 2 and 3 suggest that comparatively higher income from interest on loans and lower deposit interest expenses (as a fraction of the assets of the branch) both contributed to the higher ROA in branches located in arid and semi-arid counties. These findings are consistent with a more aggressive pricing schedule by Equity Bank in areas largely ignored by its competitors, as is also reflected in higher lending-deposit interest rate spreads in arid and semi-arid counties (Model 4). Since holding a bank account and/or a loan with Equity Bank was the only option for many customers in less developed areas to keep their money safe and/or finance their business projects, the bank was able to combine low interest paid on deposits with relatively high interest charged on loans in less banked regions. The fact that the new branches of Equity Bank had higher profits and higher lending-deposit interest rate spreads (two measures of market power) in arid and semi-arid areas suggests that

Equity Bank was able to exploit market power in geographic areas where other banks did not enter or entered with fewer bank branches.

In terms of credit quality, Equity Bank has also benefited from a lower delinquency rate in arid and semi-arid counties. Model 5 shows that, as expected, delinquency rates are lower for new branches than old branches, and much lower for new branches in arid and semi-arid areas, despite the higher loan rates in those areas. This suggests that Equity bank was able to effectively screen borrowers in the areas where it faced less competition and could charge higher rates. Finally, Models 6 and 7 show that income from interest on loans represented a higher proportion of revenues, and customer deposits represented a higher proportion of the total liabilities, in branches located in arid and semi-arid counties as compared to branches in rural and urban counties.

It is noteworthy that in Table 9 most coefficients associated with the new branches dummy variable are statistically significant, which is in line with our hypothesis that new and old branches are different from one another. For example, delinquency rates are significantly smaller in new branches compared with old branches.

To further explore the market power enjoyed by Equity Bank, we now estimate branch-level regressions that explore whether Equity Bank's branch expansion from 2006 to 2009 was even more profitable in arid and semi-arid areas where minority languages were predominant (which were also areas with the lowest levels of bank branch penetration at the start of our period of study). In order to do this, we restrict our sample to arid and semi-arid districts and estimate the following model:

$$y_{ict} = A_{ct} + \alpha New_i + \beta New_i x Minority\ Language_c + \varepsilon_{it}, \quad (6)$$

where *Minority Language_c* represents the proportion of people speaking minority languages in county *c* in 2006.

Table 10 reports the results from estimating Equation (6) by OLS, with standard errors clustered at the county level. The results reported in Models 1 and 5 show that Equity Bank's new

branches were even more profitable, although riskier (in the sense of higher delinquency rates), in counties where minority languages were predominant than in counties where minority languages were not. Additionally, compared to arid and semi-arid areas where minority languages were *not* predominant, those results indicate that Equity Bank's new branches in arid and semi-arid areas where minority languages were predominant exhibited: (1) higher income from interest on loans as a fraction of the assets of the branch (Model 2), (2) higher lending-deposit interest rate spreads (Model 4) and (3) higher customer deposits as a fraction of their total liabilities (Model 7). Thus, these results emphasize the market power of Equity Bank as well as its reliance on deposits in arid and semi-arid areas where Equity Bank faced the most limited competition.

The findings that the new branches of Equity Bank had higher profits and higher lending-deposit interest rate spreads in arid and semi-arid areas where minority languages were predominant confirm that Equity Bank was able to exploit market power in geographic areas where other banks did not enter or entered with fewer bank branches. In fact, our dataset on bank branches in Kenya indicates that in 2009 there were 471 branches in urban districts, 398 branches in rural districts, 89 in arid and semi-arid districts and only 42 branches in arid and semi-arid districts where minority languages were predominantly spoken. Therefore, there is a strong negative correlation between profitability and the number of bank branches. This is also consistent with our bank branch expansion analysis in Section 3, which showed that Equity Bank expanded more into underserved districts where it did not face (or faced a lower level of) competition, namely arid and semi-arid districts as well as districts where minority languages were predominantly spoken.

The main contribution of this analysis is to show that Equity Bank's branch expansion into areas largely ignored by traditional commercial banks was profitable, and to describe the business model that drove that profitability. A large body of research that explores the determinants of bank profitability is based largely on bank level data, in part because no meaningful statistics on branch

performance are usually reported publicly. Our analysis, therefore, provides a deeper investigation of the strategies that Equity Bank employed and the drivers of profitability across geographic areas.

6. Interpretations and Limitations

In this study, we have limited ourselves to analyzing the case of Equity Bank to explore the relationship between bank branch expansion, financial inclusion and bank profitability. We acknowledge, however, that provision of financial services on the scale that Equity Bank does raises a host of additional issues that we do not address. For example, having a very large proportion 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 while the failure is resolved poses its own set of stability issues.

Equity Bank's expansion into the neighboring countries, such as Uganda, Tanzania and Rwanda, 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 (Mader, 2013). All of these issues are worthy of investigation, but we leave this to future research.

Further, this raises the question of what is the role of financial inclusion in promoting economic growth. Simply expanding credit to poor areas and populations does *not* guarantee that the funds will be used properly (for example, in spawning entrepreneurial activities). This has been shown

by the uneven successes of many microfinance institutions in developing countries. Although Equity Bank has been financially successful thus far, it remains to be seen whether the bank's model is sustainable over the long term.

Although in this paper we have focused on the case of Equity Bank, it is important to highlight that the bank business model of fostering financial inclusion while remaining profitable is not unique to Equity Bank. Some examples are ProCredit in Albania, Bulgaria, Macedonia and Serbia; and Banco Azteca in Mexico. They have all followed an offensive strategy of vigorously expanding to traditionally unbanked territories, which has generated substantial profits for them. Moreover, the business model and performance of these banks is in line with recent international evidence that shows that 'retail-funded' banks—banks characterized by a high share of loans on the balance sheet and greater reliance on stable funding sources including deposits—have gained ground in recent years and have exhibited greater profitability than 'wholesale-funded' banks and 'trading' banks (Roengpitya, Tarashev and Tsatsaronis, 2014).³⁸ Therefore, we believe that variants of the model of Equity Bank explored in this paper can be applied successfully to other banks in low and middle income economies characterized by latent demand for basic banking services.

7. Conclusions

Most Sub-Saharan African countries face a financial development gap relative to other peer developing economies. A key issue to financial development is access to finance for underprivileged segments of the population, which would promote economic growth at the broadest scale. In view of the important role of financial inclusion in low income economies, in this paper we study the relationship between bank branch expansion, financial inclusion and bank profitability in Kenya.

³⁸ According to Roengpitya et al. (2014), customer deposits are about two thirds of the overall liabilities of the average 'retail-funded' bank.

The paper finds that the bank branch expansion led by Equity Bank, a pioneering institution that devised a banking service strategy targeting low income clients and traditionally underserved districts in Kenya, had a positive impact on households' access to bank accounts and credit. This effect was particularly strong for Kenyans with less education, who did not own their own homes and those living in less-developed areas. The paper also shows that the business model followed by Equity Bank was profitable as it allowed the bank to maintain an aggressive pricing schedule, reduce delinquency rates and secure inexpensive funding in the form of retail deposits. Moreover, the higher profitability of Equity Bank in areas characterized by a lower number of competing bank branches suggests that it was able to exploit market power where it faced less competition. Our work provides a deeper investigation of bank branching strategies targeting less privileged households and areas largely ignored by traditional commercial banks, as well as the drivers of profitability across geographic areas.

The results highlight that microfinance at scale can be profitable and can lead to increased financial access, but there is much more to it. The success of institutions such as Equity Bank depends crucially on the business model and innovation. Therefore, it is important to emphasize that the success of innovative delivery mechanisms depends also on the regulatory environment, as suggested by Equity Bank's mixed success in neighboring countries. For example, much of Equity Bank's growth in Kenya since 2009 has been fueled by an expanded network of agents (rather than by new branch expansion). However, in Uganda, Equity Bank's attempts to recruit an agent network have thus far met with less success due in part to regulatory impediments.

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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.

Domestic private banks	2006	2009	Change	% Change
African Banking Corporation Ltd.	8	10	2	25
Charter House Bank Ltd.	10	10	0	0
Chase Bank Kenya Ltd.	2	12	10	500
City Finance Bank Ltd.	1	1	0	0
Commercial Bank of Africa Ltd.	19	20	1	5
Co-operative Bank of Kenya Ltd.	52	83	31	60
Credit Bank Ltd.	4	5	1	25
Diamond Trust Bank of Kenya Ltd.	8	32	24	300
Dubai Bank Ltd.	4	4	0	0
Equatorial Commercial Bank Ltd.	3	5	2	67
Equity Bank	44	112	68	155
Fidelity Commercial Bank Ltd.	5	7	2	40
FINA Bank Ltd.	6	14	8	133
First Community Bank	0	18	18	-
Giro Commercial Bank Ltd.	6	8	2	33
Guardian Bank Ltd.	6	7	1	17
Imperial Bank Ltd.	6	13	7	117
Investments and Mortgages	9	17	8	89
Middle East Bank Kenya Ltd.	2	3	1	50
National Industrial Credit Bank Ltd.	16	16	0	0
Oriental Commercial Bank Ltd.	4	8	4	100
Paramount Universal Bank Ltd.	4	7	3	75
Prime Bank Ltd.	9	14	5	56
Southern Credit Banking Corporation Ltd.	9	10	1	11
Trans-National Bank Ltd.	9	13	4	44
Victoria Commercial Bank Ltd.	1	1	0	0
Sub-Total	247	450	203	82
Foreign banks	2006	2009	Change	% Change
Bank of Africa Kenya Ltd.	4	10	6	150
Bank of Baroda Kenya Ltd.	7	9	2	29
Bank of India Ltd.	4	5	1	25
Barclays Bank of Kenya Ltd.	62	119	57	92
Citibank N.A.	3	4	1	33
ECO BANK	9	19	10	111
Gulf African Bank Ltd	0	14	14	-
Habib Bank A.G. Zurich	4	5	1	25
Habib Bank Ltd.	4	4	0	0
K-Rep Bank Ltd.	22	30	8	36
Standard Chartered Bank Kenya Ltd.	31	35	4	13
UBA	0	4	4	-
Sub-Total	150	258	108	72
Government and government-influenced banks	2006	2009	Change	% Change
CFC Stanbic Bank Ltd.	16	35	19	119
Consolidated Bank of Kenya Ltd.	12	13	1	8
Development Bank of Kenya Ltd.	1	2	1	100
Kenya Commercial Bank Ltd.	117	169	52	44
National Bank of Kenya Ltd.	33	43	10	30
Sub-Total	179	262	83	46
Total	576	970	394	68

Table 2
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. The table also reports marginal effects of the 2009 dummy variable conditional on two values of district minority language share (0.85 and 1) and on arid and semi-arid equal to 1, and the p-value of F-tests where the *null hypothesis* is that the marginal effects are equal to zero. 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)	(11)	(12)
Number of branches over number of banks	Foreign	Govern.	Domestic	Equity	Foreign	Govern.	Domestic	Equity	Foreign	Govern.	Domestic	Equity
Rural	-4.032** (1.677)	-4.368*** (1.470)	-2.958** (1.360)	-6.440 (3.898)	-4.032** (1.684)	-4.367*** (1.476)	-2.958** (1.365)	-6.438 (3.913)	-4.032** (1.684)	-4.367*** (1.476)	-2.958** (1.365)	-6.439 (3.914)
Arid and semi-arid	-4.146** (1.681)	-4.598*** (1.478)	-3.051** (1.362)	-7.276* (3.929)	-4.146** (1.688)	-4.598*** (1.485)	-3.051** (1.368)	-7.275* (3.946)	-4.096** (1.669)	-4.477*** (1.476)	-3.005** (1.351)	-7.035* (3.840)
District minority language share in 2006	-0.080 (0.052)	-0.102* (0.057)	-0.063 (0.043)	-0.311** (0.134)	-0.080 (0.052)	-0.102* (0.058)	-0.063 (0.043)	-0.311** (0.135)	-0.080 (0.052)	-0.102* (0.058)	-0.063 (0.043)	-0.311** (0.135)
District Swahili share in 2006	-5.801** (2.691)	-6.808*** (2.474)	-4.588** (2.192)	-17.880*** (6.334)	-5.700** (2.640)	-6.635*** (2.392)	-4.496** (2.149)	-17.538*** (6.083)	-5.800** (2.702)	-6.806*** (2.484)	-4.588** (2.200)	-17.875*** (6.359)
log(Density population in 1999)	-5.902** (2.741)	-6.953*** (2.512)	-4.680** (2.232)	-18.666*** (6.452)	-5.899** (2.751)	-6.947*** (2.521)	-4.677** (2.240)	-18.655*** (6.471)	-5.901** (2.752)	-6.950*** (2.522)	-4.679** (2.241)	-18.660*** (6.477)
Dummy (2009)	0.118** (0.052)	0.213*** (0.072)	0.102** (0.045)	1.045*** (0.282)	0.206 (0.134)	0.363** (0.174)	0.182 (0.114)	1.341* (0.681)	0.153* (0.078)	0.296*** (0.105)	0.133* (0.067)	1.209*** (0.402)
District minority language share in 2006 x Dummy(2009)					-0.198 (0.189)	-0.339 (0.246)	-0.181 (0.162)	-0.669 (0.983)				
Arid and semi-arid x Dummy (2009)									-0.100 (0.080)	-0.243** (0.111)	-0.091 (0.069)	-0.482 (0.488)
Constant	10.054*** (2.858)	11.720*** (2.595)	7.711*** (2.329)	25.869*** (6.585)	10.008*** (2.830)	11.640*** (2.560)	7.668*** (2.305)	25.711*** (6.418)	10.036*** (2.856)	11.676*** (2.591)	7.694*** (2.327)	25.781*** (6.553)
Marginal effect of Dummy(2009) for:												
District minority language share=0.85					0.038	0.075	0.028	0.772				
F-test (p-value)					0.258	0.140	0.308	0.002				
District minority language share=1					0.008	0.024	0.001	0.672				
F-test (p-value)					0.891	0.772	0.989	0.070				
Arid and semi-arid=1									0.053	0.053	0.042	0.727
F-test (p-value)									0.003	0.162	0.018	0.011
Observations	129	129	129	129	129	129	129	129	129	129	129	129
Adjusted R-squared	0.750	0.747	0.717	0.524	0.749	0.748	0.717	0.522	0.749	0.748	0.716	0.522

Table 3
Access to Banking Services and Bank Presence: OLS

This table reports estimates from a Linear Probability Model (LPM) of the probability of a household having a bank account. We include district and year 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.

Bank account	(1)	(2)	(3)
<i>Individual/household level variables</i>			
Household size	-0.0037** (0.001)	-0.0037** (0.001)	-0.0037** (0.001)
Education: Primary	-0.0104 (0.011)	-0.0103 (0.011)	-0.0103 (0.011)
Education: Secondary	0.0944*** (0.018)	0.0944*** (0.018)	0.0947*** (0.018)
Education: Tertiary	0.1783*** (0.062)	0.1793*** (0.062)	0.1786*** (0.062)
Female	-0.0174** (0.008)	-0.0172** (0.008)	-0.0174** (0.008)
Asset score	0.0375*** (0.004)	0.0376*** (0.004)	0.0375*** (0.004)
Own permanent house	0.0612*** (0.013)	0.0609*** (0.013)	0.0618*** (0.013)
Income type: Agriculture	0.0096 (0.011)	0.0095 (0.011)	0.0090 (0.011)
Income type: Waged	0.1385*** (0.016)	0.1378*** (0.017)	0.1382*** (0.017)
Income type: Business	0.0502*** (0.013)	0.0499*** (0.013)	0.0494*** (0.013)
Age group: 18-24	-0.0179* (0.010)	-0.0181* (0.010)	-0.0178* (0.010)
Age group: 25-34	0.0229* (0.014)	0.0226 (0.014)	0.0228* (0.014)
Age group: 35-44	0.0616*** (0.014)	0.0614*** (0.014)	0.0616*** (0.014)
Age group: 45-54	0.0664*** (0.014)	0.0666*** (0.014)	0.0667*** (0.014)
Age group: 55+	0.0795*** (0.014)	0.0797*** (0.014)	0.0797*** (0.014)
Swahili	-0.1647*** (0.027)	-0.1642*** (0.027)	-0.1647*** (0.027)
Minority language	-0.1835*** (0.028)	-0.1835*** (0.028)	-0.1840*** (0.028)
Own mobile phone	0.1439*** (0.014)	0.1439*** (0.014)	0.1437*** (0.014)
<i>District level variables</i>			
Bank branches	-0.0001 (0.002)		
Equity Bank presence	0.0523*** (0.011)	0.0458*** (0.010)	0.0494*** (0.011)
Foreign bank presence		-0.0088 (0.009)	
Gov. and gov.-influenced bank presence		0.0112 (0.011)	
Domestic private bank presence		0.0122 (0.015)	
Foreign bank branches			-0.0058 (0.005)
Gov. and gov.-influenced bank branches			0.0052 (0.003)
Domestic private bank branches			0.0009 (0.009)
Observations	5,314	5,314	5,314
Adjusted R-squared	0.2926	0.2925	0.2926
District Fixed Effects	YES	YES	YES
Time Fixed Effects	YES	YES	YES

Table 4 Access to Banking Services and Bank Presence: IV Approach

Panel A Time Trends, Wage Employment by Districts

This table reports estimates from OLS regressions on wage employment by district in Kenya. The data is from the Central Bureau of Statistics of Kenya and covers 38 districts from 1994 to 1999. We include district and year fixed effects in all the models. Robust standard errors are in parentheses. Standard errors are clustered by district groups. ***, **, * indicate significance at the 1%, 5% and 10% levels, respectively.

Wage employment by district	(1)	(2)	(3)	(4)
Dummy (1995)	1.4147** (0.598)	1.0749 (0.760)	-0.0344 (0.593)	2.1153** (0.876)
Dummy (1996)	3.0648* (1.732)	3.3266 (2.420)	-0.6571 (1.805)	5.5645** (2.453)
Dummy (1997)	4.3054* (2.141)	3.1436 (2.425)	2.0469 (2.886)	6.5606** (2.935)
Dummy (1998)	4.7525** (2.288)	3.7283 (2.624)	2.2782 (3.089)	7.2414** (3.152)
Dummy (1999)	4.9765** (2.327)	4.0286 (2.729)	2.3586 (3.099)	7.5566** (3.205)
High district minority language share in 2006 x Dummy (1995)		0.6796 (1.205)		
High district minority language share in 2006 x Dummy (1996)		-0.5236 (3.511)		
High district minority language share in 2006 x Dummy (1997)		2.3236 (4.320)		
High district minority language share in 2006 x Dummy (1998)		2.0484 (4.623)		
High district minority language share in 2006 x Dummy (1999)		1.8959 (4.705)		
High district own mobile share in 2006 x Dummy (1995)			2.7533** (1.077)	
High district own mobile share in 2006 x Dummy (1996)			7.0717** (3.196)	
High district own mobile share in 2006 x Dummy (1997)			4.2912 (4.246)	
High district own mobile share in 2006 x Dummy (1998)			4.7012 (4.534)	
High district own mobile share in 2006 x Dummy (1999)			4.9741 (4.599)	
Arid and semi-arid x Dummy (1995)				-2.0479** (0.890)
Arid and semi-arid x Dummy (1996)				-7.3067*** (2.572)
Arid and semi-arid x Dummy (1997)				-6.5921* (3.765)
Arid and semi-arid x Dummy (1998)				-7.2752* (3.961)
Arid and semi-arid x Dummy (1999)				-7.5416* (4.012)
Observations	228	228	228	228
Adjusted R-squared	0.990	0.989	0.990	0.990
District fixed effects	YES	YES	YES	YES

Table 4
Panel B Access to Banking and Bank Presence: IV GMM Regressions

This table reports estimates from first and second stages of IV GMM Linear Probability models of a household having a bank account. We include district and year fixed effects in all the models. In models 1 and 2, Equity Bank presence is instrumented with the district-level proportion of people speaking a minority language and its interaction with a 2009 dummy variable. In models 3 and 4, Equity Bank presence is additionally instrumented with the interaction between an arid and semi-arid district dummy variable and a 2009 dummy variable. Robust standard errors are in parentheses. Standard errors are clustered by district-year groups. ***, **, * indicate significance at the 1%, 5% and 10% levels, respectively.

Dependent variable:	(1)		(2)		(3)		(4)	
	Second-stage	First-stage	Second-stage	First-stage	Second-stage	First-stage	Second-stage	First-stage
	Bank account	Equity Bank presence	Bank account	Equity Bank presence	Bank account	Equity Bank presence	Bank account	Equity Bank presence
<i>Individual/household level variables</i>								
Household size	-0.0038** (0.002)	0.0017 (0.001)	-0.0038** (0.002)	0.0014 (0.001)	-0.0038** (0.002)	0.0017 (0.001)	-0.0038** (0.002)	0.0014 (0.001)
Education: Primary	-0.0109 (0.009)	0.0136 (0.009)	-0.0109 (0.009)	0.0152* (0.008)	-0.0109 (0.009)	0.0168** (0.008)	-0.0109 (0.009)	0.0168** (0.008)
Education: Secondary	0.0934*** (0.017)	0.0231** (0.011)	0.0933*** (0.017)	0.0220** (0.011)	0.0935*** (0.017)	0.0269** (0.011)	0.0933*** (0.017)	0.0239** (0.011)
Education: Tertiary	0.1769** (0.073)	0.0344 (0.049)	0.1769** (0.073)	0.0492 (0.049)	0.1768** (0.073)	0.0403 (0.048)	0.1768** (0.073)	0.0522 (0.048)
Female	-0.0172** (0.008)	-0.0054 (0.006)	-0.0172** (0.008)	-0.0022 (0.006)	-0.0172** (0.008)	-0.0048 (0.006)	-0.0172** (0.008)	-0.0020 (0.006)
Asset score	0.0377*** (0.004)	-0.0031 (0.002)	0.0377*** (0.004)	-0.0012 (0.002)	0.0377*** (0.004)	-0.0037 (0.002)	0.0377*** (0.004)	-0.0016 (0.002)
Own permanent house	0.0633*** (0.014)	-0.0388*** (0.009)	0.0634*** (0.014)	-0.0392*** (0.008)	0.0632*** (0.014)	-0.0421*** (0.009)	0.0634*** (0.014)	-0.0407*** (0.008)
Income type: Agriculture	0.0103 (0.010)	-0.0076 (0.010)	0.0103 (0.010)	-0.0067 (0.009)	0.0103 (0.010)	-0.0112 (0.010)	0.0103 (0.010)	-0.0086 (0.009)
Income type: Waged	0.1393*** (0.017)	-0.0086 (0.013)	0.1393*** (0.018)	-0.0190 (0.012)	0.1392*** (0.017)	-0.0104 (0.013)	0.1392*** (0.018)	-0.0197 (0.012)
Income type: Business	0.0506*** (0.012)	-0.0023 (0.011)	0.0505*** (0.012)	-0.0060 (0.010)	0.0505*** (0.012)	-0.0067 (0.011)	0.0505*** (0.012)	-0.0084 (0.010)
Age group: 18-24	-0.0183 (0.013)	0.0085 (0.016)	-0.0184 (0.013)	0.0008 (0.015)	-0.0183 (0.013)	0.0070 (0.016)	-0.0184 (0.013)	0.0000 (0.015)
Age group: 25-34	0.0225* (0.013)	0.0034 (0.016)	0.0225* (0.013)	-0.0051 (0.015)	0.0226* (0.013)	0.0031 (0.016)	0.0225* (0.013)	-0.0052 (0.015)
Age group: 35-44	0.0611*** (0.014)	0.0069 (0.016)	0.0611*** (0.014)	0.0024 (0.015)	0.0612*** (0.014)	0.0065 (0.016)	0.0611*** (0.014)	0.0022 (0.015)
Age group: 45-54	0.0657*** (0.015)	0.0074 (0.017)	0.0657*** (0.015)	0.0080 (0.016)	0.0657*** (0.015)	0.0081 (0.017)	0.0657*** (0.015)	0.0083 (0.016)
Age group: 55+	0.0793*** (0.015)	-0.0023 (0.017)	0.0794*** (0.015)	-0.0013 (0.016)	0.0794*** (0.015)	-0.0015 (0.017)	0.0794*** (0.015)	-0.0010 (0.016)
Swahili	-0.1655*** (0.028)	-0.0001 (0.015)	-0.1656*** (0.028)	0.0054 (0.014)	-0.1655*** (0.028)	-0.0013 (0.015)	-0.1656*** (0.028)	0.0044 (0.014)
Minority language	-0.1828*** (0.028)	0.0006 (0.016)	-0.1829*** (0.029)	0.0040 (0.015)	-0.1828*** (0.028)	-0.0007 (0.016)	-0.1830*** (0.028)	0.0029 (0.014)
Own mobile phone	0.1436*** (0.013)	0.0003 (0.009)	0.1436*** (0.013)	-0.0010 (0.008)	0.1435*** (0.013)	-0.0004 (0.008)	0.1435*** (0.013)	-0.0013 (0.008)

Table 4 Panel B Continued

	(1)		(2)		(3)		(4)	
	Second-stage	First-stage	Second-stage	First-stage	Second-stage	First-stage	Second-stage	First-stage
Dependent variable:	Bank account	Equity Bank presence	Bank account	Equity Bank presence	Bank account	Equity Bank presence	Bank account	Equity Bank presence
<i>District level variables</i>								
Equity Bank presence	0.0963* (0.057)		0.0983* (0.053)		0.0960* (0.057)		0.0986* (0.053)	
Foreign bank presence			-0.0038 (0.015)	-0.1443*** (0.012)			-0.0037 (0.015)	-0.1483*** (0.012)
Gov. and gov.-influenced bank presence			-0.0006 (0.021)	0.2239*** (0.016)			-0.0008 (0.021)	0.2158*** (0.017)
Domestic private bank presence			0.0004 (0.022)	0.2353*** (0.014)			0.0003 (0.022)	0.2330*** (0.014)
<i>Year Dummy</i>								
Dummy (2009)	-0.0532 (0.038)	0.6595*** (0.015)	-0.0538* (0.031)	0.6209*** (0.015)	-0.0529 (0.038)	0.6902*** (0.015)	-0.0538* (0.031)	0.6387*** (0.015)
<i>District level instruments</i>								
District minority language share		-0.4632*** (0.026)		-0.4864*** (0.026)		-0.5073*** (0.029)		-0.5121*** (0.029)
District minority language share x Dummy (2009)		-0.4200*** (0.035)		-0.5176*** (0.030)		-0.4575*** (0.036)		-0.5364*** (0.031)
Arid and semi-arid x Dummy (2009)						-0.0827*** (0.016)		-0.0438*** (0.016)
Observations	5,314	5,314	5,314	5,314	5,314	5,314	5,314	5,314
p-value of Hansen J statistic	0.919		0.914		0.992		0.992	
F-test of excluded instruments		216.28		312.83		140.84		203.56
Individual / Household								
Controls	YES	YES	YES	YES	YES	YES	YES	YES
District Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
Time Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES

Table 5
Access to Banking and Bank Presence: Comparing 2006 and 2009

This table reports estimates from a Linear Probability Model (LPM) of the probability of a household having a bank account. We include district and year fixed effects in all the models; we also include but do not report coefficients on the other controls. Equity Bank presence (2009) takes the value 1 for Equity Bank presence in the year 2009 and 0 otherwise (i.e., it is equivalent to the product between Equity Bank presence and a 2009 dummy variable). The same for the other bank presence variables. Robust standard errors are in parentheses. Standard errors are clustered by district-year groups. ***, **, * indicate significance at the 1%, 5% and 10% levels, respectively.

Dependent variable: Bank account	(1)	(2)	(3)
Bank branches	0.0052** (0.002)		
Equity Bank presence	-0.0176 (0.012)	-0.0405* (0.021)	-0.0106 (0.014)
Foreign bank presence		0.0064 (0.014)	
Gov. and gov.-influenced bank presence		-0.0036 (0.012)	
Domestic private bank presence		-0.0045 (0.018)	
Foreign bank branches			0.0126* (0.007)
Gov. and gov.-influenced bank branches			-0.0036 (0.004)
Domestic private bank branches			-0.0012 (0.005)
Bank branches (2009)	-0.0017* (0.001)		
Equity Bank presence (2009)	0.0654*** (0.012)	0.0538** (0.021)	0.0666*** (0.013)
Foreign bank presence (2009)		-0.0178 (0.017)	
Gov. and gov.-influenced bank presence (2009)		-0.0146 (0.016)	
Domestic private bank presence (2009)		0.0625*** (0.021)	
Foreign bank branches (2009)			-0.0031 (0.006)
Gov. and gov.-influenced bank branches (2009)			0.0001 (0.004)
Domestic private bank branches (2009)			-0.0007 (0.004)
Observations	10,922	10,922	10,922
Adjusted R-squared	0.3415	0.3397	0.3415
Individual / Household Controls	YES	YES	YES
District Fixed Effects	YES	YES	YES
Time Fixed Effects	YES	YES	YES

Table 6
Access to Banking and Bank Presence: Interaction Effects

This table reports estimates from a LPM of the probability of a household having a bank account. We include district and time fixed effects in models 1 through 4, and district-time fixed effects in models 5 through 7. We also include but do not report coefficients on the other control variables. Robust standard errors are in parentheses. Standard errors are clustered by district-year groups. ***, **, * indicate significance at the 1%, 5% and 10% levels, respectively.

Bank account	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Education: Secondary	0.0668*** (0.012)	0.0990*** (0.015)	0.0670*** (0.012)	0.0957*** (0.015)	0.0658*** (0.012)	0.0988*** (0.015)	0.0962*** (0.015)
Education: Tertiary	0.2120*** (0.022)	0.2396*** (0.025)	0.2143*** (0.021)	0.2340*** (0.025)	0.2107*** (0.022)	0.2395*** (0.027)	0.2348*** (0.027)
Own permanent house	0.0801*** (0.015)	0.0495*** (0.015)	0.0501*** (0.015)	0.0756*** (0.015)	0.0781*** (0.015)	0.0464*** (0.015)	0.0734*** (0.015)
Equity Bank presence	-0.0113 (0.016)	-0.0151 (0.017)	-0.0130 (0.016)	-0.0150 (0.017)	-0.0727*** (0.006)	-0.0723*** (0.006)	-0.0694*** (0.006)
Equity Bank presence (2009)	0.0728*** (0.016)	0.0686*** (0.017)	0.0610*** (0.016)	0.0782*** (0.017)	0.2812*** (0.007)	0.2808*** (0.006)	0.2846*** (0.007)
Permanent own house x Equity Bank presence (2009)	-0.0528** (0.025)			-0.0454* (0.024)	-0.0538** (0.025)		-0.0466* (0.025)
Secondary-tertiary education x Equity Bank presence (2009)		-0.0715*** (0.023)		-0.0662*** (0.022)		-0.0727*** (0.024)	-0.0678*** (0.023)
Urban x Equity Bank presence (2009)			-0.0600*** (0.020)	-0.0565*** (0.019)			
Observations	10,922	10,922	10,922	10,922	10,922	10,922	10,922
Adjusted R-squared	0.3419	0.3424	0.3414	0.3427	0.3414	0.3419	0.3422
Control Variables	YES	YES	YES	YES	YES	YES	YES
District Fixed Effects	YES	YES	YES	YES	NO	NO	NO
Time Fixed Effects	YES	YES	YES	YES	NO	NO	NO
District-Time Fixed Effects	NO	NO	NO	NO	YES	YES	YES

Table 7
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. We include district and time fixed effects in all the models; we also include but do not report coefficients on the other control variables. Robust standard errors are in parentheses. ***, **, * indicate significance at the 1%, 5% and 10% levels, respectively. Column 1 presents coefficients from the Ordered Probit model while the next three columns present the associated average marginal effects of the bank branching variables for each level of financial access.

	(1)	(2)	(3)	(4)
	Ordered Probit	Average Marginal Effects		
		Financial	Financial	Financial
		Access=0	Access=1	Access=2
Bank branches	0.0023*** (0.0003)	-0.0004*** (0.0000)	0.0002*** (0.0000)	0.0001*** (0.0000)
Equity Bank presence	0.0430 (0.0678)	-0.0075 (0.0119)	0.0052 (0.0083)	0.0022 (0.0036)
Equity Bank presence (2009)	0.1962** (0.0917)	-0.0345** (0.0161)	0.0241** (0.0113)	0.0104** (0.0048)
Observations	10,922	10,922	10,922	10,922
Pseudo R-squared	0.3253			
Individual / Household Controls	YES	YES	YES	YES
District Fixed Effects	YES	YES	YES	YES
Time Fixed Effects	YES	YES	YES	YES

Table 8
Bank Profitability

This table reports estimates from a model of the profitability of Equity Bank compared to other banks in Kenya. The data consists of 41 commercial banks from 2004 to 2013. In Model 1, we include year fixed effects. In Model 2 we include both bank and year fixed effects. Robust standard errors are in parentheses. Standard errors are clustered by bank groups. ***, **, * indicate significance at the 1%, 5% and 10% levels, respectively.

Return on Average Assets (%)	(1)	(2)
Domestic private bank	0.688 (0.862)	
Government bank	0.187 (0.871)	
Equity Bank	2.643*** (0.404)	
Equity Bank x Dummy (2005)		3.245 (2.047)
Equity Bank x Dummy (2006)		4.043* (2.115)
Equity Bank x Dummy (2007)		3.852* (2.026)
Equity Bank x Dummy (2008)		4.942** (2.085)
Equity Bank x Dummy (2009)		4.563** (2.136)
Equity Bank x Dummy (2010)		4.733** (2.141)
Equity Bank x Dummy (2011)		4.716** (2.109)
Equity Bank x Dummy (2012)		4.411** (2.153)
Equity Bank x Dummy (2013)		4.176* (2.158)
Observations	311	311
Adjusted R-squared	0.002	0.131
Bank Fixed Effects	NO	YES
Time Fixed Effects	YES	YES

Table 9
Branch Profitability

This table reports estimates from a model of branch profitability. The data consists of 112 branches of Equity Bank. We include county x year fixed effects in all the models. Robust standard errors are in parentheses. Standard errors are clustered by county groups. ***, **, * indicate significance at the 1%, 5% and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Profitability				Credit quality	Financial structure	
	ROA	Income from interest on loans to Assets	Deposits interest expense to Assets	Lending-deposit spread	Delinquent rate	Income from interest on loans to Income	Customer deposits to Liabilities
New branch	-0.053*** (0.013)	-0.012*** (0.002)	-0.001 (0.001)	-0.018*** (0.005)	-0.026** (0.010)	-0.043 (0.028)	-0.010*** (0.003)
New branch x Arid and semi-arid county	0.185*** (0.000)	0.088*** (0.002)	-0.004*** (0.000)	0.076*** (0.005)	-0.057*** (0.010)	0.284*** (0.028)	0.019*** (0.003)
Observations	919	920	916	975	897	914	716
Adjusted R-squared	0.410	0.714	0.293	0.542	0.386	0.502	0.639
County-Time Fixed Effects	YES	YES	YES	YES	YES	YES	YES

Table 10
Branch Profitability: Subsample of Arid and Semi-Arid Areas

This table reports estimates from a model of branch profitability on a sub sample of arid and semi-arid districts. The data consists of 21 branches of Equity Bank in arid and semi-arid counties. We include county and year fixed effects in all the models. Robust standard errors are in parentheses. Standard errors are clustered by county groups. ***, **, * indicate significance at the 1%, 5% and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Profitability				Credit quality	Financial structure	
	ROA	Income from interest on loans to Assets	Deposits interest expense to Assets	Lending-deposit spread	Delinquent rate	Income from interest on loans to Income	Customer deposits to Liabilities
New branch	-0.056*** (0.005)	-0.020*** (0.003)	-0.010*** (0.001)	-0.022*** (0.006)	-0.046*** (0.003)	0.008 (0.013)	-0.011*** (0.001)
New branch x County minority language share	0.013*** (0.000)	0.007*** (0.000)	0.001*** (0.000)	0.003*** (0.000)	0.011*** (0.000)	-0.176*** (0.000)	0.024*** (0.001)
Observations	154	155	155	172	153	153	131
Adjusted R-squared	0.355	0.841	0.574	0.745	0.355	0.739	0.720
County Fixed Effects	YES	YES	YES	YES	YES	YES	YES
Time Fixed Effects	YES	YES	YES	YES	YES	YES	YES

Figure 1: Equity Bank's stock price index

This figure shows the evolution of the stock price of Barclays Bank of Kenya, Equity Bank and Kenya Commercial Bank, and the FTSE/JSE Africa Banks Index (August 15, 2006=100). Data Source: Bloomberg.

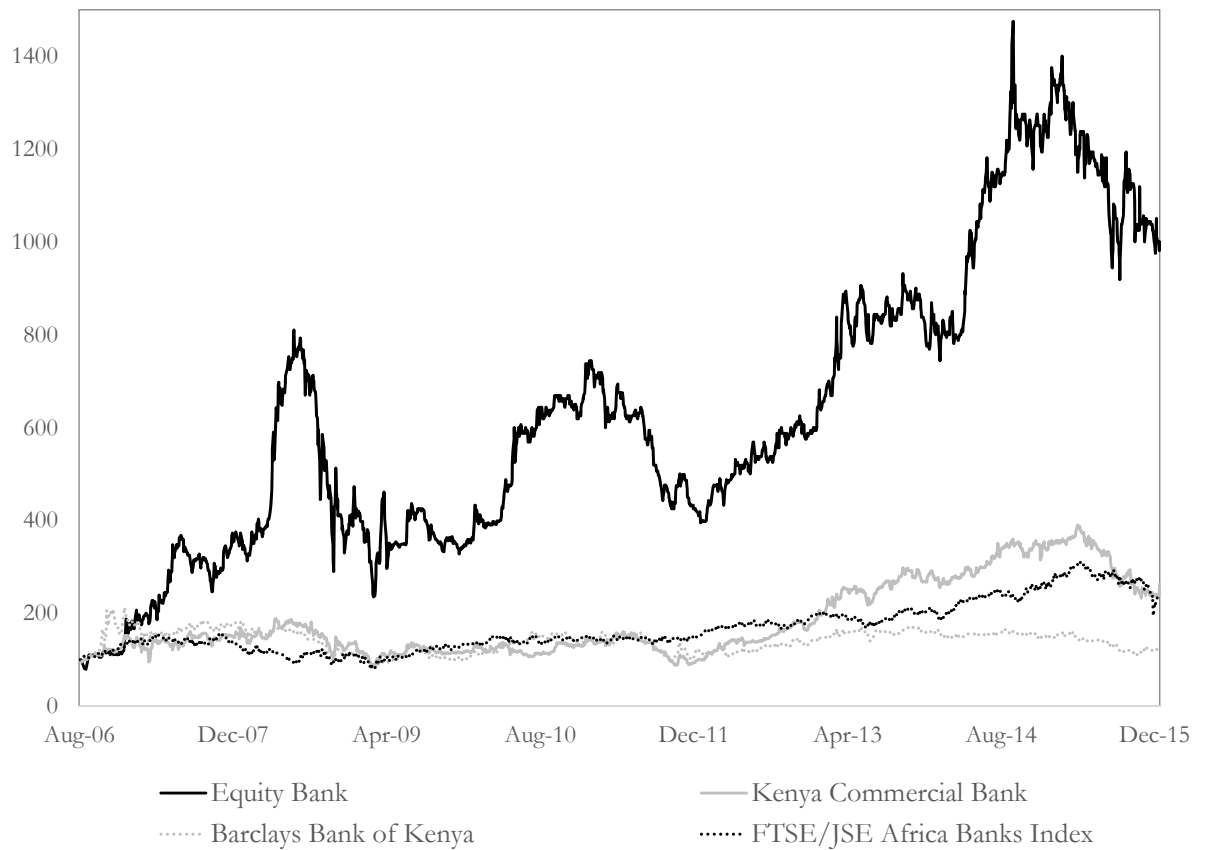
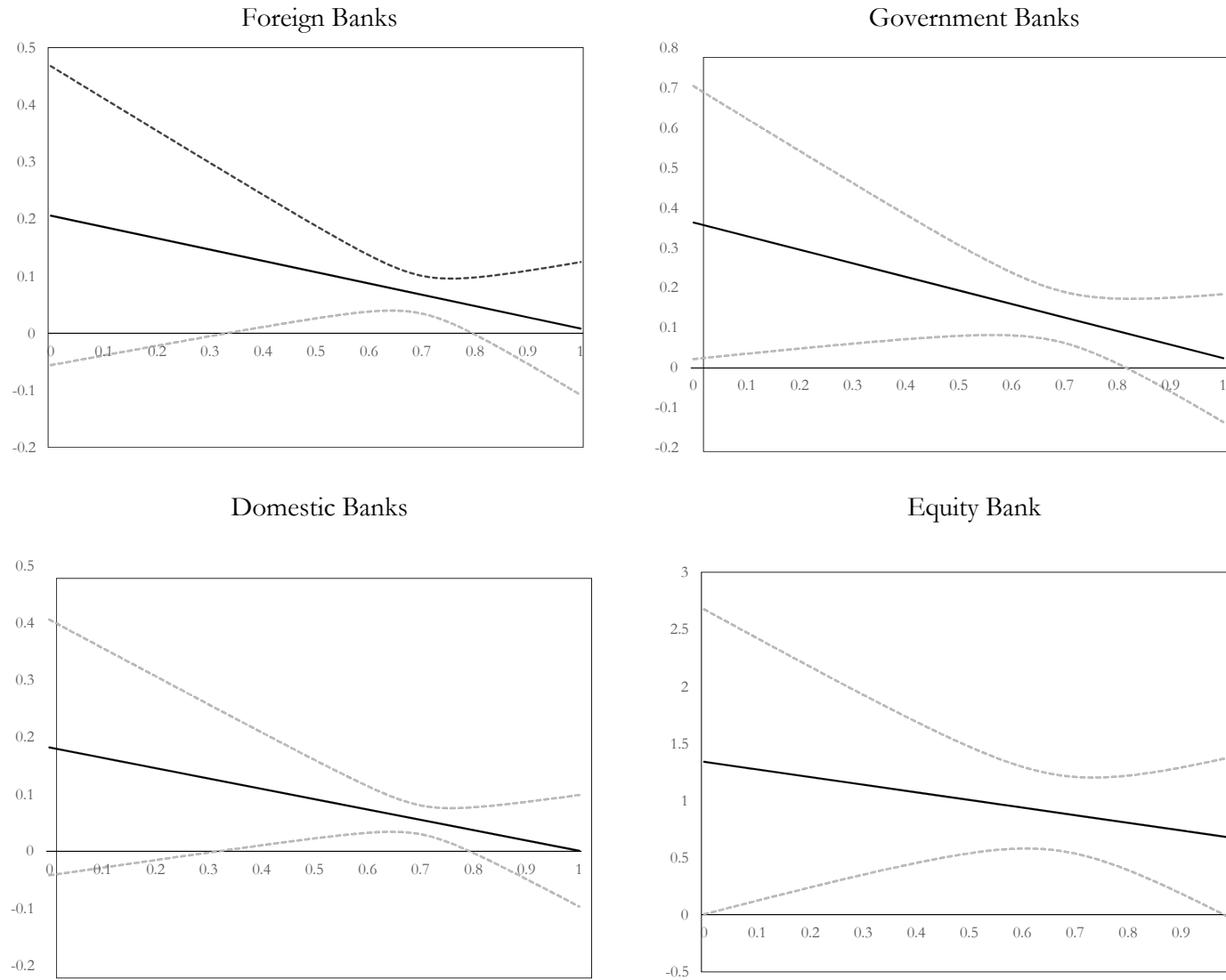


Figure 2: Branch Bank Expansion and Minority Languages

Branch expansion across districts conditional on values of district-level proportion of people speaking minority languages. Dotted lines are 95% confidence bands.



Appendix

Table A.1

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 A.2
Descriptive Statistics, Household Level

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

Variable	2006					2009				
	Obs	Mean	Std. Dev.	Min	Max	Obs	Mean	Std. Dev.	Min	Max
Bank account	4,360	0.1420	0.3491	0	1	6,562	0.227	0.419	0	1
Bank Loan	4,360	0.0290	0.1680	0	1	6,562	0.044	0.204	0	1
Household size	4,360	4.4722	2.3382	1	16	6,562	4.959	2.600	1	20
Education: Primary	4,360	0.3172	0.4654	0	1	6,562	0.186	0.389	0	1
Education: Secondary	4,360	0.2289	0.4202	0	1	6,562	0.124	0.329	0	1
Education: Tertiary	4,360	0.0234	0.1512	0	1	6,562	0.007	0.082	0	1
Female	4,360	0.5585	0.4966	0	1	6,562	0.419	0.493	0	1
Asset score	4,360	2.2011	2.1053	0	15	6,562	2.723	2.761	0	18
Own permanent house	4,360	0.1298	0.3361	0	1	6,562	0.186	0.389	0	1
Income type: Agriculture	4,360	0.4165	0.4930	0	1	6,562	0.417	0.493	0	1
Income type: Waged	4,360	0.1729	0.3782	0	1	6,562	0.152	0.359	0	1
Income type: Business	4,360	0.2865	0.4522	0	1	6,562	0.286	0.452	0	1
Age group: 18-24	4,360	0.2032	0.4024	0	1	6,562	0.178	0.383	0	1
Age group: 25-34	4,360	0.2837	0.4509	0	1	6,562	0.258	0.438	0	1
Age group: 35-44	4,360	0.1982	0.3987	0	1	6,562	0.208	0.406	0	1
Age group: 45-54	4,360	0.1232	0.3287	0	1	6,562	0.134	0.340	0	1
Age group: 55+	4,360	0.1459	0.3530	0	1	6,562	0.183	0.387	0	1
Language: Swahili	4,360	0.4764	0.4995	0	1	6,562	0.647	0.478	0	1
Language: Minority language	4,360	0.4266	0.4946	0	1	6,562	0.231	0.422	0	1
Urban	4,360	0.1135	0.3173	0	1	6,562	0.158	0.365	0	1
Rural	4,360	0.6564	0.4750	0	1	6,562	0.649	0.477	0	1
Arid and Semi-Arid	4,360	0.2300	0.4209	0	1	6,562	0.193	0.395	0	1
Total bank branches	4,360	29.3475	67.4684	0	230	6,562	61.189	124.190	0	388
Bank branches (excluding Equity Bank)	4,360	27.7094	64.6335	0	220	6,562	56.249	116.231	0	362
Equity bank branches	4,360	1.6381	2.9712	0	10	6,562	4.939	8.093	0	26
Equity bank presence	4,360	0.477	0.50	0	1	6,562	0.873	0.333	0	1

Table A.3
Instrumental Variables: Placebo

This table reports estimates from first and second stages of IV GMM Linear Probability models of a household having a bank account. We include district and year fixed effects in all the models. In models 1 to 4, Equity Bank presence, foreign bank presence, government bank presence and domestic private bank presence are instrumented with the district-level proportion of people speaking a *minority* language and its interaction with a 2009 dummy variable. Robust standard errors are in parentheses. Standard errors are clustered by district-year groups. ***, **, * indicate significance at the 1%, 5% and 10% levels, respectively.

	(1)		(2)		(3)		(4)	
	Second-stage	First-stage	Second-stage	First-stage	Second-stage	First-stage	Second-stage	First-stage
	Bank account	Equity Bank presence	Bank account	Foreign bank presence	Bank account	Gov. and gov.-influenced bank presence	Bank account	Domestic private bank presence
<i>District level variables</i>								
Equity Bank presence	0.0983*		0.0535***	-0.1758***	0.0480*	0.2047***	0.0684**	0.2304***
	(0.053)		(0.019)	(0.014)	(0.025)	(0.018)	(0.032)	(0.015)
Foreign bank presence	-0.0038	-0.1443***	0.0638		-0.0095	-0.1531***	-0.0011	0.0934***
	(0.015)	(0.012)	(0.070)		(0.019)	(0.018)	(0.017)	(0.017)
Gov. and gov.-influenced bank presence	-0.0006	0.2239***	0.0272	-0.2039***	0.0022		0.0191	0.0812***
	(0.021)	(0.016)	(0.022)	(0.025)	(0.089)		(0.019)	(0.018)
Domestic private bank presence	0.0004	0.2353***	0.0052	0.1161***	0.0150	0.0759***	-0.0985	
	(0.022)	(0.014)	(0.019)	(0.020)	(0.019)	(0.016)	(0.134)	
Year Dummy								
Dummy (2009)	-0.0538*	0.6209***	-0.0428*	0.2978***	-0.0242*	-0.1249***	-0.0129	0.1250***
	(0.031)	(0.015)	(0.022)	(0.018)	(0.014)	(0.017)	(0.019)	(0.015)
District level instruments								
District minority language share		-0.4864***		-0.4162***		-0.1421***		0.2485***
		(0.026)		(0.034)		(0.036)		(0.031)
District minority language share x Dummy (2009)		-0.5176***		-0.3148***		0.3591***		0.0227
		(0.030)		(0.030)		(0.030)		(0.029)
Observations	5,314	5,314	5,314	5,314	5,314	5,314	5,314	5,314
p-value of Hansen J statistic	0.914		0.922		0.295		0.535	
Partial R-squared of excluded instruments		0.102		0.047		0.039		0.0159
Individual / Household Controls	YES	YES	YES	YES	YES	YES	YES	YES
District Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
Time Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES

Table A.4
Identification Effect of the Equity Bank (2009) Dummy Variable

This table reports the construction of the Equity Bank presence (2009) dummy variable and its difference with the Equity Bank presence dummy variable. Equity Bank presence (2009) takes the value 1 for Equity Bank presence in the year 2009 and 0 otherwise. It is equivalent to the product between Equity Bank presence and a 2009 dummy variable. It identifies the additional effect on bank access of an Equity Bank branch in 2009 at the top of the effect of an Equity Bank branch in 2006.

District	Year	District 1	District 2	District 3	District 4	Dummy (2009)	Equity Bank presence	Equity Bank presence (2009)
1	2006	1	0	0	0	0	0	0
1	2009	1	0	0	0	1	0	0
2	2006	0	1	0	0	0	0	0
2	2009	0	1	0	0	1	1	1
3	2006	0	0	1	0	0	1	0
3	2009	0	0	1	0	1	1	1
4	2006	0	0	0	1	0	1	0
4	2009	0	0	0	1	1	0	0

Table A.5
Descriptive Statistics, Bank-Level Data

This table reports descriptive statistics of return on average assets (ROAA) at the bank level, based on the data obtained from the Bankscope database, and of the bank categories in Kenya.

Variable	Obs	Mean	Std. Dev.	Min	Max
Return on average assets (%)	311	2.287	3.607	-11.061	53.947
Domestic private bank (including Equity Bank)	311	0.611	0.488	0	1
Government bank	311	0.161	0.368	0	1
Foreign bank	311	0.228	0.420	0	1
Equity Bank	311	0.032	0.177	0	1

Table A.6
Descriptive Statistics, Branch-Level Data

This table reports descriptive statistics at the branch level, based on data obtained from Equity Bank.

Variable	Obs	Mean	Std. Dev.	Min	Max
Return on assets	919	0.107	0.072	-0.246	0.288
Income from interest on loans to assets	920	0.157	0.047	0.032	0.374
Deposits interest expense to assets	916	0.014	0.010	0.001	0.070
Lending-deposit spread	975	0.149	0.052	-0.042	0.361
Delinquent rate	897	0.038	0.031	0.000	0.189
Income from interest on loans to income	914	0.578	0.132	0.230	0.996
Customer deposits to liabilities	716	0.958	0.029	0.790	0.999
New branch	975	0.683	0.466	0	1
Arid and semi arid county	975	0.176	0.381	0	1

Table A.7
Times Series Results of New Branches: ROA and Delinquent Rates

This table explores the time variation in the profitability and delinquency rates of the new branches (i.e., those that opened from 2006 through 2009, respectively). Models 1 to 4 explore branch profitability of the branches, while that Models 5 to 8 explore the delinquency rates. All models include branch fixed effects.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	ROA				Delinquent rate			
Banches that opened in:	2006	2007	2008	2009	2006	2007	2008	2009
Dummy (2008)	0.066** (0.024)				0.003 (0.010)			
Dummy (2009)	0.093*** (0.018)	0.047*** (0.006)			0.007 (0.010)	0.015** (0.005)		
Dummy (2010)	0.125*** (0.023)	0.083*** (0.012)	0.095*** (0.012)		0.011 (0.012)	0.031*** (0.007)	0.009*** (0.003)	
Dummy (2011)	0.104*** (0.023)	0.057*** (0.019)	0.099*** (0.015)	0.052** (0.021)	-0.003 (0.012)	0.020** (0.008)	0.009** (0.003)	0.003 (0.005)
Dummy (2012)	0.137*** (0.028)	0.085*** (0.016)	0.128*** (0.018)	0.084*** (0.016)	0.004 (0.013)	0.025*** (0.006)	0.016*** (0.004)	0.009 (0.005)
Dummy (2013)	0.128*** (0.023)	0.092*** (0.013)	0.144*** (0.014)	0.105*** (0.022)	0.005 (0.015)	0.024*** (0.007)	0.020*** (0.004)	0.012** (0.005)
Dummy (2014)	0.133*** (0.027)	0.098*** (0.016)	0.148*** (0.013)	0.135*** (0.022)	0.009 (0.016)	0.029*** (0.008)	0.027*** (0.004)	0.018*** (0.005)
Dummy (2015)	0.117*** (0.030)	0.097*** (0.014)	0.132*** (0.013)	0.133*** (0.025)	0.009 (0.014)	0.025*** (0.005)	0.027*** (0.006)	0.019*** (0.005)
Observations	81	224	189	95	81	223	189	96
Adjusted R-squared	0.749	0.609	0.796	0.695	0.481	0.380	0.571	0.367
Branch Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES

Figure A.1: Branch Bank Expansion and Minority Languages

Branch expansion across districts conditional on values of district-level proportion of people speaking minority languages. Dotted lines are 95% confidence bands.

