

Effects of Financial Literacy on Financial Access in Kenya

Adan Guyo Shibia

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**THE KENYA INSTITUTE FOR PUBLIC POLICY
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Effects of Financial Literacy on Financial Access in Kenya

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Private Sector Development Division
Kenya Institute for Public Policy
Research and Analysis

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Abstract

This study investigates effects of financial literacy on financial access in Kenya. The FinAccess National Survey 2009 shows that 60 per cent of the adult population in Kenya lacks access to formal financial services including banking, insurance and mobile money transfer services. Access to formal financial services is not only important for individuals for risk transfer, but also for the economy at large in savings mobilization and capital allocation. Multinomial probit regression results for a sample of 6,329 national representative individuals established that financial literacy is a strong predictor of formal financial access in Kenya. Using the number of household income earners as an instrument, it was established that financial literacy is exogenous. Control variables including age, education, urbanism, proximity to formal financial institutions and being male were also found to increase incidences of financial access in Kenya. It was concluded that other factors besides price affect demand for formal financial services and policy efforts aimed at boosting financial literacy should be enhanced.

Abbreviations and Acronyms

ASCAs	Accumulated Savings and Credit Associations
FSD	Financial Sector Deepening
GDP	Gross Domestic Product
MFI	Micro-Finance Institution
RoSCAs	Rotating Savings and Credit Associations
SACCOs	Savings and Credit Co-operative Societies
SSA	Sub-Saharan Africa

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1. Introduction

1.1 Background of the Study

The purpose of this study was to establish effects of financial literacy on financial access in Kenya. A key policy concern in developing countries is to understand how to extend access to formal financial services¹ to low income segment of the population, who either rely on informal financial arrangements such as money lenders or are totally excluded from any form of financial arrangements. The policy efforts are mainly driven by empirical findings linking access to formal financial services to poverty alleviation. The problem of lack of access to formal financial services is acute in Sub-Saharan Africa (SSA), where only one in five households are banked (Honohan and Beck, 2007). According to FinAccess National Survey 2009, only 4 out of 10 adults in Kenya have access to formal financial services.

One important issue that is less analyzed in developing countries in understanding access to formal financial services is the role of financial literacy. The limited extant studies are concentrated in developed countries (Cole, Sampson and Zia, 2011). Scarce national surveys at household level are one of the main constraints to accumulation of evidence on household characteristics that affect financial access (Beck and Demirgüç-Kunt, 2008). The recent FinScope² national surveys in African countries play an important role in bridging this gap (Honohan and King, 2009). In Kenya, two national surveys referred to as the FinAccess National Surveys, on individual access to financial services were undertaken in 2006 and 2009 by the Financial Sector Deepening (FSD) Kenya in partnership with the Central Bank of Kenya.

Definitions of financial literacy in extant literature revolve around empowering consumers to enable them make informed financial decisions. Financial literacy involves empowering an individual's ability to make informed financial decisions (Kefela, 2010; Wolfe-

¹ Formal financial services include products offered by financial institutions prudentially regulated or are at least under some oversight by a government agency.

² FinScope Surveys, a FinMark Trust initiative, are national representative surveys of individual use and demand for financial services including informal products. FinMark Trust was established in 2002 and is funded primarily by the United Kingdom's Department for International Development (DfID) through its Southern Africa office.

Hayes, 2010). Consumer's knowledge of financial concepts is the most commonly used definition of financial literacy (Remund, 2010) and this was adopted as the operational definition in this study. Available data also restricts financial literacy concept to this definition.

Financial access is a broad concept encompassing credit, deposit, payment, insurance and other risk-management services provided by formal financial institutions (Beck *et al.*, 2007; Demirgüç-Kunt *et al.*, 2008). Financial access does not necessarily mean usage since people who have access to financial services might opt not to use them due to socio-cultural reasons, thus resulting to self exclusion (Beck *et al.*, 2007). However, Honohan (2008) uses the terms financial access and usage synonymously. Since the analysis of this study was based on questions relating to whether an individual currently has specified financial products; access and use are used interchangeably.

The extent to which a financial service provider is regulated is the basis on which it is classified as formal or informal. Formal financial products are supplied by institutions governed by legal precedent, while informal financial products operate outside the domain of recognized legal governance (Honohan and King, 2009; Kimenyi and Ndung'u, 2009) such as money lenders and informal groups including Rotating Savings and Credit Associations (RoSCAs) and Accumulated Savings and Credit Associations (ASCAs). However, in most cases, people may use financial services at different access strands and this is particularly true for Kenya as evidenced by the FinAccess National Survey 2009 results.

Access to formal financial services is important for both individuals and the economy at large. Financial access positively affects economic growth and poverty alleviation (Galor and Zeira, 1993); enhances technological progress (King and Levine, 1993); facilitates consumption smoothening and risk-pooling functions (Honohan and King, 2009); and is a vehicle for accessing other basic needs such as health services and education (Peachey and Roe, 2004). Informal financial services are pervasive in developing countries, although they fail to offer low-cost and broad risk-pooling services (Honohan and King, 2009; Kimenyi and Ndung'u, 2009).

² PostBank is an acronym for the Kenya Post Office Savings Bank, and is primarily engaged in the mobilization of savings for national development and operates under the Kenya Post Office Savings Bank Act Cap. 493B.

According to the FinAccess National Survey 2009, 60 per cent of adult population in Kenya lacks access to formal financial services provided by commercial banks, PostBank², insurance companies and mobile money transfer providers. Lack of access to formal financial services impedes market exchanges, increases household risks and limits opportunities to save (Kimenyi and Ndung'u, 2009). Evidence from the FinAccess National Survey 2009 shows that 13 per cent of RoSCAs members reported loss of savings, of which 60 per cent was during the preceding one year; while 19 per cent of ASCA members reported having lost savings, of which 63 per cent was during the preceding one year (Malkamaki, 2011). This raises an important policy questions on why informal financial services are perverse in Kenya, despite the lingering risks. While Kenya is relatively doing well compared to other East African countries such as Tanzania and Uganda where less than 20 per cent of the population use formal financial services (Beck *et al.*, 2010), much is yet to be achieved compared to Southern African countries. In South Africa and Botswana, 64 per cent and 43 per cent of the adult population have access to formal financial services, respectively (FinScope, 2009).

Extant studies attribute constraints to financial access in Kenya to high interest rate spread (Beck *et al.*, 2010; Beck and Fuchs, 2004; Ndung'u and Ngugi, 2000; Ngugi, 2004; Oduor *et al.*, 2010) limited bank branch network, high legal and valuation fees and restrictive legal factors such as prohibition of the PostBank from advancing credit (KIPPPRA, 2001). Low income, being female, low levels of education (Johnson and Nino-Zarazua, 2009; Johnson, 2004; Mwangi and Sichei, 2011) and increasing distance from formal financial institutions (Mwangi and Sichei, 2011) increase incidences of exclusion from formal financial services. This study thus contributes to policy debates on strategies to increase financial access, by focusing on financial illiteracy as a barrier to access of formal financial services.

1.2 Statement of the Problem

Pursuant to Vision 2030, Kenya aspires to be a prosperous middle income country by the year 2030 and financial services have been identified as engines to mobilize savings to drive growth aspirations. According to the FinAccess National Survey 2009, 60 per cent of the adult population in Kenya lacks access to formal financial services. Of the population excluded from formal financial services, 26.8 per cent

use informal financial services and 32.7 per cent are totally financially excluded. Access to formal financial services, in addition to savings mobilization, offers households with smoothening consumption and risk pooling services (Honohan, 2008), and is vital for economic growth (King and Levine, 1993). Unless the 60 per cent of the adult population who are either using informal financial services or are totally excluded are brought into formal financial system, the role of the sector in mobilizing savings and cushioning households against shocks is unlikely to be realized. One dimension in access to formal financial services that has been less analyzed is the potential role of financial literacy as a barrier to demand for formal financial services. This study aims at informing policy on the role of financial literacy on financial access in Kenya.

1.3 Objective of the Study

The objective of this study is to determine effects of financial literacy on financial access in Kenya.

1.4 Justification of the Study

Understanding barriers to financial access is critical for increasing the proportion of the population using formal financial services. The Vision 2030 recognizes pivotal role of formal financial sector in mobilizing savings to support the envisaged 10 per cent Gross Domestic Product (GDP) growth aspirations. Kenya aspires to be a middle income country and the financial sector is expected to play a key role in mobilizing private savings from 14 per cent of GDP in 2007/08 to 26 per cent of GDP in 2030. A key strategy is to increase access to formal financial services for majority of the population that are excluded. Financial intermediation contributes between 3.69 and 5.4 per cent of GDP; but still lags behind other sectors such as agriculture and manufacturing that contribute 24 and 10 per cent of GDP, respectively (Government of Kenya, 2008).

1.5 Policy Developments and Structure of Kenya's Financial Sector

The main policy document related to financial services in Kenya is the Kenya Vision 2030, which was adopted in 2007. It is a long-term

development goal that envisages improved efficiency in financial services delivery, improved access to formal financial services for majority of Kenyans and increased private savings to 26 per cent of GDP.

Kenya's financial sector has undergone tremendous evolution and is expected to accelerate with proliferation of technological advancements, especially mobile money transfer services such as M-Pesa³. Prior to liberalizing interest rate in 1991, Kenya's financial sector was characterized by repression with selected credit controls and fixed interest rates (Ngugi, 2001).

Financial service providers in Kenya comprise of 43 commercial banks, one mortgage finance institution, 47 insurance companies, the capital market and pension funds. Commercial Banks, mortgage finance institutions and deposit-taking microfinance institutions are regulated under the Banking Act. Despite the existence of array of formal financial institutions, Kenya's financial sector has failed to provide adequate access to formal financial services (Beck *et al.*, 2010). Bank lending in Kenya is skewed in favour of large private and public enterprises, though a large share of deposits is from small depositors (Beck *et al.*, 2010). Cook (2004) posits that the entry of K-Rep and Equity banks in Kenya has created awareness on untapped opportunities in low income segments of the population. Other players in the sector include quasi-banking institutions comprising of SACCOs and non-deposit taking MFIs; as well as unregulated informal financial service providers including RoSCAs and ASCAs. RoSCAs and ASCAs are similar since they are voluntary groups with their own rules, however the latter differ from the former because members save and borrow with interest, while in the former, contributions are immediately shared among one or more members (Malkamaki, 2011).

The Microfinance Act 2006, which became operational in 2008, provides regulatory and supervisory framework for deposit-taking microfinance institutions. Regulations for non-deposit taking MFIs are yet to be put in place. Microfinance institutions in Kenya play a pivotal role in providing financial services to more than half of the Kenyan population who lack access to mainstream banking system (Masa, 2009). The Kenya Post Office Savings Bank (PostBank) is primarily involved in mobilization of savings for national development under the

³ M-Pesa is a mobile money transfer service operated by Safaricom Ltd. "M" stands for mobile and "pesa" is a Swahili word meaning money.

Kenya Post Office Savings Bank Act. In addition, Postbank offers funds remittances and disbursement services. The SACCO Societies (deposit taking SACCO business) Regulations 2010, provide operational regulations and prudential standards for deposit taking SACCOs.

2. Literature Review

2.1 Theoretical Literature

The theoretical literature related to financial access includes credit rationing theory (Stiglitz and Weiss, 1981); behavioural and institutional analysis (Simpson and Buckland, 2009) and financial literacy view (Beverly and Sherraden, 1999; Atkinson *et al.*, 2007; Cole *et al.*, 2011). Banks ration credit because of adverse selection and incentive effect problems, since increasing interest rates could increase the riskiness of loan portfolio either by discouraging safer borrowers or inducing borrowers to invest in risky projects (Stiglitz and Weiss, 1981). Simpson and Buckland (2009) identify behavioural economics and institutional analysis in explaining financial access. In behavioural view, they argue that consumers behave irrationally, thus hurting their interests; for example, through borrowing from money lenders at high interest rates. Institutional analysis theory assumes that the consumer is rational and focuses on demand and supply factors such as financial liberalization that has for example led to mainstream banks closing less profitable branches in low income regions. The principal demand side factors linked with institutional analysis originate from increasing income and wealth disparity, hence resulting to growing number of unbanked households.

Financial literacy theory bridges behavioural and institutional views (Simpson and Buckland, 2009) and argues that structural changes increasingly shift the responsibility of financial planning to the citizen (Atkinson, *et al.*, 2007). If individuals have a narrow understanding of financial services, they fail to realize potential benefits of participation or will simply shy away (Beverly and Sherraden, 1999; Cole *et al.*, 2011). The high cost view is similar to institutional analysis theory (Simpson and Buckland, 2009) and argues that since formal financial services involve high fixed costs hence expensive, low income individuals seek alternative credit and saving services (Cole *et al.*, 2011). The gains from formal financial services may be less than associated transactions costs (Beck *et al.*, 2007) and a rational consumer will choose informal financial services or may decide to be completely excluded.

2.2 Empirical Literature

The effect of financial literacy on demand for financial service has been documented in developed countries and emerging economies. Cole *et al.* (2011), using field experiment in Indonesia and India in determining the relative importance of financial literacy and prices, find that financial literacy stimulates demand for bank account. They find effect of financial education to strongly stimulate demand for bank accounts among uneducated and those with low initial financial knowledge. Higher financial literacy enhances savings decision (Ameriks *et al.*, 2003; Bernheim and Garrett, 2003; Cole *et al.*, 2011; Dvorak and Hanley, 2010; Kefela, 2010; Lusardi and Mitchell, 2007a, 2007b; van Rooij *et al.*, 2011a, 2011b). Japelli and Padula (2011) find that countries exhibiting higher levels of financial literacy have higher savings rate. Higher financial literacy is associated with greater wealth accumulation, higher probability of investing in stock market (van Rooij *et al.*, 2011a) and greater portfolio diversification (Calvet *et al.*, 2009). Less financially literate households borrow at higher interest rates (Lusardi and Tufano, 2008) and are less likely to participate in formal financial systems (Alessie *et al.*, 2007).

Gender bias has been established to affect financial access in favour of male respondents. Being female reduces likelihood of having a bank account (Johnson and Nino-Zarazua, 2009; Hogarth and O'Donnell, 1997); and it reduces incidences of total exclusion (Beck *et al.*, 2010; Johnson and Nino-Zarazua, 2009; Johnson, 2004) as a result of inclusion, through semi-formal and informal financial services (Johnson and Nino-Zarazua, 2009; Johnson, 2004).

Income and proximity to financial institutions have been established as important factors affecting demand for financial services. Higher income increases household financial access (Beck *et al.*, 2010; Bendig *et al.*, 2009; Buckland and Dong, 2008; Cheron *et al.*, 1999; Claessens, 2006; Cole *et al.*, 2011; Hogarth and O'Donnell, 1997; Hogarth *et al.*, 2003; Kiiza and Pederson, 2002; Kumar *et al.*, 2005; Simpson and Buckland, 2009). Low income consumers rank proximity to bank branch than higher income consumers in choosing to open a bank account (Ekos Research Associates Inc., 2001). Being closer to a bank branch increases the probability of accessing formal financial services (Beck *et al.*, 2007; Bendig *et al.*, 2009; Kiiza and Pederson, 2002). Wider branch networks and automated teller machines enhance financial access (Beck *et al.*, 2007; Kumar *et al.*, 2005).

Being older increases incidence of financial access (Delvin, 2005; Johnson and Nino-Zarazua, 2009; Simpson and Buckland, 2009). Simpson and Buckland (2009) attribute this linkage to life-cycle hypothesis which postulates higher consumption relative to income and higher likelihood of credit constraint during early years of a person. Johnson and Nino-Zarazua (2009) find that being young reduces the likelihood of using informal groups in Kenya and they attribute it to their high mobility level and weaker social networks.

Extant studies also show that formal education affects financial access. Being educated increases incidences of financial access (Beck *et al.*, 2010; Bendig *et al.*, 2009; Buckland and Dong, 2008; Delvin, 2005; Johnson and Nino-Zarazua, 2009; Kiiza and Pederson, 2002; Kumar *et al.*, 2005; Simpson and Buckland, 2009).

3. Methodology

3.1 Conceptual Framework

The conceptual framework of this study borrows from analytical framework developed by Beck and De la Tore (2006) where demand for financial services is driven by both economic factors including price and income, and non-economic factors such as financial illiteracy and socio-cultural barriers. Income, prices and wealth define the budget constraint of a consumer. Within the constraints of price, wealth and income tastes and preferences shape the demand curve (Case *et al.*, 2009). Demand is an increasing function of income but a decreasing function of price and financial illiteracy; thus creating a possibility whereby actual demand is lower than potential demand driven by economic factors (Beck and De la Tore, 2006). Consumer access to information and product characteristics play important roles in shifting demand for a product (Stiglitz and Walsh, 2006). Financial illiteracy, therefore, plays a role in demand for formal financial products as individuals learn about the products, and this can help in shaping their tastes and preferences. Indeed, Bertrand *et al.* (2005) using experimental design, show that consumer psychological features affect demand for credit.

3.2 Econometric Model

The definition of access strand varies with a country depending on the structure of the financial sector. To facilitate comparison with similar studies in other countries, definition of formal access strand by Porteus (2007) was adopted, but formal bank services (commercial banks and PostBank) and non-bank formal services (insurance companies) were amalgamated. In situations where a respondent uses multiple services that rank at different access strands, the 'most formal' access strand classification was used following Johnson and Arnold (2011) and Beck *et al.* (2010). Thus, each respondent is placed in a single and mutually exclusive category of financial access strand, dependent on the most formal financial service they use. Following this approach, commercial banks, PostBank and insurance companies are categorized as formal financial institutions; SACCOs and MFIs as semi-formal financial institutions; ASCAs, RoSCAs and other informal groups as informal financial services; and those who lack access to at least informal financial services were categorized as excluded. The dependent variable

was categorical access strand taking on four alternatives: 1 for formal financial services; 2 for semi-formal financial services; 3 for informal financial services; and 4 for financially excluded category.

The Hausman test of Independence from Irrelevance Alternative (IIA) was conducted and the null hypothesis in favour of IIA was rejected at 1 per cent; and therefore multinomial probit model was employed. Further, multinomial probit model allows for the error correlations along with the estimated coefficients (Greene, 2008). Unordered choice models such as multinomial probit model can be motivated by a random utility model (Greene, 2008). There are four alternatives and the highest pay-off (utility) is chosen. In this study, we only observe which alternative is chosen. If individual i makes choice j in particular, then we assume that utility u_{ij} is the maximum among j utilities. The statistical model is driven by the probability that choice j is made, which is $\text{Prob}(u_{ij} > u_{ik})$ for all other $k \neq j$ alternatives. Category j is chosen if the underlying latent y_{ij}^* is highest for j , that is

$$y_i = \begin{cases} y_j^* = \max[y_1^*, y_2^*, y_3^*, y_4^*] \\ 0 \text{ otherwise} \end{cases}$$

3.3 Data Source

The study utilized the FinAccess National Survey 2009 data for 6,329 respondents of 18 years and above. Respondents below the age of 18 were excluded from the analysis because they are not allowed to enter into a binding agreement with financial institutions. Financial institutions require identification documents such as national identity cards, yet respondents below the age of 18 usually lack such documents. The current legal age for obtaining a national identity document (ID) in Kenya is 18 years. The ID is the most commonly used identification and verification document under Know Your Customer (KYC) regulations.

3.4 Variable Definitions and Measurements

The regressor of interest is financial literacy, a continuous variable computed as an index from a set of financial literacy questions. A total of 16 questions used to assess self-reported knowledge of respondents about financial concepts and products were utilized. The scores were as follows: 1=have never heard of the concept or product; 2=have heard of the concept or product but does not understand what it means; 3=have heard of the concept or product and knows what it means. The concepts include savings account, insurance, interest rate, shares,

cheque, collateral, ATM card, credit card, budget, investment, inflation, leasing, pension, mortgage, pyramid schemes and credit bureau. Control variables include a continuous age variable, income as proxied by respondent's total monthly consumption expenditure, a binary region variable (1= urban, 0= rural), categorical variable for proximity to reach nearest bank branch to proxy for proximity to formal financial institutions (1=Less than 30 minutes; 2=30 minutes-1 hour; 3=2-3 hours; 4=4-5 hours; 5=6+ hours), a dummy gender variable (1=male; 0=female), and a categorical education variable (1=none; 2=primary; 3=secondary; 4=tertiary).

3.5 Test of Financial Literacy Endogeneity

Despite efforts to enhance financial access through enhanced financial literacy, questions still linger on direction of causality of financial literacy and financial access (Lusardi *et al.*, 2010). Individuals who lack financial access may also be financially illiterate due to measurement error and underlying unobservable factors (Behrman *et al.*, 2010). To evaluate the possibility of endogeneity, the number of household income earners was used as an instrument. The financial experience of other household members is assumed to be exogenous with respect to a respondent's actions to belong to a particular access strand, which is driven by individual utility maximization function. However, financial experiences of other household members create an environment where one is exposed to financial literacy. Income earners are more likely to discuss finance related concepts. An additional or alternative excluded instrument could not be found with the available data set.

Recent studies on financial literacy that have attempted to address endogeneity include: van Rooij *et al.* (2011b) who used the extent to which high school education was devoted to economics (a lot, some, little, or hardly at all); and Cole *et al.* (2011) who used a dummy on whether the respondent participated in financial education programme. However, these studies do not report whether they tested for endogeneity of financial literacy. It is imperative to test for endogeneity since instrument estimates can be worse than estimates without instruments in the absence of endogeneity (Bound *et al.*, 1995).

To test for endogeneity, two-stage residual inclusion (2SRI) also known as control function approach, were used. In the first stage, financial literacy index was regressed on both included and excluded

instruments. In the second stage, the first stage residual was included as additional explanatory variable in the structural regression. Terza *et al.* (2008) compare the Two-Stage Residual Inclusion (2SRI) to the Two-Stage Predictor Substitution (2SPS) in addressing endogeneity and show that for non-linear models, 2SRI produces consistent estimates compared to 2SPS.

The coefficient of the first stage residual in the structural regression was insignificant as shown in Appendix 2, implying there is no sufficient evidence of endogeneity problem. Bound *et al.* (1995) posit that the partial R^2 and F-Statistics of the excluded instruments in the first-stage estimation are important indicators of quality of the instrumental variable estimates and recommend that they should be reported. The partial R^2 and F-statistic are obtained by partialling out the excluded instruments (Bound *et al.*, 1995). Carmignani (2009) posits that partial F-statistic is a reliable measure of instrument relevance if there is only one endogenous variable, while Shea's partial R^2 is designed to account for multiple endogenous regressors. As a rule of the thumb, if the standard R^2 is high and the Shea's partial R^2 is low, then instruments lack sufficient relevance (Baum *et al.*, 2003; 2007).

The partial R^2 and F-statistic using the number of household income earners as an instrument are 0.3 percent and 15.34, respectively. The partial F-statistic in the first-stage regression is high (15.34) and exceeds the value of 10 recommended by Staiger and Stock (1997), indicating that the instrument is sufficiently correlated with the suspect endogenous variable. The coefficient of household income earners is positive and significant at 5 per cent significance level in the first stage regression.

4. Results and Discussions

4.1 Descriptive Statistics

Table 4.1 shows multiple uses of financial services across access strands. Of those who have access to formal financial services, 2.5 per cent use formal financial services only, 6.9 per cent use formal services in conjunction with semi-formal services such as SACCOs and MFIs; 3 per cent use formal and informal financial services; while 10.2 per cent use formal services together with semi-formal and informal services. There is also an overlap in use of semi-formal and informal financial services.

Table 4.1: Financial access strands and multiple uses in Kenya*

Access strands	Frequency	Percent
Formal only	148	2.5
Semi-formal only	469	7.8
Informal only	1,603	26.8
Formal and semi-formal only	413	6.9
Formal and informal	180	3.0
Semi-formal and informal	604	10.1
Formal and semi-formal and informal	610	10.2
Excluded	1,958	32.7
Total	5,985	100.0

Data source: FinAccess National Survey, 2009

*The data was weighted back to the population.⁴

Table 4.2 shows descriptive statistics of explanatory variables. Financial literacy index ranges from 16, indicating that the respondent never heard of any of the financial terms and economic concepts related to finances, to 48 indicating that the respondents have heard of all the terms and concepts and understand what they mean. Income ranges from Ksh 51 to Ksh 300,000, with a mean of Ksh 13,758. The age variable ranges from 18 to 105 years, with a mean of 40 years.

⁴ The weights are based on national gender and household distribution (FinAccess, 2009). Unless stated, analysis is based on unweighted data.

Table 4.2: Descriptive statistics of explanatory variables

Variable	N	Minimum	Maximum	Mean	Std. Deviation
Financial literacy index	6,329	16.00	48.00	33.04	9.60
Gender	6,329	0.00	1.00	0.41	0.49
Income (Ksh)	6,329	51.00	300,000.00	13,757.66	23,213.44
Age (Years)	6,329	18.00	105.00	39.60	15.82
Proximity	6,094	1.00	5.00	1.86	0.96
Education	6,329	1.00	4.00	2.26	0.85
Region	6,329	0.00	1.00	0.29	0.45

Data source: *FinAccess National Survey, 2009*

Table 4.3 shows that the mean of the financial literacy index declines with decreasing level of ‘formality’. Individuals with formal financial access have a mean financial literacy index of 41, while those excluded have least financial literacy index of 29. However, the standard deviation of financial literacy index across the access strands increases with decreasing level of ‘formality’, an indication of increasing disparities of financial literacy among those who are financially excluded.

4.2 Regression Results

In this section, multinomial probit model marginal effects are reported using ‘excluded’ category as the base outcome. Version 10.0 of the statistical software, Stata, was used for analysis. The result shows that financial literacy is a strong predictor of financial access. The marginal effects for financial literacy for formal, semi-formal and informal financial services are statistically significant at 1 per cent. A unit increase in financial literacy index increases the probability of access to

Table 4.3: Financial literacy index and financial access strands*

Access strand	Number of respondents		Financial Literacy Index			
	Frequency	%	Minimum	Maximum	Mean	Standard deviation
Formal	1,351	22.6	18	48	40.80	6.26
Semi-formal	1,073	17.9	17	48	35.81	7.63
Informal	1,603	26.8	16	48	29.34	7.78
Excluded	1,958	32.7	16	48	28.95	8.75
Total	5,985	100	-	-	-	-

Data source: *FinAccess National Survey, 2009*

* Weighted data

formal and semi-formal financial services by 2 per cent and 0.3 per cent higher respectively, compared to the financially excluded category. The results show that a unit increase in financial literacy index lowers the probability of informal financial access by 0.7 per cent, compared to the financially excluded category. The implication of the negative coefficient for informal category is that individuals possessing higher financial literacy are likely to possess knowledge of inherent risks associated with informal financial services. This finding has two important policy implications: First, it indicates that policy needs to address alternative access barriers rather than focusing solely on transaction costs and distance (proximity) in order to achieve financial access for majority of the population. Second, it shows that current policy initiatives to formalize semi-formal financial institutions such as SACCOs and MFIs are important policy steps that need to be further enhanced.

The coefficient of age is positive and being older increases the probability of formal access. This is consistent with findings of Delvin (2005); Johnson and Nino-Zarazua (2009); and Simpson and Buckland (2009). Being older by one year increases the probability of access to formal and semi-formal financial services by 0.5 per cent and 0.1 per cent higher respectively, compared to the excluded category. Delvin (2005) posits that younger individuals are more likely to self exclude, choosing to consume their financial resources rather than defer them for future consumption. From the perspective of formal financial institutions, this finding calls for innovative products that induce younger individuals to defer current consumption in favour of future consumption. Efforts to develop youth development accounts at an early age to inculcate savings culture are imperative in increasing younger individuals' access to financial services. Access to formal financial services at a younger age is critical for accumulating savings and building stock of credit information over lifecycle. However, being older by one year lowers informal access by 0.1 per cent, compared to the base category.

The marginal effect for income is statistically significant at 1 per cent for formal and informal categories. Such resource exclusion can be tackled with intervention policies aimed at removing households from poverty. The small magnitude of income effect on financial access has important policy implications of addressing alternative barriers other than income and costs that are hitherto believed to be key impediments. Therefore, concerted efforts to address financial access require addressing both demand and supply factors targeting consumers and financial service providers, respectively.

The marginal effect for region is positive and statistically significant for the formal outcome and being urban increases probability of access to formal financial services by 4.3 per cent, compared to the base outcome. Being rural or urban does not affect the choice of semi-formal and informal financial services compared to the base outcome. However, this contrasts with the findings of Johnson and Nino-Zarazua (2009) who find that while region does not affect access to formal financial services, being rural significantly lowers likelihood of being completely excluded through semi-formal and informal sector. They attribute this unexpected finding to historical dominance of agricultural-based SACCOs in rural areas. The contrast in effect of region on formal financial access could be due to their inclusion of another region variable, province, which may have had dominating effect. With the promulgation of the Constitution of Kenya 2010, provinces no longer exist and the province variable has little policy implication in the current context.

The marginal effect for gender is insignificant with regards to demand for formal and semi-formal categories, compared to the base outcome. However, the marginal effect is significant for informal access, lowering the probability of male informal access by 10.4 per cent, compared to the financially excluded category. Women's higher access to informal financial services could be due to their historical dominance of informal groups such as RoSCAs and their strong social ties (Johnson, 2004). Education is also an important determinant of demand for financial services. Individuals with formal education have higher probability of access to formal and semi-formal financial services compared to the base outcome. Having tertiary education increases the probability of formal access by 36.7 per cent, compared to the excluded category.

Proximity to formal financial institutions, proxied by time taken to reach nearest bank branch is also an important determinant of financial access. Those who spend more than six hours are 10.1 per cent less likely to have access to formal financial services, compared to those who spend less than 30 minutes to reach nearest bank branch.

Table 4.4: Multinomial probit marginal effects^a

	Formal	Semi-formal	Informal
Variables	Access	Access	Access
Financial literacy	0.0199***	0.00270***	-0.00722***
	(0.000974)	(0.000891)	(0.000952)
Age	0.00501***	0.000750*	-0.00121***
	(0.000459)	(0.000417)	(0.000434)
Income	6.25e-06***	8.06e-07	-2.77e-06***
	(5.12e-07)	(5.05e-07)	(7.29e-07)
Region: Urban	0.0431***	0.00981	-0.0279
	(0.0166)	(0.0153)	(0.0172)
Proximity: 30min-1hr	-0.0364**	-0.0321**	0.0667***
	(0.0147)	(0.0137)	(0.0160)
Proximity: 2-3 hrs	-0.0798***	-0.0458***	0.0899***
	(0.0179)	(0.0168)	(0.0207)
Proximity: 4-5 hrs	-0.0543	-0.0747**	-0.000219
	(0.0491)	(0.0368)	(0.0428)
Proximity: 6+ hrs	-0.101**	-0.185***	-0.0985***
	(0.0511)	(0.0233)	(0.0375)
Gender: Male	0.0140	0.00804	-0.104***
	(0.0130)	(0.0121)	(0.0128)
Education: Primary	0.0910***	0.0679***	0.0256
	(0.0266)	(0.0217)	(0.0202)
Education: Secondary	0.196***	0.115***	-0.119***
	(0.0339)	(0.0286)	(0.0229)
Education: Tertiary	0.367***	0.0883**	-0.246***
	(0.0467)	(0.0402)	(0.0200)
Observations	6,094	6,094	6,094

^a. Excluded is the base outcome; Standard errors in parentheses; Base for categorical variables are as follows: Region: rural; Proximity: less than 30 minutes; Gender: female; Education: no formal education. Significant at *** p<0.01, ** p<0.05, * p<0.1

Data source: FinAccess National Survey, 2009

5. Conclusion and Policy Recommendations

5.1 Conclusion

This study has established that financial literacy is a strong predictor of financial access in Kenya. In the absence of access to formal financial services, individuals rely on unregulated risky informal financial services, or are totally excluded. Access to formal financial services is important for individuals in risk transfer across time and for the economy at large in savings mobilization, market exchanges and capital allocation. Using number of income earners as an instrument, it was established that financial literacy is exogenous. Even after controlling for a host of variables including income, education, gender, proximity, region (rural vs. urban) and age, the study finds that financial literacy is a strong predictor of formal financial access in Kenya. This calls for enhanced policy efforts geared at increasing financial literacy as a strategy for expanding access to formal financial services.

5.2 Policy Recommendations

Based on the findings of this study, the following policy recommendations are made as strategies for increasing financial literacy and furthering financial access:

- i) Develop and integrate mandatory financial literacy programmes in academic curricular. Financial literacy programmes introduced at primary level and higher levels can provide life-long learning experience and reach large segments of youth who are financially excluded. Such financial literacy programmes should include knowledge of financial institutions, financial products and computations of risks and returns.
- ii) For the greatest impact of financial literacy programmes to be realized, there is need to tailor financial literacy programmes for different segments of the population. While it may involve higher cost implications, importance of reaching target audience is paramount as “one size for all” is unlikely to make significant impact. The government should consider targeted education through media such as television, radio and social media. For example, the youth and educated can be easily reached through social media, while the elderly and less educated can be reached through local radio channels.

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Appendix

Appendix 1: First-stage regression of instrumental variable

```
. xi: ivreg2 accesfin (finlit = hhinc) agerspex income i.regn i.trnsptme i.gend
> i.educate
> g. first/*Testing for endogeneity- step 1:regressing other independent variab
> les on fin
> ancial literacy index*/
i.regn      _Iregn_0-1      (naturally coded: _Iregn_0 omitted)
i.trnsptme  _Itrnsptme_1-5  (naturally coded: _Itrnsptme_1 omitted)
i.gend      _Igend_0-1      (naturally coded: _Igend_0 omitted)
i.educateg  _Ieducateg_1-4  (naturally coded: _Ieducateg_1 omitted)
```

First-stage regressions

First-stage regression of finlit:

Ordinary Least Squares (OLS) regression

```
-----+-----
Total (centered) SS      = 543166.5535
Total (uncentered) SS   = 7373183
Residual SS             = 251594.2905

Number of obs = 6094
F( 12, 6081) = 587.27
Prob > F      = 0.0000
Centered R2   = 0.5368
Uncentered R2 = 0.9659
Root MSE     = 6.432
```

finlit	coef.	std. Err.	t	P> t	[95% Conf. Interval]	
agerspex	.0063402	.0057603	1.10	0.271	-.004952	.0176325
income	.0000388	4.06e-06	9.55	0.000	.0000308	.0000467
_Iregn_1	2.376494	.2258234	10.52	0.000	1.9338	2.819188
_Itrnsptme_2	-.9175004	.2079545	-4.41	0.000	-1.325165	-.5098559
_Itrnsptme_3	-2.206906	.2623005	-8.41	0.000	-2.721108	-1.692704
_Itrnsptme_4	-3.853472	.5705569	-6.75	0.000	-4.971965	-2.734978
_Itrnsptme_5	-3.871989	.5561532	-6.96	0.000	-4.962246	-2.781732
_Igend_1	2.61133	.1710334	15.27	0.000	2.276044	2.946616
_Ieducateg_2	6.699827	.2598493	25.78	0.000	6.190431	7.209224
_Ieducateg_3	13.94565	.2988545	46.66	0.000	13.35979	14.53151
_Ieducateg_4	17.08001	.4066291	42.00	0.000	16.28288	17.87715
hhinc	.3370893	.0860608	3.92	0.000	.1683796	.5057991
_cons	22.64348	.433686	52.21	0.000	21.7933	23.49365

Partial R-squared of excluded instruments: 0.0025

Test of excluded instruments:

F(1, 6081) = 15.34

Prob > F = 0.0001

Summary results for first-stage regressions

Variable	Shea	Partial R2	F(1, 6081)	P-value
finlit	0.0025	0.0025	15.34	0.0001

Appendix 2: Two-stage residual inclusion estimates

Variables	Formal	Semi-formal	Informal
Financial Literacy	0.0838	0.150*	0.0241
	(0.0960)	(0.0911)	(0.0854)
Age	0.0278***	0.0135***	0.00822***
	(0.00231)	(0.00215)	(0.00191)
Income	3.18e-05***	9.50e-06**	3.09e-06
	(4.71e-06)	(4.64e-06)	(4.82e-06)
Region: Urban	0.244	-0.136	-0.0246
	(0.234)	(0.222)	(0.210)
Proximity: 30 min-1hour	-0.142	-0.0193	0.178*
	(0.117)	(0.112)	(0.105)
Proximity: 2-3 hours	-0.415*	-0.0221	0.152
	(0.236)	(0.225)	(0.209)
Proximity: 4-5 hours	-0.559	-0.180	-0.269
	(0.459)	(0.421)	(0.378)
Proximity: 6+ hours	-1.218**	-1.474***	-1.032***
	(0.505)	(0.531)	(0.387)
Gender: Male	-0.112	-0.447*	-0.513**
	(0.258)	(0.246)	(0.230)
Education: Primary	0.902	0.0189	0.519
	(0.657)	(0.622)	(0.582)
Education: Secondary	1.397	-0.504	0.136
	(1.349)	(1.279)	(1.200)
Education: Tertiary	1.931	-0.724	-0.454
	(1.652)	(1.569)	(1.478)
Residual	0.0192	-0.103	-0.00487
	(0.0962)	(0.0912)	(0.0855)
Constant	-5.412**	-5.480***	-1.320
	(2.241)	(2.127)	(1.991)
Observations	6,094	6,094	6,094

Excluded is the base outcome

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Data source: FinAccess National Survey, 2009

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