DOES FINANCIAL INCLUSION REDUCE POVERTY? EVIDENCE FROM DEVELOPING AND TRANSITION ECONOMIES

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TOURAY, Yankuba K.

THESIS

Submitted to

KDI School of Public Policy and Management

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Professor Kim, TaeJong, Supervisor _____

Professor HWANG, Sunjoo _____

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Abstract

Keywords: financial inclusion, poverty, panel data

In 2010, the world has registered significant strides to reduce global poverty by half but despite this progress the amount of people living in abject poverty globally remain inadmissibly high at 735 million. At this pace, unless more efforts are directed to this campaign, the target of ending poverty by the 2030 would remain elusive. One of those efforts is financial inclusion. Using five proxies of financial inclusion and the poverty headcount, as a proxy for poverty, this paper attempt to examine the effects of access to finance on poverty. This paper employs the panel data methods and the results suggest that access to banking services can contribute to poverty alleviation.

초록 (한국어)

핵심어 : 금융 수용성, 빈곤, 패널 데이터

2010 년, 전 세계는 지구촌 빈곤을 반으로 줄이는 괄목할만한 성과를 거두었다. 그러나 이런 발전에도 불구하고 인정하기는 힘들지만 전세계적으로 7 억 35 백만명이 극도의 빈곤에 노출되어 있다. 이 시점에, 만약 2030 까지 빈곤퇴치를 목표로 하는 캠페인에 더 많은 노력을 기울이지 않는다면, 빈곤근절의 목표 달성은 힘들 것이다. 따라서, 금융 수용성은 이런 노력의 일환 중 하나이다. 이 논문은 금융서비스에 대한 접근이 빈곤에 미치는 영향에 대한 조사를 하기 위하여 빈곤을 대체하기 위한 금융 수용성의 다섯 가지 변수들과 빈곤 인구수를 사용하였다. 이 논문에서는 패널 데이터 방법을 수용하였으며, 그 결과 금융 서비스이용이 빈곤 완화에 기여하고 있다는 결론에 도달하였다.

Table of Contents

1 Introduction

1.1 Background of the Study

In 2010, the world has succeeded in reducing global poverty to half from the 1990 baseline, despite this significant progress, the amount of deprived people living in debilitating depravation globally remain inadmissibly high. At this pace, unless more efforts are directed to this campaign, the target of ending abject poverty by the 2030 would remain elusive (World Bank, 2019).

The most recent estimates of the World Bank released in 2015, illustrates that 10 percent of the global populace lived on less than US$1.90 a day which translates to 736 million people (World Bank, 2019).

Out of the 736 global poor in 2015, 413, million comes from Africa. The World Bank warns that by 2030, if nothing is done, out of every 10 poor people in the world, 9 would be from this region (World Bank, 2019). Table 1 provides details of world poverty and number of poor by region from 2013 to 2015.

In this sense, the fight against this menace is far from over, and there exists numerous obstacles and hence the usual trajectory is no longer tenable if the world aspires to eradicate extreme poverty by 2030. (World Bank, 2019[1]).

One instrument that could serve as a catalyst to end abject poverty and accelerate the path to achieving agenda 2030 especially for the development countries is

[1]Retrieved from http://www.worldbank.org/en/topic/poverty/overview(World Bank,2019)

financial inclusion. It is against this backdrop, policy makers and developing practitioners have devoted much energy and attention to the prioritization of financial inclusion within the financial sector infrastructure.

Although, giant strides have been recorded toward banking access, about 1.2[2] billion adults worldwide are reported to have access to an account since 2011 and as of 2017, the amount of people who own an account in formal financial institution stood at 69%. However, similar to the poverty story, significant number of people about 1.7 billion adults are still unbanked (Global Findex, 2017).

A robust and a vibrant financial systems is instrumental in providing the much needed financial services that can empower people to become financial independent. Access to an appropriate financial system that allows for a broader access will benefit the poor and marginalized groups. Without a broad financial structures, poor people are constraint to engage in any meaningful economic activities; a factor that lead to perpetual income disparity (Demirgüç-kunt, 2012) For these reasons, enabling the deprived access to the mainstream financial services should be an essential part of an inclusive financial sector development agenda (Imboden, 2005).[3]

However, in many unindustrialized countries, a greater portion of the people are excluded from the banking system, particularly, prevalent in Africa where not more

[2] https://globalfindex.worldbank.org/(Global fidex database,2017)
[3] Imboden, K. (2005). BUILDING INCLUSIVE FINANCIAL SECTORS : THE ROAD TO GROWTH AND POVERTY REDUCTION. 58(2).

than one in every five households has access to banking services. (Beck & Demirgu, 2009).

Table 1: World poverty and number of poor by region from 2013 to 2015

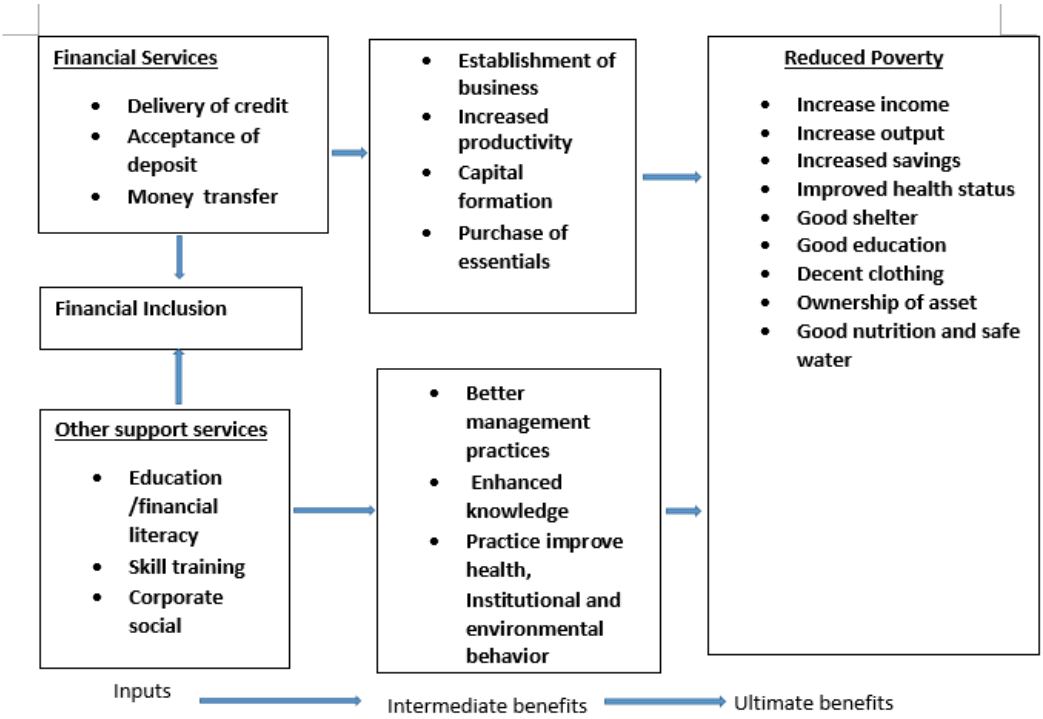
Poverty at the International Poverty Line of $1.90/day (in 2011 PPP)				
Region	*Headcount ratio (%)*		*No. poor (millions)*	
	2013	*2015*	*2013*	*2015*
East Asia and Pacific	3.6	2.3	73.1	47.2
Europe and Central Asia	1.6	1.5	7.7	7.1
Latin America and the Caribbean	4.6	4.1	28.0	25.9
Middle East and North Africa	2.6	5.0	9.5	18.6
South Asia	**16.2**	**12.4**	**274.5**	**216.4**
Sub-Saharan Africa	**42.5**	**41.1**	**405.1**	**413.3**
World Total	11.2	10.0	804.2	735.9

Source: World Bank[6]

1.2 Conceptual Framework

The argument that access to banking services could reduce poverty is premised on the notion that when poor people who need the services, are given the opportunity accompanied with mentorship as to how to use these services offered, it can results in improved welfare, and that this can have both intermediate and ultimate benefit. This is what the conceptual framework below attempts to convey.

Figure 3: Conceptual Framework



Source: Adapted from (Enu-kwesi, Koomson, & Baah-mintah, 2013)

If this makes sense, then it is reasonable to conclude that, the world could significantly reduce poverty, since the number of extreme poor (734 million) is far less that the amount of people who do not still own a bank account (1.7 billion). The benefits of access could only be harnessed when the services are actively used for the intended purposes. This point illustrate the importance of financial literacy which can help increase both account ownership and better usage by people who already have an account.

1.3 Research Question

Does access to banking services reduce poverty? By providing poor people the chance to use appropriate financial services, could the world alleviate extreme poverty and ensure improve livelihood? Because financial inclusion is regarded as both pro-poor and a conduit for broad base all-inclusive development; it thus serves as an important tool that can reduce risk and vulnerability of the underprivileged masses. Access to banking facilities enables households to enjoy basic amenities such as health and education. In this regard, this thesis proposes that access to a banking facility is an effective tool to alleviate poverty in developing counties.

1.4 Hypothesis

The incorporation of the poor in the mainstream banking system would significantly lead to a positive and direct alleviation of poverty in developing economics.

1.5 Research Objective

This research seeks to examine the effect of banking access on alleviating poverty in the development world the aim demonstrating that financial access matters for growth and has the potential to reduce poverty with a view to drawing some policy recommendations for policy makers.

1.6 Limitations of the study

In the absence of demand-side data, the use of only supply side data to measure financial inclusion may not present the true picture of the degree of financial inclusion in an economy. Furthermore, our study uses individual indicators as a proxy for access, the use of single indicator to measure access can be problematic for the

simple reason that it might underestimate or overestimate the extent of inclusion in a particular county, because people can have more than one bank account which might not be used for the intended services. As argued by (Sarma & Pais, 2008)the use of individual indicators, may not give an accurate depiction about the level of financial inclusion in a country. Therefore, our study suffers from these limitations.

1.7 Statement of the problem

So much emphasis has been centered on the potential impact of banking access on poverty reduction, yet the amount of people who do not have a bank account outnumbered the amount of poor people, if banking access has the potential to reduce poverty, the world could eradicate abject poverty if all the unbaked are given access and are supported to use the services. Although progress is being made in both fronts, nevertheless, both the number of unbanked and poor remains unacceptably high, hence more efforts is needed for the realization of the agenda 2030.

1.7 Research outline

The outline of this thesis will follow the following sequence, firstly, a review of previous literature. Secondly, the methodology and analysis of the data as well as definition of relevant variables and summary statistics follows. Thirdly we will interpret the result stemming from the various regressions, this will be followed by policy implications and conclusion.

2 Literature review

Financial inclusion has been widely discussed and debated by scholars (Akudugu, 2014) (Sinclair & Gamser, 2013)[4] because of the acknowledgement that an inclusive financial system is critical in channeling funds to economic agents who can invest in productive ventures which could empower a large segment of the population. Furthermore, ability to find suitable banking facilities improves the efficient management of funds. A sound financial system can prevent the mushrooming of informal sources of fund such as moneylenders which are usually found to be manipulative to the poor. Therefore, a rigorous and a robust financial system ensures effectiveness by giving chances to investment funds and streamlining a wide scope of productive money related transactions. For these reasons financial inclusion has been at the center stage of the policy discourse with many countries prioritizing financial inclusion policies.

Despite the fact that financial inclusion has become the focus of the policy discourse for sustainable development, academic research on the subject is still at nascent stage (Park & Mercado, 2015). The available research so far can be categorized in three main areas, namely appropriate measure, which has being studied both at household and country levels, others focused on the role of financial access in reducing paucity and income disparity and yet other papers looked at the differences in the degree of financial inclusion both in advanced and developing economies; still,

[4] Sinclair, H., & Gamser, M. S. (2013). Crossfire : 'Should financial inclusion be part of the next set of MDGs ?' 24(4).

more work needs to be done (Park & Mercado, 2015). This lend credence to our study, as it will contribute to the much needed literature on the financial inclusion-poverty-nexus and as such update knowledge in that regards especially at a time when development practitioners are rethinking about the traditional redistribution measures that seeks to reduce paucity and disparity such as land reform which can have negative consequence on incentives rendering it inefficient because the underlying causes of inequality are not tackled, such measures may not be sustainable. Therefore to promote an inclusive sustainable growth, a complementary development strategy that could directly address the core causes have to be considered, and this where financial inclusion comes to the equation (Aslı Demirgüç-Kunt; Thorsten; Beck; Patrick Honohan, 2008)

On the issue of appropriate measure, the academic community is yet to reach a consensus as to how exactly inclusion is measured, as a results, the existing literature on the topic suggests difference measures of financial inclusion. For instance, some scholars such as (Honohan, 2007) resorts to constructing a financial access indicator by means of household survey data on access to banking services However, this measure falls short of capturing cross country time varying trends .

Similarly(Amidžić, Massara, & Mialou, n.d.) Built a composite indicator using a statistical technique which consist of outreach, usage, and quality. The methods used by these authors suffers from two shortcomings, firstly, available data for each

country was not used due to the factor analysis and secondly, the criteria used to assign weight to each indicator might results to bias in the selection of indicators .

Before proceeding further, it is necessary to define clearly the key terminologies referred to in this paper. Several definition of financial inclusion exists in the literature. Group of scholars defines financial inclusion in terms of exclusion. On the other hand, some scholars such as (Sarma & Pais, 2008) defines the concepts in terms of inclusion "as a process that ensures the ease of access, availability, and usage of financial services of all members of society"(Sarma & Pais, 2008)[5] This definition is comprehensive and inclusive, touching on several dimensions, including but not limited to accessibility, convenience, and usage. This paper is motivated by the work of these authors and tends to lean along similar line of thinking. For the definition of poverty, the is paper use the one given by ((Foster & Foster, 1998) as "a person or family is identified as poor if its resources fall short of the poverty threshold" (Foster & Foster, 1998, p.353).

As indicated by (Sarma & Pais, 2008)[6] there is no disagreement as to whether relationship exists between financial sector growth and economic development but not much has been said about whether financial development implies financial

[5] Sarma, M., & Pais, J. (2008). Financial Inclusion and Development: A Cross Country Analysis. In Annual Conference of the Human Development and Capability Association, New Delhi, (10–13), 1–30. https://doi.org/10.1002/jid

[6] Sarma, M., & Pais, J. (2008). Financial Inclusion and Development: A Cross Country Analysis. In Annual Conference of the Human Development and Capability Association, New Delhi, (10–13), 1–30. https://doi.org/10.1002/jid

inclusion. The study by (Rasheed, Law, Chin, & Habibullah, 2016)[7] argues that financial inclusion can lead to financial development, the authors found a huge positive link between the two . This imply that if all citizens have access to appropriate banking products and services (financial inclusion) could enhance development of the financial landscape which can ultimately results to a broader economic development. This suggest that emphasis should be laid on access to banking services rather than financial sector development.

The origin of financial inclusion poverty relationship can be attributable to the success story of the developing Asia's drive to sustainable economic expansion trajectory that was able to lift million out of poverty even though most developing economies are still grappling with poverty and inequity. The inclusion of the poor in the formal financial would provide the poor the opportunity to access loans and other valuable services which can serve as an effective tool to reduce poverty and disparity (Williams, Adegoke, & Dare, 2017)[8].

Recently, growing evidence shows that financial sector development is a sine qua non for economic growth as well as poverty reduction, in line with our conceptual framework financial sector development has both an intermediate and ultimate

[7] Rasheed, B., Law, S.-H., Chin, L., & Habibullah, M. S. (2016). The Role of Financial Inclusion in Financial Development: International Evidence. Abasyn Journal of Social Sciences, 9(2), 330–349.
[8] Williams, H. T., Adegoke, A. J., & Dare, A. (2017). Role of Financial Inclusion in Economic Growth and Poverty Reduction in a Developing Economy. 7(May), 265–271. Retrieved from http://euroasiapub.org

benefit which cumulatively can have a direct impact on poverty alleviation (Imboden, 2005)[9].

Several empirical evidence suggests that access to banking facility for the poor can alleviate poverty (Burgess & Pande, 2005) reports that providing rural bank branches to the unbanked in India has led to reduction of poverty. Similarly, (Brune, Giné, Goldberg, & Yang, 2011)[10] found that households who benefited from a commitment saving scheme in Malawi reported improve welfare and food security due to the access to savings for farming input use.

In Philippine, a three year intervention which began in the year 2000 through a commitment savings also reported similar impact as in Malawi(Nava, Dean, & Wesley, 2010)[11]

(Allen, Demirgüç-Kunt, Klapper, & Martinez-Peria, 2012)[12] shows that the presence of bank branches has a relatively higher correlation among the poor in general, which infer that if the poor are given access to financial services, the probability of account ownership would increase, this is consistent with our findings, as branch per 100,000

[9] Imboden, K. (2005). BUILDING INCLUSIVE FINANCIAL SECTORS : THE ROAD TO GROWTH AND POVERTY REDUCTION. 58(2).
[10] Brune, L., Giné, X., Goldberg, J., & Yang, D. (2011). Commitments to Save: A Field Experiment in Rural Malawi. https://doi.org/10.1596/1813-9450-5748
[11] Nava, A., Dean, K., & Wesley, Y. (2010). Female Empowerment: Impact of a Commitment Savings Product in the Philippines. World Development, 38(3), 333–344. https://doi.org/10.1016/j.worlddev.2009.05.010
[12] Allen, F., Demirgüç-Kunt, A., Klapper, L., & Martinez-Peria, M. S. (2012). The Foundations of Financial Inclusion: Understanding Ownership and Use of Formal Accounts. World Bank Policy Research Paper No. 6290. In World Bank Policy Research Working Paper (Vol. 27).

adults is highly significant in our model; this suggest that access to finance benefits the poor and would likely empower them financially.

Similar findings were reported by (Beck, Demirguc-kunt, Soledad, & Peria, n.d.) Who reports that in regions where there is a higher branch and Automatic teller machine dissemination accompanied by high usage, financing burden of firms are eased; by extension, if firms find easy access to finance, it is assumed that such funds would be invested in productive ventures which would have a snowball effect on the overall economy; this can improve general welfare and reduce poverty drastically. These findings are all consistent with our conceptual framework, that if poor people are given access and are empowered to use the financial facility, poverty could be significantly reduced.

There is no dispute over the significance of access to financial in general, and the use of bank accounts in particular, what is lacking is the policies to broaden the scope of the financial sector especially in countries where access to finance is low.

Having discussed the definitions of both poverty and financial inclusion and highlights the various perspective on the topic, let us now turn to a discussion on the confines and boundaries of this study. The aim of this paper is to assess the effect of financial inclusion on alleviating poverty in all developing countries for which the relevant data was available and our unit of analyses is country. This paper follows (Sarma & Pais, 2008) in the use of indicators, though we do not use an index, and this is acknowledged as a limitation in this paper.

3 Econometrics Methodologies, Data, and summary statistics

This section outlines, define and describe the variables as well as the econometrics models and descriptive statistics. We source all our poverty data and the data for controls as well as the fifth explanatory variable- Domestic credit to private sector from World Bank database, measures of banking access were obtained from the IMF Financial Access Survey database.

3.1 Data: Financial Inclusion

Four of our explanatory variables were sourced from the Financial Access Survey (FAS)[13] of the International Monetary Fund (IMF, 2017). FAS is an annual dataset that tracks financial access in countries. Several studies have used this data in analyzing financial inclusion For example,(Kim, Yu, & Hassan, 2018)[14] , (Williams et al., 2017) and (Neaime & Gaysset, 2018).[15] (Sarma & Pais, 2008) identified five proxy variables that could be regarded as indicators of banking access. This study uses these five indicators as proxies for access to finance. The IMF financial access survey is only

[13] Available at https://www.imf.org/en/News/Articles/2017/10/02/pr17383-imf-releases-2017-financial-access-survey(IMF,2017)

[14] Kim, D. W., Yu, J. S., & Hassan, M. K. (2018). Financial inclusion and economic growth in OIC countries. Research in International Business and Finance, 43(December 2015), 1–14. https://doi.org/10.1016/j.ribaf.2017.07.178

[15] Neaime, S., & Gaysset, I. (2018). Financial inclusion and stability in MENA: Evidence from poverty and inequality. Finance Research Letters, 24(August 2017), 199–220. https://doi.org/10.1016/j.frl.2017.09.007

available from 2004, therefore, this dictates the period of our study i.e. from 2004 to 2017 hence all variables including the poverty data follows the same period

- **Outreach indicators**

1. Automatic Teller Machines for every 100,000 adults- (represents the total amount of automatic teller machines for every 100,000 adults in a country. Formula: number of automatic teller machines multiplied by 100,000 divided by adult population in a given country).

2. Outlets of banks (commercial) for every '100,000' adults: (indicates the sum of outlets of banks for every '100,000' adults in a country. formula: (sum of institutions and sum of outlets of commercial banks) multiplied by '100,000' divided by adult populace in the country.

- **Usage Indicator**

1. Debtors at banks outlets (commercial) for every 1,000 adults: (signifies the overall amount of inhabitant customers that does not own a financial establishments. i.e. (Public and private and families) who obtained credits from banks (commercial) for every 1,000 adults in a given country.

2. Savers with banks (commercial) for every 1,000 adults: (indicates the aggregate amount of individuals that own savings and are inhabitant non-financial entities –i.e. (public and private and households in banks for every 1,000 adults in each country.

3. (Domestic credit to private sector) refers to the sum of money mobilized from the national economy and given to the private sector by the custodians of those funds.

3.2 Data on Poverty[16]

We use the commonly used proxy for poverty namely, headcount ratio at ($1.90) per day is the fraction of the people who could not afford to spend this amount on daily basis. This is a measure of absolute poverty and focuses on households and not individuals.

3.2 Descriptive statistics and correlations

Table 2 shows the descriptive statistics and correlations for our measurement variables for the periods 2004 to 2017. Data limitation, dictate our sample size to 94 countries.

[16] Available at https://datacatalog.worldbank.org/dataset/worldwide-governance-indicators

It is important to highlight the negative association between, our variables. This might mean that access to banking facility would be an important tool to reduce poverty more efficiently, by reducing income disparity among households.

3.3 Summary Statistics and Correlations

Table 3 presents the descriptive statistics and table 3 present the pair-wise correlations. We can discern a negative correlation between poverty headcount and all our explanatory variables which seems to confirm our thesis that financial inclusion does have a significant impact on poverty reduction**.**

Table 3: Descriptive Statistics

Variable	Obs	Mean	Std.Dev.	Min	Max
Poverty head count @$(1.90)	501	11.17	17.08	0	96.1
ATMs for every 100,000 adults	1115	25.217	27.594	.012	185.324
Debtors at banks for 1,000 adults	676	128.002	151.332	.018	872.807
Outlets of commercial banks for every 100,000 adults	1225	11.784	12.788	.374	92.173
Savers with commercial banks per 1,000 adults	662	421.816	507.825	.473	3379.808
Domestic credit to private sector	1268	34.983	28.928	.443	160.125

Table 4: Correlation Matrix

	Headcount	Poverty gap	ATMs per 100,000 adults	Borrowers at commercial banks per 1,000 adults	Branches of commercial banks per 100,000 adults	Depositors with commercial banks per 1,000 adults	Domestic credit to private sector
Headcount	1						
Poverty gap	0.982***	1					
ATMs per 100,000 adults	-0.451***	-0.396***	1				
Borrowers at commercial banks per 1,000 adults	-0.391***	-0.348***	0.548***	1			
Branches of commercial banks per 100,000 adults	-0.391***	-0.356***	0.314***	0.270***	1		
Depositors with commercial banks per 1,000 adults	-0.521***	-0.473***	0.521***	0.521***	0.636***	1	
Domestic credit to private sector	-0.381***	-0.342***	0.653***	0.411***	0.157*	0.391***	1

3.4 Econometric methodology

3.4.1 Panel Fixed Effects

To evaluate empirically the impact of our explanatory variables on poverty, a good identification strategy is needed to measure the accurate effect of financial inclusion on poverty. Thus, we estimate our model using panel data analysis. In choosing the best estimator, we run the Hausman test, the results of which is reported below.

Hausman test.

b = consistent under Ho and Ha; obtained from xtreg

B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

Chi2 (5) = (b-B)'[(V_b-V_B)^ (-1)](b-B) = 2.46

Prob>chi2 = 0.7820

(V_b-V_B is not positive definite)

Due to the high P-value, we cannot reject the null hypothesis and hence we settle for random effect. The Random Effect model assumes that an error term has no correlation with Explanatory variables; and hence it accounts for all unobserved heterogeneity effects which could reduce the omitted variable bias (Ferdousi, 2013).

Thus panel random effects regressions was used for all the countries with robust standards errors clustered at country level with this model:

$$\boldsymbol{Y_{it=}\alpha_{it} + \beta FI_{it+}\gamma X_{it} + \varepsilon_{it}}$$

Where:

Y_{it} is the head count ratio for state *i* at time *t*

FI_{it} is usage and outreach indicators of in a particular country in a given time period **.**

X_{it} accounts for a number of country specific conditioning variables in a given time period.

In this model we follow the literature by controlling for a set of variables commonly used in poverty equations, we control for gross domestic product per capita, to account for the contribution of economic development. The growth of the consumer price index (Inflation) is added to control for the macroeconomic instability following (Neaime & Gaysset, 2018); governance indicators are also included as propounded by (Acemoglu, Johnson, & Robinson, 2005)[17]. Institutional quality is proxy by the world wide governance index (WGI) through the ranks scored by each country in control of corruption, government effectiveness and political stability, trade is added to control for international openness. Finally we add a measure of education, proxy by the tertiary school gross enrollment ratio. Trade is added to control for the degree of market and country's international openness. Foreign direct investment as well as remittances are also added.

3.4.2 Instrumental variables Fixed Effects

[17] Acemoglu, D., Johnson, S., & Robinson, J. A. (2005). Chapter 6 Institutions as a Fundamental Cause of Long-Run Growth. Handbook of Economic Growth, 1(SUPPL. PART A), 385–472. https://doi.org/10.1016/S1574-0684(05)01006-3

Instrumental variable fixed effect is used here due to some potential endogeneity emanating from reverse causality. The explanatory variables are likely to be endogenous in the regression; suggesting that financial inclusion is driven by poverty reduction because as poverty decline, banks might be motivated to provide financial infrastructure or on the other hand, hardship might trigger innovativeness of the poor people, leading to a greater demand for banking services. In which case banks can respond positively

To this end, to account for causality, we use random effects instrumental variable estimator with clustered standard errors. This estimation method is robust to heteroscedasticity. For the instruments, we use the ***legal origin* of *countries***. Several studies in this subject used this as an instruments. See for instance (Beck, Demirgüç-Kunt, & Levine, 2007)[18]The logic being that exogenous state characteristics effect financial development.(Asongu, 2014)[19].Thus our instruments meets both relevance and exclusion restrictions.

4 Results

Table 4: Automatic Teller Machine for every 100,000 and the Headcount:

Logarithm of Automatic Teller Machine for every 100,000 adults is the explanatory variable and the Headcount is the dependent variable. The results includes the log of all other control variables except the tertiary school gross enrollment ratio, which is

[18] Beck, T., Demirgüç-Kunt, A., & Levine, R. (2007). Finance, inequality and the poor. Journal of Economic Growth, 12(1), 27–49. https://doi.org/10.1007/s10887-007-9010-6

[19] Asongu, S. (2014). Law, Finance, Economic Growth and Welfare: Why Does Legal Origin Matter? Ssrn, 55455(May). https://doi.org/10.2139/ssrn.2493125

lagged by one year. Regressions1 - 6 are estimated using random effects with robust standard errors while regression 7 is instrumental random effect estimator also standard errors are robust. All regressions shows the R-squared.

TABLE 4
Automatic Teller Machine with Headcount

	(1) Random effect Headcount	(2) Random effect Headcount	(3) Random effect Headcount	(4) Random effect Headcount	(5) Random effect Headcount	(6) Random effect Headcount	(7) IV Random effect Headcount
ATMs per 100,000 adults	-1.331*	-1.392*	-1.281	-1.010	-1.077	-1.077	-1.589
	(0.624)	(0.621)	(0.702)	(0.892)	(0.873)	(0.875)	(5.532)
GDP per Capita	-13.762***	-13.243***	-13.602***	-13.932***	-14.549***	-14.496***	-19.175*
	(2.446)	(2.387)	(2.576)	(2.934)	(3.013)	(2.995)	(8.317)
Trade	0.148	-0.268	0.007	-0.055	-0.077	-0.067	-0.938
	(0.641)	(0.594)	(0.629)	(2.060)	(2.006)	(2.045)	(3.407)
Inflation	0.299	0.224	0.248	0.736*	0.697*	0.693*	0.901
	(0.223)	(0.221)	(0.237)	(0.288)	(0.285)	(0.289)	(0.467)
Political Stability		-0.062*	-0.065*	-0.047	-0.056	-0.055	-0.092
		(0.027)	(0.027)	(0.032)	(0.035)	(0.034)	(0.060)
Remittances			-0.383	-0.278	-0.284	-0.279	-0.485
			(0.430)	(0.570)	(0.553)	(0.558)	(1.634)
FDI			-0.056	-0.393	-0.358	-0.363	-0.238
			(0.281)	(0.363)	(0.371)	(0.376)	(0.752)
Human Capital				-0.023	-0.026	-0.027	0.038
				(0.056)	(0.049)	(0.050)	(0.178)
Government effectiveness					0.059	0.061	0.136
					(0.045)	(0.050)	(0.071)
Control of corruption						-0.009	-0.050
						(0.047)	(0.061)
Constant	139.252***	138.915***	140.635***	142.110***	145.875***	145.596***	188.469***
	(20.702)	(20.124)	(21.452)	(24.419)	(24.843)	(24.832)	(52.913)
N	404	401	388	254	254	254	157
R-sq	0.5215	0.5259	0.5044	0.4546	0.4567	0.4553	0.7881

Standard errors in parentheses
* p<0.05 ** p<0.01 *** p<0.001

In this regression, explanatory variable turns negatively significant to the poverty headcount for regressions 1-2 all at $p < 0.05\%$, for regressions 3 to 7 is not significant but all coefficient are negative, The reasons for the modest figures might be related to the point that most of the poor people live in the rural areas and might not attain formal education, the issue of illiteracy was highlighted earlier in this study. With low level of education, it will be difficult to use automation. Nearly half of our sample were drawn from Sub-Saharan Africa where the level of financial infrastructure compared to the rest of the region is still not developed, and outreach is very narrow. However, this results suggest that if individuals are given access to ATM services, it can reduce poverty. In order to control for endogeneity we employ the random effects estimation technique, and to control for reverse causality and omitted variable bias, we employ the use of the instrumental variable random effects estimator using *legal origin of countries* as an instruments. To control for potential serial correlation we use clustered standard errors which are not only robust to heteroscedasticity, but also for serial correlation. According to the results in Table 4, if the number of automatic teller machine is increased by 1% percent, the fraction of people living on less than $1.90 per day could be reduce by 1.3%

It is interesting to see GDP per capita enters to a highly significant negative coefficient throughout, while trade, though not significant, turns negative, implying that if right economic and trade policies are formulated, poverty can be greatly reduced. Inflation turns positive and significant at $p < 0.05\%$, for regression 4 to 6 , this indicates that

inflation can make to poor worse off as it erodes their purchasing powers, this emphasizes the significance of a sound macro policies in a country .

Political stability becomes significant at $p < 0.05\%$, for regression 2 and 3 and remains negative for the rest of the regressions, this points to the fact that political stability is good for economic growth which can thus reduce poverty. In this model the rest of the explanatory variables except government effectiveness assume a negative coefficient though not significant which indicates that all of these variables could reduce poverty if right policies are formulated and implemented.

Table 5: Debtors at banks (commercial) for every 1,000 adults and headcount

Logarithm of debtors at banks (commercial) is the explanatory variables and the Headcount is the dependent variable. The results includes the log of all other control variable except the tertiary school gross enrollment ratio, which is lagged by one year. Regressions1 - 6 are estimated using random effects with robust standard errors while regression 7 is instrumental random effect estimator also standard errors are robust. All regressions shows the R-squared.

Table 5

Borrowers per 1000 adults with Headcount

	(1) Random effect Headcount	(2) Random effect Headcount	(3) Random effect Headcount	(4) Random effect Headcount	(5) Random effect Headcount	(6) Random effect Headcount	(7) IV Random effect Headcount
Borrowers per 1000 adults	0.001	0.001	0.001	-0.006	-0.007	-0.008	0.006
	(0.006)	(0.005)	(0.005)	(0.006)	(0.006)	(0.006)	(0.033)
GDP per Capita	-18.811***	-17.966***	-17.348***	-13.047***	-14.003***	-14.171***	-23.920**
	(2.807)	(2.783)	(2.614)	(3.416)	(3.744)	(3.810)	(7.915)
Trade	-0.313	-0.786	-0.528	-2.173	-2.209	-2.308	1.402
	(0.542)	(0.608)	(0.655)	(2.612)	(2.617)	(2.469)	(2.906)
Inflation	0.013	0.075	0.071	0.454	0.394	0.404	0.058
	(0.232)	(0.230)	(0.226)	(0.285)	(0.293)	(0.281)	(0.931)
Political Stability		-0.081*	-0.078*	-0.068	-0.077	-0.078	-0.196
		(0.036)	(0.037)	(0.046)	(0.049)	(0.047)	(0.118)
Remittances			-0.186	-0.764	-0.750	-0.736	-1.327
			(0.471)	(0.689)	(0.685)	(0.692)	(1.194)
FDI			-0.349	-0.157	-0.149	-0.163	0.433
			(0.345)	(0.484)	(0.484)	(0.491)	(0.933)
Human Capital				-0.100	-0.097	-0.091	0.020
				(0.064)	(0.062)	(0.068)	(0.136)
Government effectiveness					0.066	0.065	0.123
					(0.061)	(0.061)	(0.086)
Control of corruption						0.025	-0.025
						(0.048)	(0.075)
Constant	182.496***	179.767***	173.648***	145.365***	151.678***	152.657***	219.597***
	(23.709)	(22.873)	(21.079)	(27.237)	(29.462)	(29.668)	(66.563)
N	273	271	266	163	163	163	108
R-sq	0.4587	0.4580	0.4333	0.3983	0.3939	0.3975	0.7731

Standard errors in parentheses

* p<0.05 ** p<0.01 *** p<0.001

In this regression, our variable of interest borrowers per 1000 people is not significant, though when we control for political stability which becomes significant for regressions 2 And 3 turns our variable of interest negative, which suggest that when poor people have access to appropriate loan facilities in a stable environment, poor people could invest in productive ventures to improve welfare and reduce poverty. This coefficients should not be that surprising, these are people who are below the poverty line and therefore lack collateral to borrow which might be responsible for their exclusion for the formal financial services and hence remain poor.

GDP per capita again remains highly significant at throughout , this shows that economic growth is negatively related to poverty reduction, with a huge income per capita , poor people can eventually save and borrow . The rest of the coefficients are not significant but manifest the desired signs, implying that all are akin to poverty reduction.

Table 6: Savers with commercial banks for every 1,000 adults and headcount ratio

Logarithm of savers (depositors) at banks (commercial) is the explanatory variable and the Headcount is the dependent variable. The results includes the log of all other control variable except the tertiary school gross enrollment ratio, which is lagged by one year. Regressions1 - 6 are estimated using random effects with robust standard errors while regression 7 is instrumental random effect estimator also standard errors are robust. All regressions shows the R-squared.

Table 6
Savers per 1000 and Headcount

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Random effect Headcount	Random effect Headcount	Random effect Headcount	Random effect Headcount	Random effect Headcount	Random effect Headcount	IV Random effect Headcount
Depositors per 1000	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.016
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.029)
GDP per Capita	-21.643***	-21.635***	-21.406***	-18.802***	-19.230***	-19.343***	-26.090***
	(2.616)	(2.649)	(2.575)	(2.752)	(2.953)	(2.962)	(7.692)
Trade	-4.730	-4.752	-4.215	-8.513	-8.372	-8.552	-2.118
	(2.855)	(2.871)	(2.969)	(4.430)	(4.589)	(4.400)	(5.106)
Inflation	0.326	0.324	0.409	0.861*	0.838*	0.837*	0.599
	(0.350)	(0.353)	(0.360)	(0.348)	(0.364)	(0.357)	(0.465)
Political Stability		-0.007	-0.009	-0.008	-0.006	-0.004	-0.078
		(0.085)	(0.086)	(0.092)	(0.094)	(0.095)	(0.160)
Remittances			-0.373	-0.598	-0.596	-0.592	-0.930
			(0.578)	(0.683)	(0.683)	(0.683)	(0.876)
FDI			-0.098	0.054	0.069	0.084	0.425
			(0.442)	(0.498)	(0.500)	(0.520)	(0.672)
Human Capital				-0.122*	-0.118*	-0.112	-0.102
				(0.060)	(0.060)	(0.065)	(0.135)
Government effectiveness					0.033	0.023	0.002
					(0.077)	(0.081)	(0.198)
Control of corruption						0.030	0.052
						(0.060)	(0.134)
Constant	224.772***	224.958***	220.919***	219.090***	221.035***	222.052***	247.557***
	(26.407)	(26.227)	(25.106)	(28.887)	(28.236)	(27.784)	(57.350)
N	219	219	212	135	135	135	102
R-sq	0.6452	0.6449	0.6276	0.6413	0.6463	0.6531	0.8235

Standard errors in parentheses
* p<0.05 ** p<0.01 *** p<0.001

In the above model, Borrowers per 1000 adults is not also significant but turns negative throughout, this is expected because poor people might not have enough to allow for any significant savings, however, it seems to suggest that by having access to deposit services, poverty can be reduce. As usual, GDP remain significant throughout, while trade, remittances and political stability, though not significant remains negatively related to poverty, this suggest that poverty will not thrive in a good policy environment. Inflation remain positive throughout and turns significant at $p < 0.05\%$, in regressions 4 to 6 again highlighting the importance of a sound macroeconomic policies. In regression 3 when we control for FDI, it turns negative but remain positive in the remaining regressions, probably due to the criticism against FDI as responsible for capital flight which might be positively related to poverty

When we control for Human capital, in regressions 4 to 7, it assume significance at $p < 0.05\%$, in regressions 4 and 5 and remain negative throughout. In all our models, human capital is proxy by gross tertiary enrollment in a given country and we use the lagged value of this variable, premised on the fact that the benefits of the current year's gross tertiary enrollment will have effects in the coming years and not in the very same year, this maybe particularly true for most countries in our sample especially Sub-Saharan Africa where it is highly unlikely for school leavers to get jobs in the year of graduation. This nonetheless illustrates the point for improved education quality and access in developing countries. Government effectiveness and

control of corruption are not significant and turn positive suggesting that if government are not effective corruption will be widespread and all these could be positively related to poverty. This demonstrated the importance of strong institution in a country

Table 7: Outlets of banks (commercial) for every 100,000 adults and headcount Regressions1 - Logarithm of outlets of banks (commercial) is the explanatory variable and the Headcount is the dependent variable. The results include the log of all other control variable except the tertiary school gross enrollment ratio, which is lagged by one year. Regressions1 - 6 are estimated using random effects with robust standard errors while regression 7 is instrumental random effect estimator also standard errors are robust. All regressions shows the R-squared.

Table 7
Branches per 100,000 adults with Poverty headcount

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Random effect headcount	Random effect headcount	Random effect headcount	Random effect headcount	Random effect headcount	Random effect headcount	IV Random effect headcount
Branches per 100,000 adults	-4.583***	-4.449***	-4.517**	-5.579***	-5.518***	-5.514***	-2.128
	(1.209)	(1.313)	(1.375)	(1.524)	(1.573)	(1.581)	(14.607)
GDP per Capita	-14.419***	-14.471***	-14.309***	-11.519***	-11.872***	-11.897***	-6.455
	(1.736)	(1.719)	(1.717)	(2.250)	(2.314)	(2.343)	(16.676)
Trade	-0.273	-0.474	-0.175	-2.543	-2.541	-2.549	-3.125
	(0.508)	(0.565)	(0.528)	(1.724)	(1.722)	(1.700)	(2.684)
Inflation	0.044	0.013	0.058	0.544*	0.538*	0.539*	0.363
	(0.227)	(0.231)	(0.220)	(0.240)	(0.239)	(0.239)	(0.301)
Political Stability		-0.025	-0.024	-0.010	-0.014	-0.014	-0.028
		(0.039)	(0.042)	(0.034)	(0.037)	(0.038)	(0.061)
Remittances			-0.588	-0.550	-0.556	-0.555	-0.550
			(0.405)	(0.417)	(0.418)	(0.421)	(0.392)
FDI			0.066	0.010	0.011	0.011	0.439
			(0.258)	(0.320)	(0.319)	(0.318)	(1.352)
Human Capital				-0.085	-0.087*	-0.087	-0.000
				(0.045)	(0.044)	(0.045)	(0.055)
Government effectiveness					0.025	0.024	0.037
					(0.054)	(0.053)	(0.049)
Control of corruption						0.002	0.003
						(0.042)	(0.095)
Constant	153.362***	155.282***	153.006***	141.545***	143.738***	143.913***	77.967
	(14.534)	(14.646)	(14.545)	(17.584)	(17.106)	(17.110)	(118.329)
N	420	417	400	256	256	256	158
R-sq	0.5990	0.5988	0.5762	0.5751	0.5775	0.5780	0.6796

Standard errors in parentheses
* p<0.05 ** p<0.01 *** p<0.001

In the above model, bank outlets for every 100,000 adults enters significant at p < 10%, from regression 1 to 6. According to this model, a 1% increases in bank outlets in a given country will reduce poverty headcount by between 4 to 5% in each country. The magnitude of this coefficient could be ascribed to the point that in rural areas where most poor people are concentrated and may prefer using traditional brick and mortar banking services rather than automation. The reason for this is explained in table 4. This again highlights the importance of given the poor access to appropriate financial services that is user friendly and underpin by financial literacy. This outcome is consistent with the findings of (Allen et al., 2012). As usual GDP per Capita remain highly significant, while trade, political stability and remittances, though not significant but turns negative suggesting an inverse relationship with poverty. In this model, inflation enters to positive significant at p < 0.05%, in regressions 4 to 6, indicating a positive relationship with poverty, therefore to reduce poverty, sound monetary and fiscal policies needs to be the rule rather than the exception. In this model human capital turns negative and enters significant in regression 5. A proof that a quality human capital can help reduce poverty. Again both government effectiveness and control of corruption remain insignificant in this model.

Table 8: Domestic credit with poverty headcount

Logarithm of domestic credit to the private sector is the explanatory variables and the Headcount is the dependent variable. The results includes the log of all other control variable except the tertiary school gross enrollment ratio, which is lagged by one year. Regressions1 - 6 are estimated using random effects with robust standard errors while regression 7 is instrumental random effect estimator also standard errors are robust. All regressions shows the R-squared.

Table 5
Domestic Credit with Headcount

	(1) Random effect Headcount	(2) Random effect Headcount	(3) Random effect Headcount	(4) Random effect Headcount	(5) Random effect Headcount	(6) Random effect Headcount	(7) IV Random effect Headcount
Domestic Credit	-1.450	-1.515	-1.119	-1.264	-1.467	-1.571	2.845
	(1.281)	(1.437)	(1.456)	(1.472)	(1.496)	(1.499)	(60.824)
GDP per Capita	-17.398***	-17.196***	-17.296***	-15.443***	-16.040***	-16.204***	-23.130
	(2.148)	(2.110)	(2.170)	(2.576)	(2.701)	(2.616)	(20.011)
Trade	-0.498	-0.775	-0.341	-2.467	-2.447	-2.655	-1.081
	(0.626)	(0.693)	(0.639)	(1.992)	(1.945)	(1.945)	(2.335)
Inflation	0.261	0.208	0.266	0.813**	0.789**	0.776**	1.092
	(0.246)	(0.248)	(0.246)	(0.295)	(0.294)	(0.283)	(2.778)
Political Stability		-0.041	-0.043	-0.036	-0.046	-0.040	-0.058
		(0.044)	(0.048)	(0.045)	(0.047)	(0.046)	(0.110)
Remittances			-0.549	-0.421	-0.441	-4.621	-0.720
			(0.424)	(0.508)	(0.495)	(2.990)	(1.005)
FDI			-0.126	-0.375	-0.356	-0.175	-0.546
			(0.309)	(0.398)	(0.401)	(0.461)	(1.979)
Human Capital				-0.050	-0.056	-0.050	0.010
				(0.049)	(0.046)	(0.046)	(0.118)
Government effectiveness					0.067	0.062	0.082
					(0.043)	(0.048)	(1.300)
Control of corruption						-0.009	-0.024
						(0.048)	(0.194)
Constant	175.461***	176.573***	174.653***	167.724***	171.429***	173.592***	211.110***
	(16.575)	(16.535)	(16.913)	(19.680)	(20.052)	(19.379)	(15.506)
N	436	433	417	267	267	267	169
R-sq	0.5453	0.5488	0.5232	0.5051	0.5075	0.5051	0.7816

Standard errors in parentheses
* p<0.05 ** p<0.01 *** p<0.001

In this mode, the explanatory variable, though not significant but show a negative relationship with poverty. Also this might not be too difficult to explain because if people are poor we expected a low savings therefore not much credit can be mobilized from the domestic economy to be given to the private sector. In the model again, GDP per capita remain highly significant, while the rest of the variables that we expected to be negatively related to poverty did manifest that relationship. Inflation remain positive and enters significant at $p < 1\%$, in regressions 4 to 6. In this regression, government effectiveness is insignificant as well as control of corruption, but for the first time it shows a negative relationship with poverty as expected.

5 Conclusion

Our study investigates the relationship between access to banking services and alleviation of poverty, using five different proxies for financial inclusion. Our estimates suggests a strong link between banking access and poverty. We find that two of our variables- Outlets for banks for every 1000,000 adults and Automatic teller machine per 100,000 adults does have a direct impact on poverty reduction even after controlling for various country specific fixed effects. Therefore to reduce poverty, the implication for policymakers is to implement policies that will promote financial inclusion.

Secondly, the study shows the importance of good institutions as well a sound macroeconomic policy in order to promote economic growth which can ultimately reduce poverty. The importance of human capital is also demonstrated, policies that will improve standard of learning in emerging countries should be pursued more so in Africa sub-continent, South Asia and Arab States, first to increase the general literacy levels literacy and then financial literacy. Access to banking services should be complimented by financial education to allow the uptake of the services being offered.

Based on our study, is reasonable to conclude that access to finance has the potential to reduce poverty in developing countries. Our findings are consistent with numerous empirical evidence highlighted in this study.

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