

Financial Outreach and Working Poverty in Developing Countries

New Evidence from Bank Penetration

Aïssata Coulibaly
Urbain Thierry Yogo



WORLD BANK GROUP

Macroeconomics, Trade and Investment Global Practice

December 2018

Abstract

Although a growing body of literature emphasizes that the poor may benefit from better access to financial services through more growth and employment opportunities, there is a continuing debate about the mechanism and extent to which such access would reduce inequalities. Considering that labor is the main asset of the poor, this paper investigates the impact of access to financial services, measured by the number of bank branches, on working poverty and inequality in the labor market. The study uses a panel of 63 developing countries over 2004–13 to demonstrate that

improving financial access reduces the proportion of poor workers, especially in countries hit by macroeconomic instability. The analysis shows that the negative impact on working poverty is two times less important than the positive impact on workers at the top of the income distribution, suggesting an increase in inequality. But this effect is mitigated, since the study finds evidence that providing greater access to financial services for relatively rich workers can have a strong effect on decreasing working poverty.

This paper is a product of the Macroeconomics, Trade and Investment Global Practice. It is part of a larger effort by the World Bank to provide open access to its research and make a contribution to development policy discussions around the world. Policy Research Working Papers are also posted on the Web at <http://www.worldbank.org/research>. The authors may be contacted at uyogo@worldbank.org.

The Policy Research Working Paper Series disseminates the findings of work in progress to encourage the exchange of ideas about development issues. An objective of the series is to get the findings out quickly, even if the presentations are less than fully polished. The papers carry the names of the authors and should be cited accordingly. The findings, interpretations, and conclusions expressed in this paper are entirely those of the authors. They do not necessarily represent the views of the International Bank for Reconstruction and Development/World Bank and its affiliated organizations, or those of the Executive Directors of the World Bank or the governments they represent.

Financial Outreach and Working Poverty in Developing Countries: New Evidence from Bank Penetration¹

Aïssata Coulibaly

CERDI - University Clermont Auvergne(UCA) and The World Bank Group (Washington, DC, USA),

Email: caissata@gmail.com / acoulibaly7@worldbank.org

Urbain Thierry Yogo

The World Bank Group (LOME, Togo),

Email: yogout@gmail.com / uyogo@worldbank.org

JEL Classification: G21, I3, J8, O16

Keywords: Financial outreach, Working poverty, Bank penetration

¹ Acknowledgments

We are grateful to Samuel Guerinéau, Armand Fouejieu, Andrew Dabalén and the participants of the CSAE Conference at Oxford in 2017, for the helpful comments and discussions.

1. Introduction

Addressing the decent work² deficit is essential to ending poverty in all its forms, as outlined in the first Sustainable Development Goal (SDG). While there is a global consensus about the poverty-reducing impact of decent work (both monetary and non-monetary), little compelling evidence has emerged as to how to increase decent work in a sustainable manner. This paper focuses on the monetary aspect of decent work, namely, working poverty. It argues that poverty can be further reduced by providing poor workers with better access to financial services.

A flourishing literature has emphasized a negative relationship between poverty and financial development (Beck, Demirgüç-Kunt, & Martinez Peria, 2007; Jeanneney & Kpodar, 2011; Uddin, Shahbaz, Arouri, & Teulon, 2014). Increasing access to financial services can boost the capabilities of the poor by providing the means to invest in education and improve their employability. With access to banks or formal financial services, transactions such as payment, transmission and receipt of remittances are safer, quicker and cheaper. Likewise, better access to financial services enables households and firms with credit and saving to invest in more productive inputs such as fertilizers, improved seeds and machinery. With savings and insurance, they can also smooth their income and reduce their vulnerability to unfortunate events like economic shocks, drought, disease or death. The impact could also be indirect through growth³ or by increasing employment opportunities for the poor through loans provided to micro entrepreneurs (Beck, Demirgüç-Kunt, & Honohan, 2009). However, the current global deficit in decent work is likely to threaten several decades of efforts in poverty reduction and clearly put at risk the sustainable development goal of ending poverty by 2030.

This paper examines the poverty-reducing impact of access to finance by focusing on the labor market. We argue that because the main asset of the poor is their labor, a better understanding of their working conditions is of great interest. In fact, for the poor, unemployment is not a major concern in developing countries, as they already have jobs; the issue is that despite working long hours, they do not earn enough to escape poverty (Fields, 2012).⁴ Thus, beyond absolute poverty and the overall supply of the

²‘Decent work’ refers to work that is productive and delivers a fair income, security in the workplace, social protection and freedom of expression through social dialogue (ILO, 2018).

³ This is the trickle-down hypothesis according to which economic growth will ultimately benefit the poor through more jobs and a higher income.

⁴ It is estimated that a third of the poor in developing countries have a job, but most of them are concentrated in low-paying informal activities (ILO, 2018).

labor force, we focus on the proportion of employed persons in a household whose members are living below the international poverty line of US\$1.25 a day in purchasing power parity (PPP), namely, the extreme working poor. This indicator has been developed by the International Labor Organization (ILO) to assess the ‘decent work’ agenda. According to the latest estimates, there are more than 300 million workers in emerging and developing countries with a per capita household income or consumption of less than US\$1.90 per day (International Labour Organization (ILO), 2018).

This paper tests the hypothesis that better access to financial services reduces the share of working poor in the developing world. This effect works on both the demand and supply sides of the labor market. From the supply side, with better access to financial services, the poor will be able to negotiate better salaries and supply labor more elastically. As shown by Blundell, Pistaferri and Saporta-Eksten (2016), poor households respond to income shocks by increasing their labor supply in order to smooth their consumption. This induces a downward pressure on wages and increases working poverty (Combes, Ebeke, Maurel, & Yogo, 2014). Jayachandran (2006) was the first to illustrate this channel by showing that in the case of negative productivity shocks, with no possibility of borrowing, drawing on savings or migrating, the equilibrium wage for poor people is lower because they are constrained to work at lesser rates.

From the demand side, better access to financial services in developing countries can be beneficial to small enterprises. It could encourage entrepreneurship and lead to an increase in the demand for workers with low levels of qualification, who constitute the poor. For example, Beck, Levine and Levkov (2010) demonstrate that bank deregulation in the United States during the 1980s and 1990s reduced income inequality by boosting output and demand for unskilled labor. Thus, the wage and salary earnings of the unskilled and lower-paid workers increased. It follows that the share of poor workers decreased. Similar results have been found for Thailand (Giné & Townsend, 2004). Furthermore, Beck and colleagues (2009) have argued that the main impact of financial development on income inequality occurs through higher wages and the inclusion of a larger share of the population in the formal economy. Overall, increasing access to financial services will reduce working poverty through fewer employment vulnerabilities, better business opportunities and higher wages.

In this study, we focus on the tail of the distribution of domestic wages and investigate the poorest workers (those stuck in a poverty trap). We also take advantage of a data set compiled by the ILO, the Key Indicators of the Labor Market (KILM, ninth edition), which gives information on the share of individuals remunerated at less than US\$1.25 per day as a proxy for extreme working poverty. The

definition of the working poor rate in the data set is based on the work of Kapsos and Bourmpoula (2013). The KILM data set provides information on working poverty rates, which can be compared across countries, a critical requirement for the present cross-country study. Another advantage is that the KILM is derived from a micro-based approach to computing the working poverty rates for those countries where direct information from household and labor market surveys is not available. This approach gives robust estimations of the prevalence of working poverty with a minimized prediction error. The data set also provides the share of workers living on less than US\$1.90 per day, as well as the proportion of workers considered to be middle class and higher (living on more than US\$13 a day). Thus, this allows us to contribute to the debate on the link between financial development and inequality in the labor market by looking at the differential impact of financial access according to the level of poverty.

Moreover, unlike previous studies which use a macro-focused proxy for financial development, such as private credit, we use an indicator of financial outreach, namely, the number of bank branches per 100,000 people, in line with the work of Mookerjee and Kalipioni (2010). This has the advantage of being correlated with aggregate measures as well as micro-indicators of barriers to finance (Beck, Demirgüç-Kunt, & Martinez Peria, 2008) and more precisely captures the real impact of finance through access to ordinary people in a country (Mundaca, 2009). In addition, we address the endogeneity concern by implementing an instrumental variable approach, while using the timing of the establishment of credit bureaus and public credit registries as a source of exogenous variation of financial outreach. Credit bureaus and public credit registries are reasonable instruments as they theoretically explain access to financial services and are less likely to have a direct effect on working poverty. Furthermore, this paper takes advantage of the granularity of the working poverty data set to explore transmission channels through which financial outreach may affect working poverty.

Using a sample of 63 developing countries spanning the period of 2004–2013 and after factoring in the endogeneity of financial development, this paper yields the following results: (1) greater access to finance measured by the number of bank branches per 100,000 people reduces the share of individuals remunerated at low wages; (2) this effect is even more relevant in countries affected by strong macroeconomic instability; and (3) access to financial services also disproportionately benefits people at the top of the income distribution in the labor market. But this inequality-enhancing impact is attenuated, since access to financial services for top income workers tends to act as a transmission channel of the effect of bank branch penetration on working poverty. Our findings are robust as to

the introduction of new control variables, namely governance, mobile phone subscriptions and other measures of financial development, such as private credit and bank concentration. Furthermore, the results withstand various tests aimed at addressing measurement bias in the variable of interest.

The rest of this paper is organized as follows: section 2 presents a selective literature review. Section 3 describes the econometric specification and estimation method with some figures and tables on the distribution of access to financial services and working poverty. In Section 4, we discuss our results with some robustness checks, and subsequently, we conclude in section 5.

2. Selective literature review

An extensive body of literature has documented the relationship between financial development and growth, although it has focused less on poverty. This literature assumes that financial development may trickle down to the poor through its influence on agricultural output and economic growth (Dollar & Kraay, 2002; Ravallion & Datt, 2002; Mallick, 2014).

The direct effect of financial development on poverty is also well documented in the literature (Beck et al., 2007; Burgess and Pande, 2005; Jeanneney and Kpodar, 2011; Boukhatem, 2016).⁵ First, it can improve opportunities for the poor to access formal finance by addressing the causes of financial market failures, such as information asymmetry and the high fixed cost of lending to small borrowers (Jalilian & Kirkpatrick, 2005). In particular, more bank branches reduce the distance between lenders and borrowers and improve lending conditions. For instance, Degryse and Ongena (2005) demonstrate that interest rates on loans increase with the distance between the firm and bank branches. Likewise, Bofondi and Gobbi (2006) find that default rates are more than three times higher for firms outside the local market. Moreover, Brevoort and Hannan (2007) demonstrate a negative association between distance and the likelihood of a local commercial loan being granted, while Gobbi and Zizza (2012) show that the probability that a household has a bank account is positively correlated with the number of bank branches. Most closely related to our paper is the study of Burgess and Pande (2005), which finds that opening one bank branch per 100,000 people in a rural, unbanked location reduces rural poverty by 4.7 percent in India.

Second, with access to financial services such as credit, savings and insurance, the poor can engage in riskier high-yielding activities, start microenterprises and reduce their vulnerability to shocks (Rewilak, 2013). In addition, providing wider financial access to the excluded non-poor entrepreneurs can have

⁵ An extensive review has been compiled by Uddin et al. (2014).

a strongly favorable indirect effect on the poor by generating more employment and higher incomes, thereby reducing poverty (Beck et al., 2009). But this effect could partly be overshadowed by macroeconomic and financial instability generated by the expansion of financial markets, as the poor are the most affected (Boukhatem, 2016; Jeanneney & Kpodar, 2011).

Financial access can also have an impact on poverty through the labor market. First, in developing countries, where wages are more volatile and sensitive to growth instability (Agénor, McDermott, & Prasad, 2000), the poor tend to increase their labor supply in the case of shocks, even if wages decrease (Blundell et al., 2016; Jayachandran, 2006). Second, by allowing consumption smoothing, reducing financing constraints and overall disposable income, financial access can affect the composition of the workforce and thus the equilibrium of the labor market. In the short term, a household's labor supply can become more elastic, leading to a lower prevalence of working poor. In the medium and long term, as long as access to finance helps build human capital (De Gregorio, 1996), the economy starts to create relatively high-paying jobs.

Overall, the literature generally shows that financial development reduces poverty, irrespective of the measure used. This effect operates mainly through the expansion of the poor's access to financial services (credit, insurance and savings) and increases in economic opportunities, including in the labor market. The latter channel is less documented in the literature and deserves further analysis, especially in developing countries where a huge part of the labor force remains trapped in extreme poverty.

3. Empirical strategy

3.1. Econometric model and data

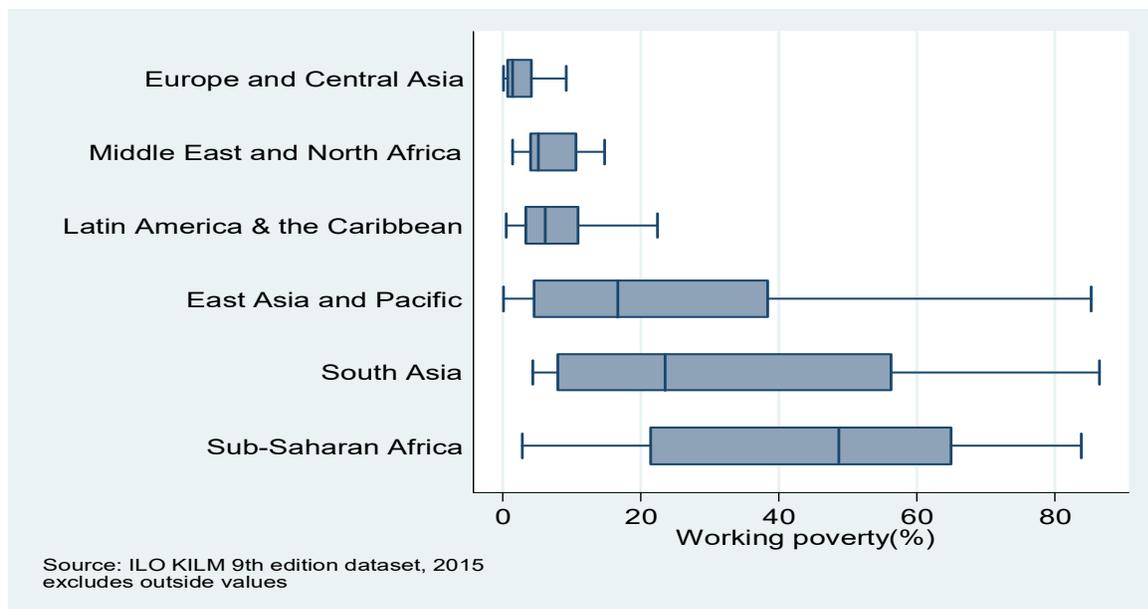
In this section, we explore the link between financial access and working poverty in a sample of 63 developing countries over the period of 2004–2013 (see Appendix 1 for the list of countries). Because the estimation of working poverty uses national household surveys, which, in developing countries, are not available on an annual basis, the sample used in this study is unbalanced. Likewise, the choice of the sample period is dictated by data availability of the measure of financial access. The baseline econometric model we want to estimate is the following:

$$wp_{i,t} = \beta_1 fin_{i,t} + X'_{i,t} \delta + \alpha_i + \varepsilon_{i,t} \quad (1)$$

Where $wp_{i,t}$ is the share of working poor in the total employment in each country i at year t . Following Kapsos and Bourmpoula (2013), extreme working poverty is defined as the percentage of workers living on less than US\$1.25 a day in 2005 PPP. The choice of a US\$1.25 poverty threshold instead of the US\$1.90 poverty line is justified by the need to remain consistent with the definition of economic classes adopted by Kapsos and Bourmpoula (2013) to estimate trends in the working poor. In addition, since the US\$1.90 international poverty line was only adopted in 2015, the US\$1.25 poverty line was used to define extreme poverty for almost the entire period that our study covers (2004–2013). We are aware that the income of the poor is irregular and unpredictable, and the poverty line used is an average amount. For instance, someone can earn US\$5 a day and US\$0 the next day and behave differently than somebody who earns US\$1.25 every day. The structure of the data does not allow us to make a distinction between such workers, even if we control for income instability by introducing GDP volatility in our study. These problems notwithstanding, the ILO data have the advantage of being carefully adjusted based on internationally accepted definitions, thereby allowing for cross-country comparisons over time.

Figure 1 shows the distribution of working poverty across regions. According to this figure, working poverty is more prevalent in South Asia and Sub-Saharan Africa, where 27 and 45 percent of the workforce, respectively, lives on less than US\$1.25 per day.

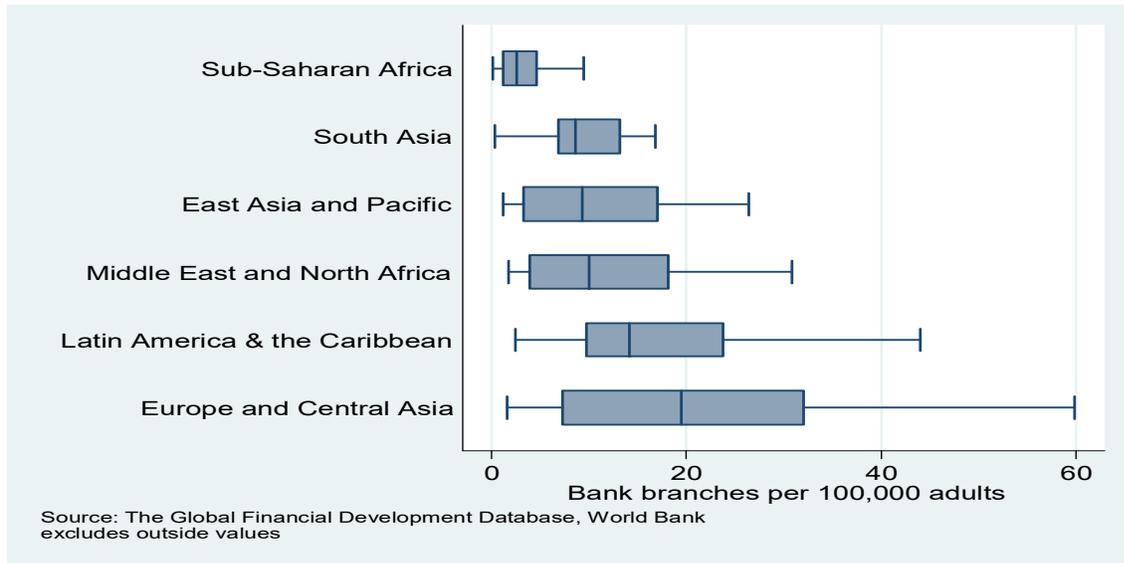
Figure 1. Distribution of working poverty by region



Notes: In the box plots, the lower and upper hinges of each box show the 25th and 75th percentiles of the samples, respectively; the line in the box indicates the median; and the end points of whiskers mark the next adjacent value.

The variable $fin_{i,t}$ captures the access to financial services and is measured by the number of commercial bank branches per 100,000 adults registered in a country. It does not include microfinance institutions (MFIs), credit unions or financial cooperatives. Due to data scarcity, we focus on formal commercial bank branches, which is likely to underestimate financial access, since MFIs provide financial services to millions of low-income households in developing countries. However, we assume that the increase in the number of bank branches per 100,000 adults is likely to boost bank competition, lowering the cost of access to financial services, even those provided by MFIs (Mengistu and Perez, 2018). This may be particularly true in our sample, which comprises mainly low-income countries where there is a strong demand for MFIs. Another potential weakness of the chosen measure is that it may poorly capture either the access or the scale. The access issue is related to the fact that the number of bank branches per 100,000 may be high, but the branches are unevenly distributed across the area. Therefore, people who are not located near the areas where bank branches are concentrated will not get access. The scale issue is the opposite and relates to the fact that in a densely populated area, the number of bank branches per 100,000 adults may be small, but due to the widespread distribution of ATMs or sheer density, people can get access to financial services quickly. These shortcomings are addressed in several ways. First, in robustness checks, the specification is augmented to control for physical access to financial services. In this vein, we include in regressions measures capturing the quality of the road network and the availability of ATMs. The rationale is that a good road network and widespread ATMs may ease physical access to financial services, even for people living in remote areas. In addition, the use of the instrumental variable methodology may help mitigate the measurement bias. The measure of financial access used in this study was initially computed by Beck and colleagues (2007) and later updated in the World Development Indicators of the World Bank.

Figure 2. Distribution of bank branches by region



Notes: In the box plots, the lower and upper hinges of each box show the 25th and 75th percentiles of the samples, respectively; the line in the box indicates the median; and the end points of whiskers mark the next adjacent value.

Figure 2 displays the distribution of bank branches by regions. As expected, Sub-Saharan Africa is the region that is least endowed, with barely four bank branches per 100,000 adults. This region has the lowest degree of financial inclusion, and bank branches tend to be concentrated in the largest cities (Guerineau & Jacolin, 2014).

In equation (1), $X'_{i,t}$ is the matrix of control variables, including the logarithm of GDP per capita, trade openness, foreign direct investment (FDI) in percentage of GDP, growth volatility and income inequality measured by the Gini index. The choice of control variables is consistent with the literature on poverty and working poverty (see Combes et al., 2014). Country fixed effects are added to the model to control for the unobserved heterogeneity at the country level. Lastly, $\varepsilon_{i,t}$ is the idiosyncratic error term which captures measurement error on the dependent variable.

The hypothesis tested in this paper is that increased access to financial services in developing countries may reduce the prevalence of working poverty. Specifically, we expect the coefficient β_1 to be negative and significant ($\beta_1 < 0$). In fact, access to financial services helps poor households to smooth their consumption by investing in productive activities which may lift them out of poverty (Beck et al., 2007). Similarly, by relaxing financial constraints, better access to financial services enables the poor to raise their reservation wage, leading to the reduction in working poverty. The GDP per capita is included in the model to control for the potential effect of the level of development on working

poverty. Because the window of opportunities for the poor widens with the level of development, we expect a negative effect of GDP per capita on working poverty. The effect of trade openness is ambiguous because trade affects both the demand and the supply sides. Furthermore, the effect may depend on how trade impacts unskilled and skilled labor. For instance, if trade openness induces an increase in the demand of skilled labor relative to unskilled, we may expect a positive effect on working poverty because the poor are more likely to offer unskilled labor. The expected effect of FDI is negative because an increase in foreign investment is likely to reduce working poverty through the rise in labor demand. Growth volatility is measured as the rolling standard deviation of GDP growth over 10 years and is expected to increase working poverty. As shown by Blundell and colleagues (2016), poor households respond to income shocks by increasing their labor supply in order to smooth their consumption. This induces a downward pressure on wages and increases working poverty (Combes et al., 2014). Data related to GDP per capita, FDI and trade openness are drawn from the World Development Indicators of the World Bank. Lastly, we expect a positive effect of income inequality through the increase in labor supply.

Income inequality is measured by the Gini coefficient of market income obtained from the Standardized World Income Inequality Database (SWIID) calculated by Solt (2014). The descriptive statistics related to the control variables are presented in Table 1.

Table 1. Descriptive statistics

	Observations	Mean	Standard- Deviation	Minimum	Maximum
Working poor (< US\$1.25)	294	10.21	16.76	0.11	78.18
Bank branches per 100,000 adults	294	15.27	13.94	0.40	112.27
GDP volatility	294	3.79	2.05	0.36	11.93
Log (GDP per capita)	294	10.85	2.68	5.59	17.03
Trade openness	294	4.29	.50	3.10	5.26
FDI-to-GDP	294	5.14	5.23	0.06	40.97
Gini index	294	43.83	8.17	17.99	70.19
Private credit bureau	294	10.61	16.16	0	54
Public credit registry	294	10.81	14.46	0	53

3.2. Identification strategy and estimation method

The standard approach to estimating the effect of financial access on working poverty is to use ordinary least squares (OLS) regression. Although this approach gives an indication of the correlation between the two variables, it is difficult to infer a causal effect running from financial access to working poverty. The relationship between financial access and working poverty might be driven by reverse causation.

For instance, financial access might be low for poor households. Therefore, the expected negative effect of the former may only indicate this reverse causality. In addition, financial access may be measured with error. In this case, the estimated OLS effect will be attenuated (underestimation/overestimation).

The strategy adopted in this paper is to build on the existing literature on the determinants of financial development to find an exogenous source of variation in financial access. Particularly, the introduction of information sharing offices (ISOs), namely, private credit bureaus (CB) and public credit registries, has been identified as a driver of financial development. According to Djankov, McLiesh and Shleifer (2007), a private credit bureau is defined as a private commercial firm or non-profit organization which maintains a database on the standing of borrowers in the financial system and has as its primary purpose facilitating the exchange of information among banks and financial institutions. Likewise, a public credit registry (CR) is defined as a database owned by public authorities (central bank or banking supervisory authority) that collects information on the standing of borrowers and shares it with financial institutions. We argue that by reducing information asymmetry, CBs and CRs can enhance financial access. Especially by sharing the information about a borrower's behavior, CBs and public CRs increase access to bank services, support responsible lending, reduce credit losses and strengthen banking supervision. For instance, several studies have demonstrated that ISOs positively affect the development of credit markets (Jappelli & Pagano, 2002; Djankov et al., 2007; Brown, Jappelli, & Pagano, 2009; Martinez Peria & Singh, 2014; Ayyagari, Juarros, Martinez Peria, & Singh, 2016).

Since these positive effects on financial development and access are strongly correlated with poverty reduction, it appears obvious that the impact of CBs and CRs on working poverty operates only through the existence of financial institutions which serve products directly to the households. Hence, we argue that better information on borrowers' behavior drives the establishment of banks and financial institutions near poor households, improving their access to financial services and thereby leading to a reduction in working poverty. Moreover, Beck and colleagues (2007) have demonstrated that the number of bank branches, our indicator of financial access, is associated positively with credit information sharing.

In this study, we consider that the establishment of an ISO is likely to be predictable, but the time when it is established, as well as the number of years of operation, are less likely to be predictable. For examples, the establishment of a CB involves dealing with several issues, including regulatory framework issues, a lack of (or unreliable) data, information technology issues and skills and human

resources issues. Consequently, the introduction of CBs and CRs can be considered a source of an exogenous positive shock to the expansion of financial services. This strategy has already been adopted by Ebeke (2012), who also used the existence of CBs and CRs as instruments for financial development in his study on the impact of remittances on child labor. Unlike the aforementioned authors, who use dummies (the variable of CBs taking the value of one if a CB operates in the country and zero otherwise), we use two variables as instruments: the number of years of operation of CBs and the number of years of operation of CRs. This seems to be more relevant and relatively exogenous.

However, to substantiate this reasoning, we test the exogeneity of our instrument while using the Hansen overidentification test. Because the two-stage least squares (2SLS) estimates can be biased if the chosen instruments are weak, we test their strength while relying on the Kleibergen-Paap F statistic. Moreover, to further ensure that our estimates are not biased, we use the limited information maximum likelihood (LIML) method, which is more robust to weak instruments than the simple 2SLS method.

4. Empirical findings

As a preliminary step of our investigation, we report in Table 2 the OLS estimates of the effect of financial access on working poverty.

The first column of the table displays the estimates of the baseline model and shows a negative and significant effect of financial access as measured by the number of bank branches on working poverty. Specifically, an increase in the number of bank branches by 1 percent induces a decrease in working poverty by 0.22 percentage points. A similar result is obtained when one controls for the growth volatility. Lastly, the third column augments the model with an interaction between the volatility of growth and financial access. The purpose of this inclusion is to test the hypothesis according to which the magnitude of the decreasing effect of financial access is higher in countries that are strongly affected by external shocks. The coefficient of the interaction term is significant and has the expected sign, confirming the hypothesis that access to financial services is even more relevant in countries affected by strong macroeconomic instability.

Table 2. Fixed effects estimates of the impact of financial access on working poverty

	(1)	(2)	(3)
	Log(Working poverty)	Log(Working poverty)	Log(Working poverty)
Log (Bank branches per 100,000 adults)	-0.224*** (0.012)	-0.217*** (0.009)	-0.180*** (0.020)
GDP volatility		0.028*** (0.004)	0.055*** (0.008)
Volatility x Bank branches			-0.013** (0.006)
Log (GDP per capita)	-0.914*** (0.035)	-0.805*** (0.022)	-0.772*** (0.023)
Trade openness	0.293*** (0.039)	0.211*** (0.039)	0.210*** (0.037)
FDI-to-GDP	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
Gini index	0.032*** (0.004)	0.035*** (0.005)	0.036*** (0.004)
Constant	9.168*** (0.321)	8.077*** (0.326)	7.599*** (0.337)
Observations	318	318	318
Number of groups	87	87	87
R-Squared	0.431	0.451	0.453

Note: Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3 reports the instrumental variables estimates, which deal with the bias induced by the endogeneity of our variable of interest. Two instruments are used to infer a causal effect of financial access on working poverty, namely, the number of years a CB and a CR have been operating in a country. In order to ensure that the instruments are not weak, we report the first-stage regressions, which provide an idea about the strength of the correlation with the variable of interest (see Panel (b)).⁶ The first-stage regressions show that our instruments are not weak, as they are strongly correlated with the measure of financial access at the 1 percent level with the correct positive sign. In addition, we report the Wald F statistic, based on the Kleibergen-Paap (2006) rk statistic, which is superior to the standard Cragg-Donald (1993) statistic in the presence of heteroscedasticity and autocorrelation. The reported statistics are far above the Stock and Yogo (2005) critical values and above the value of 10, as suggested by the ‘rule of thumb’ of Staiger and Stock (1997). The relevance of the instruments is assessed through the Hansen test of overidentifying restrictions.

⁶ Complete tables are reported in Appendix 2.

Table 3. Instrumental variable estimates of the effects of financial access on working poverty

	(1)	(2)	(3)	(4)	(5)	(6)
Panel (a) : 2SLS estimates						
Log (Bank branches)	-0.254** (0.109)	-0.352** (0.114)	-0.218** (0.096)	-0.341** (0.120)	-0.550*** (0.171)	-0.269*** (0.074)
GDP volatility		0.027*** (0.003)	0.175** (0.074)	0.027*** (0.003)	0.026*** (0.003)	0.027*** (0.003)
Volatility x Bank branches			-0.069** (0.029)			
Log (GDP per capita)	-0.871*** (0.150)	-0.623*** (0.154)	-0.349** (0.141)	-0.663*** (0.141)	-0.620*** (0.153)	-0.528*** (0.121)
Trade openness	0.305*** (0.060)	0.271*** (0.068)	0.293*** (0.073)	0.259*** (0.067)	0.224*** (0.069)	0.268*** (0.049)
FDI-to-GDP	0.001 (0.002)	0.002 (0.002)	0.003 (0.002)	0.002 (0.002)	0.001 (0.002)	-0.001 (0.002)
Gini index	0.031*** (0.005)	0.032*** (0.005)	0.036*** (0.003)	0.031*** (0.006)	0.044*** (0.005)	0.038*** (0.004)
Bank branches x SSA region				0.098 (0.088)		
Bank branches x LAC region					0.381** (0.127)	
Bank branches x Asia region						-0.440*** (0.104)
Panel (b) First-stage results						
Private credit bureau	0.022*** (0.005)	0.024*** (0.006)	0.025*** (0.005)	0.017*** (0.004)	0.018*** (0.006)	0.029*** (0.007)
Public credit registry	0.025*** (0.006)	0.028*** (0.006)	0.028*** (0.005)	0.030*** (0.006)	0.025*** (0.007)	0.025*** (0.007)
Private credit bureau x Volatility			-0.010*** (0.002)			
Public credit registry x Volatility			0.015*** (0.001)			
Private credit bureau x SSA				0.158*** (0.016)		
Private credit bureau x LAC					0.068*** (0.004)	
Private credit bureau x Asia						0.055*** (0.004)
Observations	294	294	294	294	294	294
No. of countries	63	63	63	63	63	63
R-squared	0.430	0.429	0.360	0.439	0.426	0.479
Hansen p-value	0.362	0.359	0.620	0.360	0.869	0.361
F-stat for weak ident.	84.638	85.529	75.463	108.131	43.663	61.818
Anderson-Rubin F-stat	2.387	4.062	40.506	14.584	5.586	3.614

Notes: Robust standard errors in parentheses. Other covariates in the first-stage regression are omitted for presentational convenience; more details are available in the Appendix. Country fixed effects are included in all specifications. SSA refers to sub-Saharan Africa; LAC refers to Latin America and the Caribbean. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Based on the Hansen p-values, we cannot reject the null hypothesis that the instruments are uncorrelated with the error term and that the excluded instruments are correctly excluded from the estimated equation.

The first column of Table 3 presents the baseline specification and shows a negative and significant effect of financial access on working poverty. The magnitude of the effect is slightly higher than the one obtained with the OLS estimates, suggesting that not considering the endogeneity may lead to an underestimation of the true impact. Based on these estimates, a 1 percent increase in financial access (number of bank branches) induces a decrease in working poverty of 0.25 percentage points. In the second column of Table 3, we add the volatility of GDP to the model to control for the effect of uncertainty and macroeconomic instability. The effect of financial access remains statistically significant, but the magnitude increases by about 10 percentage points. This result clearly suggests that improving financial access for the poor is very important, especially in a context of macroeconomic uncertainty.

The third column reports the estimates when we control for an interaction between growth volatility and financial access. The expected negative sign is obtained, confirming that the effect of financial access on working poverty is higher for countries facing macroeconomic instability. Another interpretation of this result is that the positive effect of macroeconomic volatility on working poverty is lower when the poor have better access to financial services.

In the last three columns, we add interactions between regional dummies and the measure of financial access,⁷ in order to test a specific regional effect of financial access. It also ensures that our analysis is not biased towards a specific developing region. Surprisingly, the marginal effect of financial access, conditional on being a country in Sub-Saharan Africa (SSA), is not significant. A potential explanation for this phenomenon is the fact that the number of bank branches in Sub-Saharan Africa is almost four times lower than the within-sample mean, which stands at 15. Therefore, the expected effect cannot be observed because the number of bank branches is too small to reach the poor. In contrast, as expected, the marginal effect of financial access, conditional on being an Asian country, is negative and significant. In other words, the impact of improving financial access for the poor is very effective in Asia (the region with the second-highest share of working poor) compared to the other regions. The magnitude of coefficients in the 2SLS regression is generally higher than the OLS estimates, suggesting that the latter understate the effect of financial outreach on working poverty. Altogether, our results indicate that financial development as measured by bank penetration reduces working poverty in

⁷ We would have liked to also additively control for regional dummies. Unfortunately, this is difficult due to the presence of the fixed effect and the multicollinearity related to the presence of the interaction term. Note that the reference group is always the other regions, as shown in Figures 1 and 2.

developing countries, despite some heterogeneity across regions. These results support those from Beck and colleagues (2007), Burgess and Pande (2005) and Jeanneney and Kpodar (2011), which highlight the poverty-reducing effect of financial development. Our findings are specifically related to the study of Burgess and Pande (2005), which shows that expansion of bank branches significantly reduces poverty.

4.1. Sensitivity analysis

In this section, we test the robustness of our results. First, we check how sensitive the estimates are to the addition of new control variables to our baseline model. Following Combes et al. (2014), we include in the model a dummy that captures whether the observations of working poverty are directly drawn from household surveys or computed by the ILO. Controlling for this dummy helps to rule out any persistent measurement error in the dependent variable.⁸ Likewise, we control for the rule of law and mobile phone subscriptions. The rule of law is used as a proxy for the quality of institutions and is deemed to be correlated with country income level and financial development (Donou-Adonsou & Sylwester, 2016). To mitigate the endogeneity concern, the rule of law enters the regression in first difference, as differences are less persistent over time than levels (Ravallion & Chen, 1997). Adding mobile phone subscriptions as a control variable helps to take into account the recent mobile revolution that has stimulated financial access in developing countries through phone-based money transfers (Aker & Mbiti, 2010; Asongu, 2013).

The first two columns of Table 4 report the results of these various robustness tests and show that the effect of financial access on working poverty remains robust irrespective of the control variable added to the model. However, the magnitude of coefficients is lower by about 6 and 10 percentage points, respectively. The improvement in the quality of institutions as measured by the rule of law is significantly associated with the reduction of working poverty, while an increase in mobile subscriptions reduces the prevalence of the working poor. The negative effect of mobile phone subscriptions supports the idea that leveraging access to financial services through mobile banking can help improve the wages of the poor.

⁸ We also perform a parametric test for the presence of attrition bias in the data, which indicated that there is no attrition bias in the sample in Appendix 6.

Table 4. Robustness check, additional control variables

	(1)-IV Log(Working poverty)	(2)-IV Log(Working poverty)	(3)-IV Log(Working poverty)	(4)-IV Log(Working poverty)
Log (Bank branches)	-0.191* (0.100)	-0.161* (0.086)	-0.353** (0.141)	-0.302** (0.100)
GDP volatility	0.186** (0.068)	0.171** (0.063)	0.184* (0.084)	0.296*** (0.061)
Volatility x Bank branches	-0.075** (0.027)	-0.068** (0.024)	-0.074** (0.031)	-0.124*** (0.021)
Log (GDP per capita)	-0.360*** (0.102)	-0.145 (0.083)	0.116 (0.098)	0.032 (0.101)
Trade openness	0.285*** (0.077)	0.230** (0.078)	0.348** (0.132)	0.423** (0.134)
FDI-to-GDP	0.004 (0.002)	0.003 (0.002)	0.000 (0.002)	0.000 (0.003)
GINI index	0.035*** (0.003)	0.037*** (0.003)	0.027*** (0.004)	0.035*** (0.005)
ILO dummy	-0.095** (0.032)	-0.106*** (0.029)	-0.102** (0.032)	-0.099** (0.036)
D.Rule of Law: Estimate	-0.277*** (0.051)	-0.236*** (0.059)	-0.109* (0.051)	-0.221** (0.073)
L.Mobile phone subscriptions (log)		-0.048* (0.022)	-0.019 (0.031)	0.030 (0.025)
L2.Private credit ratio to GDP(log)			-0.055** (0.020)	
L2.log (Bank concentration (%))			0.309** (0.102)	0.254* (0.122)
Constant				
Observations	294	293	269	279
No of countries	63.000	63.000	54.000	57.000
Hansen p-value	0.704	0.641	0.803	0.636
F-stat for weak ident.	85.186	33.508	6.923	8.443
Anderson-Rubin F-stat	43.595	37.375	23.936	26.338

Notes: Robust standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. In these specifications, the instruments are the number of years of existence for public credit registries and private credit bureaus.

Second, in order to ensure that our measure of bank penetration does not capture other dimensions of financial development, we introduce two measures of financial development – private credit ratio to GDP and bank concentration⁹ – in columns 3 and 4, in line with the work of Beck, Lin and Ma (2014). Given their potential endogeneity, we introduce their lags of two periods. The related data are available from the Global Financial Development Database of the World Bank. We find that bank concentration tends to increase working poverty, as it may reflect lower access to financial services.

⁹ The assets of the three largest commercial banks as a share of total commercial banking assets.

Consistent with Jeanneney and Kpodar (2011), as well as Donou-Adonsou and Sylwester (2016), the ratio of private credit negatively and significantly affects working poverty.

We explore alternative approaches to address the issue of endogeneity. As the first check, we use the System GMM proposed by Blundell and Bond (1998). The variable of interest (bank penetration) and GDP per capita are instrumented with their respective lags of one to four periods. Change in the rule of law is assumed to be exogenous, and the remaining variables are instrumented with their lags of one to two periods. The results are reported in column 4 of Table 5 and are qualitatively similar to those reported in Tables 3 and 4. Furthermore, to reduce the relative bias of 2SLS regression due to weak instruments (especially in the context of non-iid errors), we follow Young (2018) and perform Jackknife estimation. The Jackknife estimation method consists of repeatedly estimating the model and calculating relevant statistics, while omitting one of the data set's observations each time. Young (2018) shows that the Jackknife resampling procedure allows for better 2SLS and OLS inference¹ in the presence of non-iid errors and weak first-stage relation. The results of the Jackknife estimation are presented in columns 1–3 of Table 5. They corroborate the earlier findings as coefficients of our measure of access to finance are significant with the expected negative signs.

Table 5. Robustness check, Jackknife and GMM estimations

	(1)-OLS- Jackknife Log(Working poverty)	(2)-OLS- Jackknife Log(Working poverty)	(3)OLS- Jackknife Log(Working poverty)	(4)-GMM Log(Working poverty)
Log (Bank branches)	-0.216*** (0.0470)	-0.216*** (0.0466)	-0.165*** (0.0211)	-0.491*** (0.178)
GDP volatility	0.0287** (0.0132)	0.0271** (0.0129)	0.0230*** (0.00653)	0.015 (0.075)
Log (GDP per capita)	-0.813*** (0.165)	-0.815*** (0.170)	-0.0830 (0.0943)	-0.008 (0.113)
Trade openness	0.209 (0.142)	0.209 (0.144)	0.0962 (0.0617)	-1.610*** (0.548)
FDI-to-GDP	0.00230 (0.00588)	0.00240 (0.00562)	0.00296 (0.00302)	0.032 (0.029)
GINI index	0.0352*** (0.00907)	0.0343*** (0.00892)	0.0358*** (0.00564)	0.042* (0.022)
ILO dummy		-0.0772 (0.0661)	-0.109*** (0.0225)	
D.Rule of Law	-0.220 (0.181)	-0.219 (0.180)	-0.146* (0.0855)	-1.221*** (0.384)
L.Mobile phone subscriptions (log)			-0.127*** (0.0119)	
L.Working poverty			-0.127*** (0.0119)	0.516*** (0.152)
Constant	3.578** (1.388)	3.621*** (1.392)	-0.627 (0.659)	7.030** -3.029
Observations	318	318	316	257
No of countries	63	63	54	63
R-squared	0.987	0.987	0.988	
Replications	291	290	90	
Hansen p-value	0.704	0.641	0.803	0.68
F-stat for weak ident.	85.186	33.508	6.923	
Anderson-Rubin F-stat	43.595	37.375	23.936	
Number of instruments				37
AR1				0.047
AR2				0.727

Notes: Robust standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Lastly, we check the robustness of our results to alternative measures of access to financial services.

As discussed earlier, the chosen measure may poorly capture the spatial distribution of bank branches. In fact, the number of bank branches per 100,000 adults may be high but concentrated in only a few areas. By contrast, the number may be low, but concentrated in an area with a high population density. Depending on the relevant case, estimates may be biased upward or downward. Table 6 presents regressions using different alternative measures of the variable of interest, namely, the number of ATMs per 1,000 km², the number of bank branches per 1,000 km² and the number of ATMs per 100,000 adults. The number of ATMs per adults/ km² is used to account for the fact that in cases where bank branches are unevenly distributed across the area, the availability of ATMs ensures strong access to financial services. Results are reported in columns 1 and 3 of Table 6. Though with lower magnitude, the coefficient estimates remain consistent with previous findings. A 1 percent increase in the number of ATMs per adults/ km² generates a 0.11/0.16 percentage point decline in working poverty. Likewise, replacing the number of bank branches per 100,000 adults by the number of bank branches per 1,000 km² does not qualitatively alter the baseline findings (see column 2). In addition, in order to account for the potential effect of the distance to the nearest bank on the relationship under scrutiny, we add to the baseline model a proxy of the quality of the road network. The rationale is that access to the bank network may be easier in countries with good quality road networks, even when bank branches are unevenly distributed across living areas. The results indicate that the quality of the road network is indeed negatively and significantly correlated with the prevalence of the working poor. Furthermore, although the size of the sample sharply decreased, the effect of our variable of interest remains robust (see columns 4 and 5 of Table 6). Altogether, the baseline results are robust to the various robustness tests implemented.

Table 6. Robustness check, alternative measure of the variable of interest

	(1)	(2)	(3)	(4)	(5)
	Log(Working poverty)	Log(Working poverty)	Log(Working poverty)	Log(Working poverty)	Log(Working poverty)
Log (Bank branches)			-0.180*** (0.038)		-0.171*** (0.047)
Log (ATMs per 100,000 adults)			-0.111** (0.040)		-0.192*** (0.047)
Log (ATMs per 1,000 km ²)	-0.165*** (0.034)				
Log (Bank branches per 1,000 km ²)		-0.284*** (0.063)		-0.301** (0.092)	
Log (Paved road)				-0.136** (0.040)	-0.292*** (0.057)
Log (GDP per capita)	-0.540*** (0.159)	-0.809*** (0.096)	-0.496** (0.190)	-0.909*** (0.070)	-0.380* (0.182)
Trade openness	0.252*** (0.062)	0.246*** (0.050)	0.294*** (0.050)	0.377** (0.114)	0.272** (0.083)
FDI-to-GDP	0.000 (0.002)	0.001 (0.002)	0.002 (0.001)	-0.001 (0.003)	0.007** (0.002)
GINI index	0.047*** (0.006)	0.041*** (0.004)	0.039*** (0.007)	0.039*** (0.005)	0.029** (0.012)
Observations	272	288	258	127	110
No of countries	55.000	61.000	54.000	29.000	26.000
R-squared	0.475	0.443	0.472	0.526	0.558
Hansen p-value	0.176	0.853		0.345	
F-stat for weak ident.	24.997	107.271	5.865	10.513	21.746
Anderson-Rubin F-stat	21.733	3.511	1.426	5.232	1.693

Note: Robust standard errors in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. CRs and CBs are used as instruments for both ATMs and bank branches.

Given the structure of the data set on working poverty, we are also able to examine the effect of bank penetration for different poverty lines, thus inferring its effect on inequality.

4.2. Financial access and inequality, testing for some transmission channels

In this section, our aim is to contribute to the literature on the link between finance and inequality, and we also want to test empirically the trickle-down hypothesis that enhancing financial access to the rich would also benefit the poor.

First, by taking advantage of the granularity of the working poverty data set, we shift the poverty line from US\$1.25 to US\$1.90 per day – the latter being largely used in studies related to poverty.¹⁰ Second, in order to test whether financial access leads to more inequality, we make a distinction between poor workers living on less than US\$1.90 per day and those in the labor force belonging to the middle class

¹⁰ US\$1.90 per day is the international line that has been commonly used to define extreme poverty since 2015.

and above, earning more than US\$13¹¹ a day, according to Kapsos and Bourmpoula's (2013) classification. We examine the amplitude of the coefficients for the number of bank branches to assess who benefits more from financial access. The results are presented in Table 7, below.

Table 7. Impact of financial access for different poverty lines

	(1) Working poverty (<\$1.25)	(2) Working poverty (<\$1.90)	(3) Workers in the middle class and above (> \$13)
Panel (a) : 2SLS estimates			
Log (Bank branches)	-6.733*** (0.911)	-5.935** (2.061)	11.105*** (1.874)
GDP volatility	0.094** (0.037)	0.455*** (0.035)	0.045 (0.116)
Log (GDP per capita)	-0.547 (2.193)	-11.700*** (3.596)	18.566*** (3.651)
Trade openness	3.136*** (0.840)	2.239** (0.882)	-3.829 (2.735)
FDI-to-GDP	0.054* (0.024)	0.029 (0.047)	0.080 (0.057)
GINI index	-0.142 (0.086)	0.055 (0.097)	-0.085 (0.101)
Panel (b) First-stage results			
Private credit bureau	0.024*** (0.006)	0.024*** (0.006)	0.024*** (0.006)
Public credit registry	0.028*** (0.006)	0.028*** (0.006)	0.028*** (0.006)
Observations	294	294	294
No of countries	63.000	63.000	63.000
Hansen p-value	0.224	0.206	0.206
F-stat for weak ident.	85.529	85.529	85.529
Anderson-Rubin F-stat	134.033	98.149	38.332

Notes: Robust standard errors in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

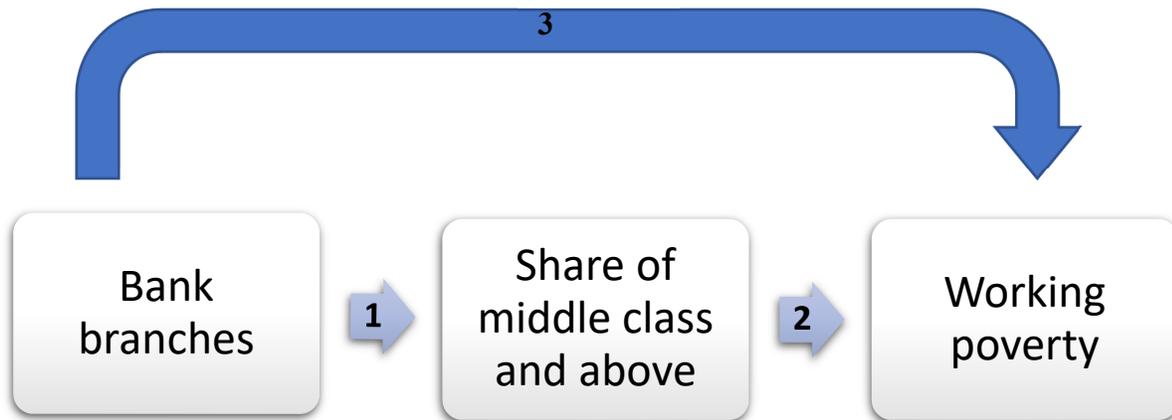
In the first two columns of Table 7, the dependent variables are, respectively, the proportion of the working poor living on less than US\$ 1.25 and US\$1.90 a day, while in the last column, the share of workers earning more than US\$13 is used. In these specifications, we focus on the amplitude of the coefficients. When we shift the poverty line from US\$1.25 to US\$1.90, the coefficient drops by 11 percent, suggesting that the impact of financial access is slightly more important for those living in extreme poverty. Nonetheless – and not surprisingly – bank branch penetration increases the proportion of workers living on at least US\$13, but this impact is approximately two times higher than the decrease in working poverty. This result suggests that the poor benefit proportionally less from

¹¹ We also use the term ‘rich workers’ for this category.

access to financial services. Though puzzling, this result echoes recent findings in the literature (Yilmazkuday, 2011; Herwartz & Walle, 2014; Donou-Adonsou & Sylwester, 2016). These findings highlight that low-income countries obtain the least benefit from financial development and that there is a minimum level of per capita income (\$665 in constant 1995 USD) to start benefiting from financial development. Several arguments are offered to explain this surprising finding. First, poor borrowers often lack collateral, and this may prevent them from benefiting from credit services on the same scale of wealthier borrowers. Furthermore, poor people live in areas that lack basic infrastructure, leading to high transaction costs and lower productivity. Lastly, poor people may have lower business skills to expand enterprise and create jobs. A trivial interpretation of this finding is that demographic branch penetration is likely to increase inequalities between poor workers and others. Nonetheless, as we mentioned in our literature review, the positive effect on rich workers can trickle down to the poor by indirectly improving their employment opportunities. In the next section, we check the hypothesis that enhancing access to the excluded rich workers can indirectly reduce working poverty in developing countries.

Thereby, to test the hypothesis that increasing the proportion of rich workers is a transmission channel to the effect of financial access on working poverty, our strategy is the following, based on Figure 3, below.

Figure 3. Testing for transmission channel



Source: Authors' compilation.

The first step is to analyze the effect of bank branches on the share of workers belonging to the middle- and high-income class (rich workers). Second, we assess the impact of increasing the proportion of rich workers on extreme working poverty, while, at the same time, controlling for bank branches. The first two steps help to show that there is an indirect effect of bank branches on working poverty that functions through the increase in the proportion of rich workers. The third and final stage is to compare the coefficient of bank branches at the second step to that obtained in our baseline model. If the proportion of rich workers is a transmission channel, the coefficient of bank branches will be less important while controlling for this category of workers. The results are presented in Table 8, below.

Table 8. Test of transmission channel and robustness check for different poverty lines

	(1) Workers in the middle class and above (> \$13)	(2) Log(Working poverty)	(3) Log(Working poverty)	(4) Log (GDP per capita)	(5) Log(Working poverty)
Log (Bank branches)	8.809*** (1.725)	-0.210* (0.096)	-0.218** (0.096)	0.495*** (0.047)	-0.305*** (0.086)
Log (share of middle class and above)		-0.215*** (0.055)			
Log (GDP per capita)		-0.120 (0.188)	-0.349** (0.141)		
GDP volatility	0.039 (0.108)	0.158** (0.067)	0.175** (0.074)		0.215*** (0.050)
Volatility x Bank branches		-0.063** (0.027)	-0.069** (0.029)		-0.087*** (0.018)
Trade openness	21.863*** (3.393)	0.252*** (0.073)	0.293*** (0.073)	-0.048 (0.029)	0.351*** (0.108)
FDI-to-GDP	-3.661 (2.490)	0.002 (0.002)	0.003 (0.002)	0.001* (0.000)	0.003 (0.002)
Gini index	0.212*** (0.052)	0.038*** (0.004)	0.036*** (0.003)	-0.001 (0.001)	0.036*** (0.004)
Log (investments)	-0.172* (0.091)			0.002 (0.020)	
Human capital index				0.284*** (0.087)	
Fertility rate				0.402*** (0.025)	
Observations	297	294	294	684	294
No. of countries	63	63.000	63.000	111.000	63.000
Hansen p-value	0.204	0.519	0.620	0.258	0.647
F-stat for weak ident.	86.904	75.797	75.463	185.551	3.642
Anderson-Rubin F- stat	31.604	37.236	40.506	49.875	143.250

Notes: Robust standard errors in parentheses. The human capital index and investment variables have been drawn from the Penn World Tables (Feenstra, Inklaar, & Timmer, 2015), and the fertility rate has been drawn from the World Development Indicators of the World Bank.* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

The first column of Table 8 presents the results for the first stage of our strategy. We notice that a 100 percent increase in the number of bank branches raises the share of workers in the middle class and above by 8.8 percentage points. Hence, the second column of Table 8 corresponds to the second stage, in which we find that the proportion of rich workers is negatively related to working poverty. This relation is intuitive and could result from simple accounting, as more middle-class workers implies fewer poor workers (as a share of total workers). However, for the same accounting reason, a different result was not expected. Therefore, the validity of our approach rests mainly on the first step, which clearly shows a strong positive relation between financial access and the proportion of rich workers. For the third step, we compare the coefficient of bank branches in column 3 to its coefficient in column 2, where the baseline regression is augmented with the proportion of rich workers. As expected, the magnitude of the coefficient of bank branches is less important when we control for the share of rich workers. Although this result provides support to the trickle-down hypothesis, we should acknowledge the fact that the difference in coefficients of bank branches between the baseline and the augmented models is marginal.

In columns 4 and 5, we use the same approach developed above to check whether raising the average income level in the population through bank branches reduces working poverty. In column 4, we notice that the number of bank branches is positively related to GDP per capita. Then, we compare the coefficient of bank branches in column 5, where GDP per capita is not included, to its coefficient in our baseline model in column 3. We find that it is of higher magnitude in the former column, suggesting that the poverty-reducing effect of the access to financial services may function through the improvement of the income level of the entire population.

Another interesting result is that the coefficient of the log of GDP per capita is no more significant in the second column of Table 8, where the share of rich workers is added as a control variable. One plausible explanation is that the effect of improving GDP per capita on working poverty occurs mainly through its benefits to the middle class and above. Hence, our findings support earlier evidence brought by Beck and colleagues (2007), according to which providing better access to financial services for the excluded non-poor, like micro and small entrepreneurs, can have a strongly positive indirect effect on growth, reducing the prevalence of the working poor overall.

5. Conclusion

According to the proponents of trickle-down economics, a rising tide lifts all boats. In other words, economic growth will ultimately benefit the poor through more jobs and higher incomes. However, despite decades of economic growth in the developing world, in 2017, about 300 million workers lived on less than US\$1.90 a day (ILO, 2018). This paper complements the existing literature by investigating the effect of financial access on the prevalence of the working poor and on inequality in developing countries.

Using a sample of 63 developing countries over the period of 2004–2013, we show that improving financial access (as measured by the number of bank branches per 100,000 adults) reduces the prevalence of the working poor (workers living on less than US\$1.25 a day). This effect is robust to endogeneity bias, measurement error in the dependent variable and the addition of various controls, including a measure of macroeconomic instability, governance and mobile phone subscriptions. The negative effect of the last variable supports the idea that mobile banking could be used to reduce working poverty, given the mobile banking revolution. In addition, the positive impact of financial access on the rich workers is two times higher than the negative impact on working poverty. Despite this inequality-widening effect, this study shows that improving financial access for the excluded workers in the middle class and above (workers living on more than US\$13 a day) could also have a strong effect on reducing working poverty.

Overall, this paper calls for an improvement of access to financial services by bringing them closer to the poor and the excluded wealthier workers. Thus, given the high costs of opening new bank branches, financial institutions should also take advantage of the expansion of mobile phone devices as a tool to target and reach the poorer workers through, for instance, mobile banking.

References

- Agénor, P.-R., McDermott, C. J., & Prasad, E. S. (2000). Macroeconomic Fluctuations in Developing Countries: Some Stylized Facts. *World Bank Economic Review*, 14(2), 251–285. <https://doi.org/10.1093/wber/14.2.251>
- Aker, J. C., & Mbiti, I. M. (2010). Mobile Phones and Economic Development in Africa. *Journal of Economic Perspectives*, 24(3), 207–232. <https://doi.org/10.1257/jep.24.3.207>
- Asongu, S. A. (2013). How has Mobile Phone Penetration Stimulated Financial Development in Africa? *Journal of African Business*, 14(1), 7–18. <https://doi.org/10.1080/15228916.2013.765309>
- Ayyagari, M., Juarros, P., Martinez Peria, M. S., & Singh, S. (2016). *Access to Finance and Job Growth: Firm-Level Evidence across Developing Countries* (Policy Research Working Paper No. 7604). Washington DC: The World Bank Group. Retrieved from <https://openknowledge.worldbank.org/handle/10986/24146>
- Beck, T., Demirgüç-Kunt, A., & Honohan, P. (2009). Access to Financial Services: Measurement, Impact, and Policies. *World Bank Research Observer*, 24(1), 119–145. <https://doi.org/10.1093/wbro/lkn008>
- 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>
- Beck, T., Demirgüç-Kunt, A., & Martinez Peria, M. S. (2007). Reaching Out: Access to and Use of Banking Services Across Countries. *Journal of Financial Economics*, 85(1), 234–266. <https://doi.org/10.1016/j.jfineco.2006.07.002>
- Beck, T., Demirgüç-Kunt, A., & Martinez Peria, M. S. (2008). Banking Services for Everyone? Barriers to Bank Access and Use around the World. *World Bank Economic Review*, 22(3), 397–430. <https://doi.org/10.1093/wber/lhn020>
- Beck, T., Levine, R., & Levkov, A. (2010). Big Bad Banks? The Winners and Losers from Bank Deregulation in the United States. *Journal of Finance*, 65(5), 1637–1667.
- Beck, T., Lin, C., & Ma, Y. (2014). Why Do Firms Evade Taxes? The Role of Information Sharing and Financial Sector Outreach. *The Journal of Finance*, 69(2), 763–817.
- Blundell, R., & Bond, S. (1998). Initial Conditions and Moment Restrictions in Dynamic Panel Data Models. *Journal of Econometrics*, 87(1), 115–143. [https://doi.org/10.1016/S0304-4076\(98\)00009-8](https://doi.org/10.1016/S0304-4076(98)00009-8)
- Blundell, R., Pistaferri, L., & Saporta-Eksten, I. (2016). Consumption Inequality and Family Labor Supply. *American Economic Review*, 106(2), 387–435. <https://doi.org/10.1257/aer.20121549>

- Bofondi, M., & Gobbi, G. (2006). Informational Barriers to Entry into Credit Markets. *Review of Finance*, 10(1), 39–67. <https://doi.org/10.1007/s10679-006-6978-2>
- Boukhatem, J. (2016). Assessing the Direct Effect of Financial Development on Poverty Reduction in a Panel of Low-and Middle-Income Countries. *Research in International Business and Finance*, 37, 214–230. <https://doi.org/10.1016/j.ribaf.2015.11.008>
- Brevoort, K. P., & Hannan, T. H. (2007). Commercial Lending and Distance: Evidence from Community Reinvestment Act Data. *Journal of Money, Credit, and Banking*, 38(8), 1991–2012. <https://doi.org/10.1353/mcb.2007.0000>
- Brown, M., Jappelli, T., & Pagano, M. (2009). Information Sharing and Credit: Firm-Level Evidence from Transition Countries. *Journal of Financial Intermediation*, 18(2), 151–172. <https://doi.org/10.1016/j.jfi.2008.04.002>
- Burgess, R., & Pande, R. (2005). Do Rural Banks Matter? Evidence from the Indian Social Banking Experiment. *The American Economic Review*, 95(3), 780–795.
- Combes, J.-L., Ebeke, C. H., Maurel, M., & Yogo, T. U. (2014). Remittances and Working Poverty. *The Journal of Development Studies*, 50(10), 1348–1361. <https://doi.org/10.1080/00220388.2014.940912>
- Cragg, J. G., & Donald, S. G. (1993). Testing Identifiability and Specification in Instrumental Variable Models. *Econometric Theory*, 9(2), 222–240.
- De Gregorio, J. (1996). Borrowing Constraints, Human Capital Accumulation, and Growth. *Journal of Monetary Economics*, 37(1), 49–71. [https://doi.org/10.1016/0304-3932\(95\)01234-6](https://doi.org/10.1016/0304-3932(95)01234-6)
- Degryse, H., & Ongena, S. (2005). Distance, Lending Relationships, and Competition. *The Journal of Finance*, 60(1), 231–266. <https://doi.org/10.1111/j.1540-6261.2005.00729.x>
- Djankov, S., McLiesh, C., & Shleifer, A. (2007). Private Credit in 129 Countries. *Journal of Financial Economics*, 84(2), 299–329. <https://doi.org/10.1016/j.jfineco.2006.03.004>
- Dollar, D., & Kraay, A. (2002). Growth is Good for the Poor. *Journal of Economic Growth*, 7(3), 195–225. <https://doi.org/10.1023/A:1020139631000>
- Donou-Adonsou, F., & Sylwester, K. (2016). Financial development and poverty reduction in developing countries: New evidence from banks and microfinance institutions. *Review of Development Finance*, 6(1), 82–90. <https://doi.org/10.1016/j.rdf.2016.06.002>
- Ebeke, C. H. (2012). The Power of Remittances on the International Prevalence of Child Labor. *Structural Change and Economic Dynamics*, 23(4), 452–462. <https://doi.org/10.1016/j.strueco.2012.05.002>

- Feenstra, R. C., Inklaar, R., & Timmer, M. P. (2015). The Next Generation of the Penn World Table. *American Economic Review*, 105(10), 3150–3182. <https://doi.org/10.1257/aer.20130954>
- Fields, G. S. (2012). *Working Hard, Working Poor: A Global Journey*. New York: Oxford University Press, USA.
- Giné, X., & Townsend, R. M. (2004). Evaluation of Financial Liberalization: a General Equilibrium Model with Constrained Occupation Choice. *Journal of Development Economics*, 74(2), 269–307. <https://doi.org/10.1016/j.jdeveco.2003.03.005>
- Gobbi, G., & Zizza, R. (2012). Does the Underground Economy hold back Financial Deepening? *Economia Marche - Journal of Applied Economics*, 31(1). Retrieved from <http://www.economiamarche.univpm.it/index.php/em/article/view/7>
- Guerineau, S., & Jacolin, L. (2014). L'inclusion financière en Afrique sub-saharienne : faits stylisés et déterminants. *Revue d'économie financière*, 116(4), 57–80.
- Herwartz, H., & Walle, Y. M. (2014). Determinants of the link between financial and economic development: Evidence from a functional coefficient model. *Economic Modelling*, 37, 417–427. <https://doi.org/10.1016/j.econmod.2013.11.029>
- International Labour Organization (ILO). (2018). *World Employment and Social Outlook: Trends 2018*. Geneva, Switzerland: International Labour Office.
- Jalilian, H., & Kirkpatrick, C. (2005). Does Financial Development Contribute to Poverty Reduction? *The Journal of Development Studies*, 41(4), 636–656. <https://doi.org/10.1080/00220380500092754>
- Jappelli, T., & Pagano, M. (2002). Information Sharing, Lending and Defaults: Cross-Country Evidence. *Journal of Banking & Finance*, 26(10), 2017–2045. [https://doi.org/10.1016/S0378-4266\(01\)00185-6](https://doi.org/10.1016/S0378-4266(01)00185-6)
- Jayachandran, S. (2006). Selling Labor Low: Wage Responses to Productivity Shocks in Developing Countries. *Journal of Political Economy*, 114(3), 538–575.
- Jeanneney, S. G., & Kpodar, K. (2011). Financial Development and Poverty Reduction: Can There be a Benefit without a Cost? *Journal of Development Studies*, 47(1), 143–163. <https://doi.org/10.1080/00220388.2010.506918>
- Kapsos, S., & Bourmpoula, E. (2013). Employment and Economic Class in the Developing World. *ILO Research Paper No. 6*. Retrieved from http://www.ilo.org/wcmsp5/groups/public/---dgreports/---inst/documents/publication/wcms_216451.pdf
- King, R., & Rebelo, S. (1999). *Resuscitating Real Business Cycles* (No. Working Paper 7534). National Bureau of Economic Research. Retrieved from <http://www.nber.org/papers/w7534.pdf>

- Kleibergen, F., & Paap, R. (2006). Generalized Reduced Rank Tests using the Singular Value Decomposition. *Journal of Econometrics*, 133(1), 97–126. <https://doi.org/10.1016/j.jeconom.2005.02.011>
- Mallick, S. K. (2014). Disentangling the Poverty Effects of Sectoral Output, Prices, and Policies in India. *Review of Income and Wealth*, 60(4), 773–801. <https://doi.org/10.1111/roiw.12026>
- Martinez Peria, M., & Singh, S. (2014). *The impact of Credit Information Sharing Reforms on Firm Financing?* (Policy Research Working Paper Series No. 7013). Washington DC, USA: The World Bank. Retrieved from <https://EconPapers.repec.org/RePEc:wbk:wbrwps:7013>
- Mookerjee, R., & Kalipioni, P. (2010). Availability of Financial Services and Income Inequality: The Evidence from Many Countries. *Emerging Markets Review*, 11(4), 404–408. <https://doi.org/10.1016/j.ememar.2010.07.001>
- Mundaca, B. G. (2009). Remittances, Financial Market Development, and Economic Growth: The Case of Latin America and the Caribbean. *Review of Development Economics*, 13(2), 288–303. <https://doi.org/10.1111/j.1467-9361.2008.00487.x>
- Ravallion, M., & Chen, S. (1997). What Can New Survey Data Tell Us about Recent Changes in Distribution and Poverty? *The World Bank Economic Review*, 11(2), 357–382. <https://doi.org/10.1093/wber/11.2.357>
- Ravallion, M., & Datt, G. (2002). Why Has Economic Growth Been More Pro-Poor in Some States of India Than Others? *Journal of Development Economics*, 68(2), 381–400. [https://doi.org/10.1016/S0304-3878\(02\)00018-4](https://doi.org/10.1016/S0304-3878(02)00018-4)
- Rewilak, J. (2013). Finance Is Good for the Poor but It Depends Where You Live. *Journal of Banking & Finance*, 37(5), 1451–1459. <https://doi.org/10.1016/j.jbankfin.2012.04.022>
- Semykina, A., & Wooldridge, J. M. (2010). Estimating Panel Data Models in the Presence of Endogeneity and Selection. *Journal of Econometrics*, 157(2), 375–380. <https://doi.org/10.1016/j.jeconom.2010.03.039>
- Sharif, M. (1991a). Landholdings, Living Standards, and Labour Supply Functions: Evidence from a Poor Agrarian Economy. *Journal of Development Studies*, 27(2), 256.
- Sharif, M. (1991b). Poverty and the Forward-Falling Labor Supply Function: A Microeconomic Analysis. *World Development*, 19(8), 1075–1093. [https://doi.org/10.1016/0305-750X\(91\)90126-3](https://doi.org/10.1016/0305-750X(91)90126-3)
- Solt, F. (2014). The Standardized World Income Inequality Database. *Working Paper SWIID Version 5.0*. Retrieved from <http://myweb.uiowa.edu/fsolt/papers/Solt2014.pdf>

- Staiger, D., & Stock, J. H. (1997). Instrumental Variables Regression with Weak Instruments. *Econometrica*, 65(3), 557–586. <https://doi.org/10.2307/2171753>
- Stock, J. H., & Yogo, M. (2005). Testing for Weak Instruments in Linear IV Regression. In *Identification and Inference for Econometric Models: Essays in Honor of Thomas Rothenberg* (In D. Andrews & J. Stock (Eds.), pp. 80–108). Cambridge: Cambridge University Press.
- Uddin, G. S., Shahbaz, M., Arouri, M., & Teulon, F. (2014). Financial Development and Poverty Reduction Nexus: a Cointegration and Causality Analysis in Bangladesh. *Economic Modelling*, 36, 405–412. <https://doi.org/10.1016/j.econmod.2013.09.049>
- Verbeek, M., & Nijman, T. (1992). Testing for Selectivity Bias in Panel Data Models. *International Economic Review*, 33(3), 681–703. <https://doi.org/10.2307/2527133>
- Yamada, G. (2008). A Downward-Sloping Labor Supply Curve: The Case of Peru. *Review of Development Economics*, 12(4), 737–750.
- Yilmazkuday, H. (2011). Thresholds in the Finance-Growth Nexus: A Cross-Country Analysis. *The World Bank Economic Review*, 25(2), 278–295. <https://doi.org/10.1093/wber/lhr011>
- Young, A. (2018). Consistency without Inference : Instrumental Variables in Practical Application. Working Paper, The London School of Economics and Political Science, London, UK.

Appendices

Appendix 1. List of countries

Albania; Argentina; Armenia; Azerbaijan; Bangladesh; Belarus; Bhutan; Bolivia; Brazil; Cambodia; Central African Republic; Chile; Colombia; Costa Rica; Dominican Republic; Ecuador; Egypt, Arab Rep.; El Salvador; Georgia; Guatemala; Honduras; India; Indonesia; Iran, Islamic Rep.; Jordan; Kazakhstan; Kyrgyz Republic; Macedonia, FYR; Madagascar; Malawi; Malaysia; Maldives; Mali; Mexico; Moldova; Mongolia; Montenegro; Namibia; Nicaragua; Niger; Nigeria; Pakistan; Panama; Paraguay; Peru; Philippines; Russian Federation; Rwanda; Senegal; Serbia; South Africa; Sri Lanka; Tajikistan; Thailand; Togo; Tunisia; Turkey; Uganda; Ukraine; Uruguay; Venezuela, RB; Vietnam; Zambia.

Appendix 2. First-stage regression results for **Table 3**

Corresponding column in Table 3	(1)	(2)	(3)		(4)		(5)		(6)	
	Log (Bank branches)	Log (Bank branches)	Log (Bank branches)	Volatility x Bank branches	Log (Bank branches)	Bank branches x SSA-region	Log (Bank branches)	Bank branches x LAC-region	Log (Bank branches)	Bank branches x Asia
GDP volatility		-0.020** (0.007)	0.002 (0.008)	2.049*** (0.088)	-0.020** (0.007)	-0.005*** (0.001)	-0.020** (0.007)	-0.008* (0.004)	-0.020** (0.007)	-0.005** (0.002)
Log (GDP per capita)	0.860*** (0.054)	0.720*** (0.068)	0.802*** (0.121)	4.578*** (0.419)	0.717*** (0.082)	-0.039* (0.020)	0.760*** (0.066)	0.523*** (0.077)	0.763*** (0.062)	0.212*** (0.023)
Trade openness	0.488** (0.193)	0.554*** (0.157)	0.532*** (0.146)	1.529** (0.489)	0.498** (0.174)	0.022* (0.011)	0.561*** (0.162)	0.482*** (0.105)	0.558*** (0.162)	0.078** (0.026)
FDI-to-GDP	0.005 (0.003)	0.004* (0.002)	0.003 (0.003)	0.015 (0.013)	0.003 (0.002)	0.002* (0.001)	0.004* (0.002)	0.001 (0.002)	0.004* (0.002)	-0.003** (0.001)
Gini index	-0.015** (0.005)	-0.016*** (0.005)	-0.024*** (0.007)	-0.005 (0.018)	-0.018** (0.006)	0.016*** (0.002)	-0.015*** (0.004)	-0.033*** (0.004)	-0.016*** (0.005)	0.009*** (0.002)
Private credit bureau	0.022*** (0.005)	0.024*** (0.006)	0.025*** (0.005)	0.020 (0.042)	0.017*** (0.004)	-0.003* (0.001)	0.018*** (0.006)	-0.032*** (0.005)	0.029*** (0.008)	-0.010*** (0.001)
Public credit registry	0.025*** (0.006)	0.028*** (0.006)	0.028*** (0.005)	0.081*** (0.022)	0.030*** (0.006)	0.018*** (0.003)	0.025*** (0.007)	0.014* (0.006)	0.025*** (0.007)	0.010*** (0.001)
Private credit bureau x Volatility			-0.004*** (0.001)	-0.010*** (0.002)						
Public credit registry x Volatility			0.001 (0.001)	0.015*** (0.001)						
Private credit bureau x SSA					0.092*** (0.023)	0.158*** (0.016)				
Private credit bureau x LAC							0.012** (0.005)	0.068*** (0.004)		
Private credit bureau x Asia									-0.016** (0.006)	0.055*** (0.004)

Observations	294	294	294	294	294	294	294	294	294	294
No. of countries	63.000	63.000	63.000	63.000	63.000	63.000	63.000	63.000	63.000	63.000
R-squared	0.266	0.273	0.290	0.847	0.285	0.409	0.274	0.279	0.274	0.493

Note: Robust standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Appendix 3. First-stage regression results for **Table 4** on robustness check, additional control variables

Corresponding column in Table 4	(1)		(2)		(3)		(4)	
	Log(Bank branches)	Volatility x Bank branches						
GDP volatility	0.002 (0.008)	2.046*** (0.087)	0.019* (0.010)	2.174*** (0.062)	0.021 (0.014)	2.222*** (0.088)	0.023 (0.015)	2.243*** (0.077)
Log(GDP per capita)	0.795*** (0.114)	4.455*** (0.396)	0.039 (0.143)	-1.134* (0.525)	0.197 (0.143)	-0.410 (0.323)	0.084 (0.177)	-0.431 (0.468)
Trade openness	0.532*** (0.150)	1.528** (0.501)	0.594*** (0.110)	1.989*** (0.260)	0.635*** (0.137)	1.916*** (0.405)	0.647*** (0.129)	2.090*** (0.382)
FDI-to-GDP	0.003 (0.003)	0.019 (0.013)	0.001 (0.003)	0.005 (0.015)	-0.000 (0.002)	0.006 (0.016)	-0.000 (0.003)	-0.001 (0.017)
GINI index	-0.025*** (0.006)	-0.010 (0.016)	-0.028*** (0.007)	-0.039** (0.013)	-0.042*** (0.007)	-0.035** (0.014)	-0.036*** (0.008)	-0.003 (0.013)
ILO dummy	-0.039 (0.027)	-0.386*** (0.064)	-0.002 (0.026)	-0.100 (0.061)	0.034 (0.025)	-0.015 (0.068)	0.028 (0.026)	-0.020 (0.074)
D.Rule of Law Estimate	0.044 (0.083)	-0.697** (0.240)	-0.012 (0.083)	-1.192*** (0.254)	0.111 (0.089)	0.034 (0.227)	-0.015 (0.100)	-0.625** (0.262)
Private credit bureau	0.026*** (0.005)	0.030 (0.043)	0.019*** (0.004)	-0.023 (0.039)	0.011** (0.005)	-0.032 (0.034)	0.015** (0.005)	-0.007 (0.035)
Public credit registry	0.028*** (0.005)	0.080*** (0.021)	0.018*** (0.005)	0.001 (0.017)	0.005 (0.003)	-0.051* (0.024)	0.013** (0.004)	-0.041* (0.020)
Private credit bureau x Volatility	-0.004*** (0.001)	-0.011*** (0.002)	-0.005*** (0.001)	-0.018*** (0.002)	-0.005*** (0.001)	-0.014*** (0.002)	-0.005*** (0.001)	-0.014*** (0.002)
Public credit registry x Volatility	0.001 (0.001)	0.016*** (0.001)	0.001 (0.001)	0.014*** (0.001)	0.001 (0.001)	0.012*** (0.001)	0.001 (0.001)	0.011*** (0.001)
L.Mobile phone subscription(log)			0.158*** (0.015)	1.193*** (0.082)	0.197*** (0.020)	1.172*** (0.090)	0.183*** (0.016)	1.216*** (0.086)
L2.Private credit ratio to GDP(log)					-0.067* (0.032)	0.166 (0.122)		
L2.log (Bank concentration(%))					0.210*** (0.038)	-0.071 (0.397)	0.170*** (0.042)	-0.375 (0.402)

Observations	294	294	293	293	269	269	279	279
Number of groups	63	63	63	63	54	54	57	57
R-Squared	0.291	0.848	0.331	0.876	0.344	0.877	0.343	0.871

Robust standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Appendix 4. First-stage regression results for Table 6

Corresponding column in Table 6	(1)	(2)	(3)	(3)	(4)	(4)
	Log(ATMs per 1,000 km ²)	Log(Bank branches per 1,000 km ²)	Log(Bank branches)	Log(ATMs per 100,000 adults)	Log(Bank branches per 1,000 km ²)	Log(Bank branches)
Log (GDP per capita)	4.328*** (0.372)	0.761*** (0.091)	0.758*** (0.065)	4.140*** (0.372)	0.202 (0.192)	0.276 (0.187)
Trade openness	0.550 (0.361)	0.211 (0.147)	0.594* (0.264)	0.439 (0.318)	-0.075 (0.247)	0.396 (0.496)
FDI-to-GDP	-0.003 (0.003)	0.004** (0.001)	-0.002 (0.004)	-0.005* (0.003)	-0.002 (0.002)	-0.005 (0.005)
GINI index	0.005 (0.010)	0.018** (0.006)	-0.026*** (0.006)	0.003 (0.010)	-0.010 (0.008)	-0.051*** (0.010)
Private credit bureau	0.069*** (0.013)	0.040*** (0.004)	0.017*** (0.004)	0.071*** (0.015)	0.016** (0.005)	-0.039*** (0.005)
Public credit registry	-0.018 (0.021)	0.018*** (0.006)	0.028*** (0.007)	-0.026 (0.023)	0.034*** (0.007)	0.084*** (0.016)
Log (Paved roads)					0.191 (0.156)	0.084 (0.153)
Observations	272	288	258	258	127	110
Number of groups	55	61	54	54	29	26
R-Squared	0.688	0.292	0.259	0.679	0.182	0.240

Note: Robust standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. CBs and CRs are used as instruments for both bank branches and ATMs indicators.

Appendix 5. First-stage regression results for Table 8

Corresponding column in Table 8	(1)	(2)		(3)		(4)	(5)	
	Log(Bank branches)	Log(Bank branches)	Volatility x Bank branches	Log(Bank branches)	Volatility x Bank branches	Log(Bank branches)	Log(Bank branches)	Volatility x Bank branches
GDP volatility	-0.020** (0.007)	0.003 (0.008)	2.046*** (0.086)	0.002 (0.008)	2.049*** (0.088)		-0.017*** (0.005)	1.939*** (0.107)
Log (share of middle class and above)		0.031 (0.036)	-0.138 (0.240)					
Log (GDP per capita)	0.745*** (0.066)	0.767*** (0.146)	4.733*** (0.495)	0.802*** (0.121)	4.578*** (0.419)			
Trade openness	0.526*** (0.154)	0.534*** (0.145)	1.519** (0.493)	0.532*** (0.146)	1.529** (0.489)	0.112*** (0.030)	0.619*** (0.138)	2.025*** (0.428)
FDI-to-GDP	0.007*** (0.001)	0.003 (0.003)	0.015 (0.013)	0.003 (0.003)	0.015 (0.013)	0.000 (0.000)	0.004** (0.002)	0.018 (0.011)
GINI index	-0.016*** (0.005)	-0.024*** (0.007)	-0.005 (0.019)	-0.024*** (0.007)	-0.005 (0.018)	0.000 (0.001)	-0.025*** (0.008)	-0.009 (0.015)
Private credit bureau	0.024*** (0.006)	0.026*** (0.006)	0.017 (0.040)	0.025*** (0.005)	0.020 (0.042)	0.007*** (0.001)	0.038*** (0.004)	0.096** (0.034)
Public credit registry	0.026*** (0.006)	0.027*** (0.006)	0.086*** (0.018)	0.028*** (0.005)	0.081*** (0.022)	0.033*** (0.002)	0.047*** (0.009)	0.190*** (0.029)
Private credit bureau x Volatility		-0.004*** (0.001)	-0.010*** (0.003)	-0.004*** (0.001)	-0.010*** (0.002)		-0.003*** (0.001)	-0.008* (0.003)
Public credit registry x Volatility		0.001 (0.001)	0.015*** (0.001)	0.001 (0.001)	0.015*** (0.001)		0.001 (0.001)	0.017*** (0.002)
Ln(investments) -- PWT 7.1						0.275*** (0.029)		
Human capital index						0.911*** (0.112)		
Fertility rate						-0.628*** (0.042)		
Observations	297	294	294	294	294	684	294	294
Number of groups	63.000	63	63	63	63	111	63	63
R-Squared	0.276	0.290	0.847	0.290	0.847	0.359	0.267	0.838

Note: Robust standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Appendix 6. Testing for attrition bias in the sample

	(1)	(2)
Dependent variable: working poverty	OLS-FE	IV-FE
Log (Bank branches)	-0.214*** (0.052)	-0.356* (0.177)
Selection indicator (lagged value)	-0.017 (0.135)	-0.036 (0.025)
Selection indicator (forward value)	-0.074 (0.100)	-0.068 (0.063)
Observations	314	290
Number of groups	87	63
Joint significance test of selection variables, P-value	0.6580	0.1299

Notes: Robust standard errors in parentheses. The models estimated in columns 1 and 2 include the full set of control variables. In column 2, the number of bank branches per 100,000 adults is instrumented by the existence of private credit bureau and/or public credit registry. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

The procedure (Semykina & Wooldridge, 2010; Verbeek & Nijman, 1992) consists of adding time-varying functions of selection indicators as explanatory variables and obtaining simple t or joint Wald tests. If we call $S_{i,t}$ the indicator of selection, which takes 1 when the dependent variable is observed at each year t and 0 otherwise, we can add $S_{i,t-1}$ and $S_{i,t+1}$ in the model for the working poor and test their joint significance. Under the null hypothesis of no attrition bias, the coefficients of these variables (ρ_1 and ρ_2) should not be statistically different from zero. More formally, the equation to be estimated is:

$$wp_{i,t} = \rho_1 S_{i,t-1} + \rho_2 S_{i,t+1} + \beta_1 fin_{i,t} + X'_{i,t} \delta + \alpha_i + \varepsilon_{i,t}$$

Regardless of the specifications, the coefficients associated with the lagged and forward 'selection' dummy variables are not individually or jointly significant.