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Can Microfinance Help to Reduce Poverty? A Review of Evidence for Developing Countries

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Abstract The main objective of this paper is to study the effects of microfinance on poverty reduction in developing countries, using cross-sectional and panel data. We show that a country with higher microfinance institution (MFI) gross loan portfolio per capita tends to have lower levels of poverty headcount ratio and higher level of expenditure of consumption per capita, confirming the role of microfinance in poverty reduction at the macro level. We show also that microfinance loans per capita are negatively associated with poverty gap (which measures the depth of poverty) and squared poverty gap (which measures the severity of poverty), implying that MFIs benefit not just the poor but also the poorest.

Keywords Microfinance · Gross loan portfolio · Poverty · Macro level

JEL classifications C21 · I30 · I38 · O16

Introduction

During the past few decades, microfinance has enjoyed tremendous growth generally targeting the very low income groups or households. During

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December 2000–2011, the number of microfinance institutions increased from 220 to 1389. It became one of the major development programs in the world, in terms of both the number of people targeted and the financial input that it receives (Rooyen et al., 2012). The industry has obtained a universal avowal as a potential in reducing poverty in many developing countries (Armendariz and Morduch, 2005; Bakhtiari, 2011; Gibbons and Meehan, 2002, Johnson and Rogaly, 1997; Imai et al. 2010), and a vital, dynamic mechanism toward attaining the millennium target of reducing poverty and hunger by 2015.

Based on this close relationship between microfinance and poverty, several studies have postulated a positive correlate between microfinance and consumption expenditure, especially if loans are taken by women (Pitt and Khandker 1998; Khandker 2005). Indeed, microfinance financial services provide a range of financial products and substantial flow of finance, often to very low income groups or households, who would normally be excluded by conventional financial institutions (Kurmanalieva, Montgomery and Weiss, 2003). Microfinance has brought positive impact to the life of clients and boosts the ability of poor individuals to improve their conditions, and others have indicated that poor people have taken advantage of increased earnings to improve their consumption level and health and build assets (Appah.Eb et al. 2012). Today, microfinance is increasingly becoming an important investment opportunity, mainly in developing regions and all major international institutions. Indeed, dominant organizations like the European Union, the United Nations, the World Bank, the Asian Bank, and the American Development Bank dedicates funding and research to microfinance.

Khandker (2005) and Mosley (2001) pointed to a potential bias arising in the impact of microfinance in these studies. In view of this, studies that have recently emerged have used one of the following three approaches: (i) examining the impact of microfinance on poverty (Hulme and Mosley, 1996; Pitt and Khandker, 1998; Copestake and James, 2002; Khandker, 2005; Tedeschi, 2010), (ii) studying the impact of microfinance on women's empowerment (Hashemi et al. 1996; Steele et al, 1998; Rahman et al. 2009; Garikipati, 2012), and (iii) highlighting on other effects of microfinance, such as the impact on education, health, nutrition, consumption level, and building assets (Deloach and Lamanna, 2011; Gertler et al, 2006; Jacobsen, 2009; Kouassi, 2008; Leatherman and Dunford, 2010). However, most of the evidence of the impact of microfinance interventions around the world remains highly controversial and limited on micro-economic foundations (household or business data).

This study set out to establish the relationship between microfinance and poverty (incidence, depth and severity) and provides some new empirical evidence on the poverty-reducing effects of microfinance institutions using the cross-country and panel data. Our objective is to further examine the hypothesis that a country with higher microfinance institution (MFI) gross loan portfolio per capita tends to have lower levels of FGT class of poverty indices and higher

level of expenditure of consumption per capita. It is notable that microfinance loans per capita are negatively associated with not only the poverty headcount ratio but also with the poverty gap (which measures the depth of poverty) and squared poverty gap (which measures the severity of poverty), implying that even the poorest benefit from them.

The rest of the paper will be organized as follows: the next section presents a literature review on microfinance, especially its impact on poverty at the macro level. The third section presents the Econometric Framework and describes the Data Source, Definitions of Variables, and Empirical Results. The last section describes the Conclusion and Political Implications.

Literature Review

The existing literature on the microfinance at the macro level can be broadly divided into two groups. The first group aims to found the factors determining the successful performance of an MFI in terms of financial sustainability and outreach to clients (e.g., Ahlin and Lin, 2006; Gonzalez, 2007; Vanroose, 2008; Vanroose and D'Espallier, 2009; Ahlin et al., 2011). Their studies show the importance of the macroeconomic environment in which the MFIs are situated, which incorporate economic growth, price stability, and the degree of financial development from a macro perspective.

The second group of studies analyzes how microfinance institutions affect the well-being of the poor. The research from a macro perspective is most closely related to the present analysis.

Due to the scarcity of reliable macro data on microfinance, macro-perspective studies of the impact of microfinance on poverty are rather limited. However, there are a few recent works that examine the relationship between microfinance and poverty at the macro level such as Ahlin, Lin, and Maio (2011) and Ahlin and Lin (2006).They concluded that microfinance is a powerful tool against poverty. These studies redirect on macro-economic studies given the mixed results of the impact studies of microfinance at the micro level. They showed that the number of poor people is inferior in countries where the number of microfinance institutions is higher compared with countries where the number of MFIs is lower (Imai et al, 2010). This acts as a catalyst for development economists to conduct thorough empirical studies to determine the impact of microfinance (Imai et al, 2012).

Kai and Hamori (2009) analyze the impact of microfinance intensity on income inequality using cross-sectional data on 61 developing countries. They measure the degree of microfinance intensity by both the number of MFIs and the number of borrowers from MFIs. They find that microfinance intensity has a significant negative relationship with income inequality.

Imai et al. (2010) examine the poverty-reducing effect of microfinance using cross-sectional data for 99 developing countries in 2007. In their empirical models, the poverty headcount ratio is explained in terms of an MFI's gross loan portfolio and

control variables, such as real GDP, GDP deflator, and regional dummies. They find that the gross loan portfolio of microfinance has a statistically significant negative relationship with poverty incidence

Takeshi Inoue et al (2013) propose a concept termed herein financial permeation as a proxy for microfinance, to describe how expanding financial activity affects low-income households. Using unbalanced, annual panel data for76 developing countries from the period 1995 to 2008, they concluded that financial permeation has a statistically significant and robust effect on reducing the poverty ratio.

This research differs from the cited studies in the following three ways. First, we use the FGT class of poverty indices as the dependent variable. The Foster–Greer–Thorbecke (FGT) class of poverty indices is a generalized measure of poverty in an economy. It is denoted as $P_\alpha = \frac{1}{N}\sum_{i=1}^{q}\left(\frac{\cdot\cdot z - yi}{z}\right)\alpha$, where z is the poverty line, y_i design the lowest income, N is the population in the economy, q represents the number of people whose income is below z, and α is a measure of poverty aversion where a larger α gives greater emphasis to the poorest of the poor (Foster, Greer, & Thorbecke 1984). This comprises the headcount ratio when $\alpha = 0$ (the fraction of the population which lives below the poverty line), the average income poverty gap when $\alpha = 1$ (the population average of the distances between poor people's income and the poverty line or the extent to which a poor falls below the poverty line on average), and the squared poverty gap index when $\alpha = 2$.

Second, we use expenditure of consumption as the fourth dependent variable. A number of studies have shown that consumption expenditure for the poor is usually more stable than income (see Woolard & Leibbrandt 1999). For this reason, we will also use, in our study, consumption per capita as a proxy to measure poverty (see also Quartey 2005; Odhiambo 2009). The present study focuses on all four poverty indices as a proxy for poverty.

Finally, we use panel data on 57 developing countries for 1132 microfinance institutions which has the advantage of incorporating individual dimension by a two-period (2005 and 2011)[1] and apply the instrumental variable estimation in order to overcome potential endogeneity in the equation. We, therefore, considered appropriate to conduct our study on this topic and try to answer the following question: (i) Can microfinance reduce poverty in the developing countries? (ii) Can it provide an important and sustainable financial service to the poorest in large scale? To resolve this issue, we present our adopted model in the next section.

Econometric Framework

This estimation method is based on the principle of application of ordinary least squares (OLS) and of instrumental variable (IV) or least squares in two stages (2SLS), to estimate the effect of gross loan portfolio per capita of microfinance

[1] Poverty data for the panel were constructed by taking averages for 2000–2005 and 2006–2011

institutions on poverty. 2SLS involves two stages: Gross loan portfolio per capita of MFIs is estimated by instrumental variable, and other covariates in the first stage and in the second poverty are estimated by the predicted gross loan portfolio per capita and other covariates, a technique for solving endogeneity problems associated with the bi-causal relationship between gross loan portfolio per capita and poverty levels in a country. This reverse causality from poverty to gross loan portfolio per capita may arise, for example, if poverty-oriented development partners and governments provide more funds to MFIs located in poorer countries (Imai et al, 2012). However, treatment with the STATA 12 allows a resolution using the methods "OLS" and "2SLS." In order to do so, a series of econometric analyses will be conducted on the usual set of equations and variables in the model estimated.

The empirical analysis includes the following items: the measure of the logarithms of gross loan portfolio, the measure of openness, inflation rate, the logarithms of gross domestic product per capita (at 2000 constant USD prices), domestic credit of banks as a proportion of GDP, enforcing contracts, the weighted 6-year average lag of gross loan portfolio, and the regional dummy.

We use the following two types of models for empirical analysis:

$$\mathrm{Pv_i} = \alpha_0 + \alpha_1 \mathrm{GLF_i} + \beta \mathrm{Xi} + \mu_i \tag{1}$$

$$\mathrm{GLF_i} = \beta_0 + \beta_1 \mathrm{CE_i} + \beta_2 \mathrm{Ln6LaGLF_i} + \beta_3 \mathrm{Y_i} + \Omega_i \tag{2}$$

where

Pv_i is the poverty headcount ratio (or poverty gap, squared poverty gap, and expenditure of consumption per capita), *GLF*" represents gross loan portfolio, X_i is a vector of control variables in country *i*, and u_i is the error term in country *i*. As control variables, we use the measure of international openness (opness1; opness2), the inflation rate (INF_i), the logarithms of per capita income ($LGDP_i$ at 2000 constant USD prices), the domestic credit of banks as a proportion of GDP (*DC*), and the Latin America and Caribbean dummy variable (*REG*) being the reference region.

We, thus, empirically analyze how a change in gross loan portfolio MFIs affects the poverty ratio. In order to address the problem of endogeneity, we use the instrumental variable method to estimate each parameter.

Equation (2) is the reduced form which tests the presence of endogeneity and suitability of our instruments. We use enforcing contracts at the country level (CE) and the weighted 6-year average lag of gross loan portfolio, which is weighted by the number of MFIs for each country (Ln6LaGLF) and *Y* is the vector of all the other explanatory variables considered in Eq. (1). Error terms for the two equations are denoted by "*u*" and "Ω."

Data Source, Definitions of Variables, and Empirical Results

Data Source

The present study analyzes the role of microfinance (gross loan portfolio per capita) to poverty reduction at macro level, using cross-sectional data covering 596 microfinance institutions in 40 developing countries for 2011. The cross-sectional data are supplemented by a two-period (2000–2005 and 2006–2011) [1] panel data of 57 developing countries in 1132 microfinance institutions with high levels of informational transparency, so we focused exclusively on those 3–5 diamond levels, which is the highest level of disclosure to its outreach, impact and financial data, audited financial statements, and ratings/evaluations.

This is based on the data generated by the Microfinance Information Exchange (2011) or MIX and the World Development Indicators 2011. These poverty estimates are based on the poverty line of US$1.25 (based on Purchasing Power Parity, PPP) per day in 2005.

Definitions of Variables

Explained Variable

Poverty Several indicators for measuring poverty have been proposed in the literature. In our study, we use the poverty head count ratio (the poverty line of US$1.25 per day in 2005), poverty gap (which measures the depth of poverty), squared poverty gap (which measures the severity of poverty), and the expenditure of consumption per capita (pov) as a proxy to measure poverty. We obtained data from the World Development Indicators (WDIs) of the World Bank.

Explanatory Variables

Gross loan portfolio (GLF; divided by the total population) as a proxy to measuring microfinance intensity in a country given that it measures actual funds disbursed to households. This is the most important explanatory variable in this study

Degree of International Openness Defined as the sum of exports and imports as a share of GDP (opness1), and the ratio of foreign direct investment (FDI) to GDP (opness2), it is introduced into the model to capture the degree of international openness. These data were obtained from the world development indicators (WDIs).

Inflation (inf) This is the variable that represents macroeconomic policy. Inflation is a factor worsening poverty because it has a negative impact on the real value of assets and the purchasing power of household incomes (Kpodar, 2006). It is measured by inflation consumer prices available in CD-ROM of World Bank.

Domestic Credit (DC) The ratio of domestic credit provided by banking sector relative to GDP. We expect a positive and significant relationship between the indicator of financial development and the level of expenditure per capita consumption and inverse relationship between poverty head count ratio and GDP per capita.

Latin America and Caribbean Dummy We also include a dummy variable for the Latin America and Caribbean region "DM" which is equal to 1 if a country belongs to this region and 0 otherwise. This region is considered to comprise countries with lower poverty rates in the developing regions for 2011.

Empirical Results

The main objective of this study is to evaluate the contribution of microfinance to poverty reduction, using cross-sectional data covering 596 microfinance institutions (MFIs) for 2011. The cross-sectional data are supplemented by a two-period (2005 and 2011) panel data of 1132 microfinance institutions in 57 developing countries. The estimation results are shown in Tables 2–9.

Table 1 displays a summary statistic of the variables used in the regression analyses. We report the median and the mean of each variable for the regions concerned. Numbers of microfinance institution in East Asia and Pacific countries are more intense than in the other regions. On the other hand, microfinance activities in Sub-Saharan African (SSA) countries tend to show the lowest values for the gross loan portfolio (as a proxy for MFI operations).

In terms of the macro indicators, SSA is the poorest region in the two periods irrespective of the measure (poverty headcount) in question. However, East Asia and the pacific tend to show the lowest values for expenditure of consumption. Over the period 2005–2011, the poverty headcount showed a decline in all regions. Besides, Middle East and North Africa (MENA) recorded the lowest poverty headcount ratio and the highest domestic credit while Latin America and the Caribbean countries showed the greatest output per head (GDPPC).

Tables 2, 3 4, 5, 6, 7, 8 and 9 indicate the empirical results of FGT class of poverty indices (poverty head count ratio, poverty gap, and squared poverty gap) and expenditure of consumption, respectively, using cross-sectional data for 2011 in Tables 2, 4, 6, and 8. The other two cases are given in Tables 3, 5, 7, and 9 using two-period (2005 and 2011) panel data with a view to examine the hypothesis of a relationship between gross loan portfolio per capita and poverty. Thus, Tables 2 and 3 contain all the

estimations (OLS, IV, fixed effects (FE), and random effects (RE)) for the poverty headcount ratio; Tables 4 and 5 examine the case for poverty gap; Tables 6 and 7 analyze the case for squared poverty gap and Tables 8 and 9 examine the case for expenditure of consumption (as a proxy for poverty).

In columns (1) and (2) of Tables 2, 4, and 6, all specifications using the cross-sectional and panel data show that GLP per capita is negatively and significantly associated with a FGT class of poverty indices, and positively and significantly associated with the expenditure of consumption. In fact, the coefficient estimation of log of gross loan portfolio per capita of MFI is negative and significant at the 1 % level with the FGT class of poverty indices in column (1) and (3) of Tables 2, 3, 5, and 7 and positively and significantly associated with the expenditure of consumption in columns (1) and (2) of Tables 8 and 9, in some cases, of the instrumental variable (IV) estimation (in columns (3) and (4) of Table 8). This is consistent with our hypothesis that microloans reduce poverty.

Columns (3) and (4) present the IV estimation with the aim of resolving the potential endogeneity of microfinance variables in the poverty equation, that is, gross loan portfolio per capita.

With regard to the control variables, GDP per capita is statistically significant in almost all estimations. This result is consistent with the results of Dollar and Kraay (2000), in which high levels of growth rates are associated with low levels of poverty rate, which confirms the theoretical predictions providing the leading role of economic growth in reduction poverty. Furthermore, as the finance-poverty literature indicates, we find that the coefficient estimate of share of domestic credit to GDP is significant in some cases (columns (1) and (3) of Tables 2, 4, and 6.

As expected in literature, the coefficients of international openness (opness 2) are statistical significance in most result sets of our estimate, but they are statistically insignificant for the trade to GDP ratio (opness1). Although Hamori and Hashiguchi (2012) report that an increase in openness leads to an increase in inequality, our empirical results indicate that such a rise may not lead to a change in the poverty ratio (Takeshi and Hamori, 2013). Furthermore, we examine the effects of inflation on the poverty ratio; the coefficient of the inflation rate (INF) is statistically significant at the 10 % level in four cases (in column (2) for Table 3, column (4) for Table 4, column (1) for Table 9, and column (3) for Table 8). This result is consistent with the results of Takeshi Inoue and Shigeyuki Hamori (2013). Thus, an increase in the inflation rate may increase and, at the same time, worsen the poverty ratio.

Columns (2) and (4) explored the potential impact of regional dummies variables on the incidence of poverty. We observe that the gross loan portfolio of microfinance institutions per capita and GDP remain statistically significant after inclusion of regional dummies variables. The inclusion of regional dummy variables in the equation of poverty also revealed that Middle East and North Africa (MENA), with Latin America and Caribbean (Lac) as the reference case, have a negative and significant coefficient (at the 1 % as in the case of OLS and IV). Also, the Sub-Saharan Africa (SSA) coefficient is statistically significant in the OLS estimation in the three Tables (2, 4, and 7). This implies that Sub-Saharan Africa has the highest level of poor population, compared to Latin

America and Caribbean region. These regression results are consistent with the descriptive statistics in Table 1, wherein the levels of poverty and per capita GDP show that Sub-Saharan Africa has a higher level of poverty and lowers GDP per capita.

As discussed earlier, the endogeneity may be due to a bi-causal relationship between poverty and gross loan portfolio per capita (Imai et al 2012). In our study, we analyze the validity of our instruments using two robust tests for identification such as: weak-identification and under-identification tests (Kleibergen and Paap, 2006) as shown in columns (3) and (4) of Table 2. This does not compromise the Sagan's over-identification test as we fail to reject the null hypothesis that the instruments are valid, that is, uncorrelated with the error term.

Tables 10 and 11 show the first stage IV estimation which offers a justification for the validity of our instruments and the list of regions and countries. We use two kinds of instrument, that is, the cost of enforcing contracts and weighted 6-year lag of average GLP.

In summary, it is clear from all estimation that microfinance institutions improve the poverty ratio. This hypothesis is further corroborated by the pooled OLS and random effects model in columns (1) and (3) of Table 3, 5, 7, and 9.

Discussion

The finding of this study confirms the role of microfinance in poverty reduction at the macro level. Thus, an increase in the degree of gross loan portfolio per capita significantly reduces, and therefore improves, the poverty ratio. This result is somewhat logical since, according to the economic literature on the subject, informal financial sector, especially small-scale non-collateral loans, affects standards of living for low-income households. These results imply the potential of microfinance in reducing poverty at macro-level and, thus, reinforce the case for channeling funds from development finance institutions and governments of developing countries into microfinance institutions. Consequently, our empirical study is compatible with the theoretical approach at macro-level, since it considers that microfinance improves the general welfare of poor people in developing countries (Imai et al., 2010, 2012), Inoue et al (2013) and Kamel Bel Hadj miled and Ben Rejeb Jaleleddine (2014)

We believe that the differences recorded in terms of the impact of microfinance on poverty or income between different regions may be mainly due to two reasons; first, we think that it can be explained by the differences in the degree of financial development and economic growth, which are influenced by other factors, such as the legislative tradition of the country (according to the theory of law and finance); the nature of political systems, available in an economy; and other factors specific to each country. Second, the weak economic scale in Sub-Saharan Africa (SSA) region may also explain their instability. Indeed, poor countries generally have very limited capacity to finance the systems of security necessary to internal stability. Furthermore, this region has difficulty in controlling social and ethnic unrest, which eventually turns into

violence and conflict. These elements are likely to delay economic takeoff. Finally, as approved by Imai and al (2012), poverty is conditioned on many unobservable regional characteristics (e.g., vulnerability to natural shocks).

Conclusion and Policy Implications

The question of whether financial development contributes positively to poverty reduction is one of the most fundamental questions in international and development economics. This perspective has been analyzed in the literature from both theoretical and empirical viewpoints. In particular, in the past few decades, the microfinance sector has registered significant growth to the point that it is increasingly considered to be the most effective tool for poverty reduction. Thus, microfinance copes with market failure in order to prompt well-balanced financial development, leading to economic growth and improvement of social welfare.

Therefore, this study focused on investigating whether microfinance actually alleviates poverty globally. We focused on the hypothesis that microfinance reduces poverty by using cross-country data for 2011 and a panel data for 2005 and 2011. Our econometric results consistently confirm that microfinance loans per capita are significantly and negatively associated with poverty head count ratio and positively and significantly associated with the expenditure of consumption. In fact, a country with a higher MFIs' gross loan portfolio per capita tends to have lower poverty head count ratio and higher expenditure of consumption after controlling for the effects of other influencing factors. It is notable that microfinance loans per capita are negatively associated with not only the poverty headcount ratio but also with the poverty gap and squared poverty gap, implying that even the poorest benefit from them.

Other factors which contribute to poverty reduction include the following items: GDP per capita, share of credit in GDP (as a measure of financial development of an economy), international openness, and inflation rate USD prices).

The results would be useful for development agencies, governments, and other investors. Indeed, microfinance can play a potentially crucial role in reducing poverty at the macro level, and opening an opportunity for low-income borrowers to play a significant role in economic development.

The policy implications of the analysis in this work are clear: First, microfinance institutions should be reinforced specially in developing countries. Second, it seems substantive that governments should act efficiently and effectively against inflation, allowing the poorest to have access to financial services. Furthermore, the government must do more direct contact with the microfinance and the banks. Third, and finally, we should never forget the essential role played by institutional quality of microfinance in the distribution of wealth, and the increase of living standards of the rural poor in developing countries. Therefore, future research should focus on how to improve the quality of these institutions for the success of microfinance development and poverty reduction.

Appendix

Table 1 Descriptive statistics of poverty correlates

Reg	phc		pg		spg		pov		GLF		GDP		DC		inf		opness1		opness1		Nmf	
	2005	2011	2005	2011	2005	2011	2005	2011	2005	2011	2005	2011	2005	2011	2005	2011	2005	2011	2005	2011	2005	2011
MENA																						
Mean	3.1	1.5	0.5	0.3	0.3	0.1	72.3	70.8	2.8	13.7	1841	2270	61.7	59	3.1	8	93.4	83	8.2	2.4	9	3
Median	1.9	1.7	0.35	0.38	0.12	0.14	71.5	75	2.2	18	1948	2432	51	71	3.5	4	70	84	6	2.5	10	8
SA																						
Mean	41.9	33.7	13.6	6.8	214.8	56.6	77.6	78	2	6	478	569	30	39	7.6	10	39.6	43	1	0.7	37	33
Median	43.2	24.8	16.4	5.5	268.6	30.8	76.9	77	0.9	4	421	568	28.6	48	7	10	39.6	41	1.2	0.6	28	34
SSA																						
Mean	58.6	52	24.7	24	722.5	773	79.9	74	2.4	4.7	449.5	500	12.7	16	9	10	59	62	2.9	7	9	11
Median	61.2	54	25.8	25	664.6	631	77.6	73	1	2.5	375	405	11	17	7.8	9	61.4	62	2.2	5	8	9
Eap																						
Mean	30.6	22	7.8	5	66.3	26	63	63	3.5	19	1019	1479	46	61	6.2	8	88.7	84	3	3.5	36	44.7
Median	29.8	21	7.8	4.7	62.5	22	63	63	2.7	5.5	970.5	1258	34	41	6.4	5	75	61	3.1	4	23.5	32.5
LAC																						
Mean	12	7.5	5.7	3	46.9	16	71	70	12	57	3619	4099	31	38	6.4	6.6	68.5	75	3	4.5	15	24
Median	11	6.5	4.8	2.7	23	7	66.8	65	7.87	43	3203	3930	23	36	5	6	59	69	3	3.7	13	21
E Eca																						
Mean	8.1	2.7	2	0.7	10	2.2	74	74	15	72	2549	3280	22	37	7	7.8	92	95	7.4	5	13.5	12.6
Median	4	0.5	0.87	0.16	0.8	0.02	76	76	13.7	84	2810	343	21.7	38	7.6	7.7	96	88	5.8	5.4	8.5	11

Table 2 Results based on cross-sectional regressions (dependent variable: poverty headcount ratio)

Variables	OLS (Without Region)	OLS (With Region)	VI (Without Region)	VI (With Region)
	(1)	(2)	(3)	(4)
ln GLF	−2.36(−2.78)*	−1.50(−1.79)***	−3.14(−2.21)**	−2.06 (−2.53)**
ln_GDP	−0.003 (−4.41)*	−0.002 (−2.95)*	−0.003 (−4.87)*	−6.84 (−3.58)*
DC	−0.12 (−1.7)***	−0.031 (−0.83)	−0.1 (−1.72)***	−0.001 (−0.05)
Opness1	−0.054(−0.7)	−0.007 (−0.17)	−0.04 (−0.46)	0.014 (0.32)
Opness2	0.68(2.82)*	0.32 (1.67)*	0.61 (2.36)**	0.15 (0.74)
Inf	−0.27(−0.72)	−0.27 (−1.25)	−0.28 (−0.84)	−0.34(−2.74)
MENA	–	−7.33 (−1.92)*	–	−9.49 (−2.74)*
SA	–	−2.73 (−0.63)	–	−6.61 (−1.53)
SSA	–	25.27 (5.01)*	–	21.05 (5.78)*
Eap	–	−1.54 (−0.44)	–	−4.12 (−1.23)
Eca	–	−2.96 (−1.14)	–	−4.62 (−1.95)***
Cons	39.48 (4.10)*	21.80 (2.93)*	40.5 (40.47)*	69.63 (3.75)*
N	40	40	40	40
R-squared	0.61	0.897	0 .76	0.9362
Under identification test	–	–	14.023[0.0009]	13.467[0.0012]
Weak identification test	–	–	24.77 [0.000]	37.98 [0.000]
Over identification test	–	–	1.516[0.218]	0.552[0.4576]
Hausman test	–	–	4.92[0.67]	9.69[0.92]

ln_GLF design the logarithms of the gross loan portfolio; ln_GDP represents the logarithms of gross domestic product per capita; DC is the domestic credit of banks as a proportion of GDP; Opness1 is the ratio of imports and exports to GDP, Opness2 is foreign direct investment (FDI) to GDP; inf is the inflation rate; and finally the regional dummies with Latin America and Caribbean being the reference region: MENA is the Middle East and North Africa, SA represent South Asia, SSA is Sub-Saharan Africa, Eap represent East Asia and Pacific, and Eca is the Europe and Central Asia

*Significant at 1 %; **significant at 5 %; ***significant at 10 %

Table 3 Results based on panel data regressions (dependent variable poverty headcount ratio)

Variables	Pool OLS	Fixed Effect	Random Effect
	(1)	(2)	(3)
ln_GLF	−2.21(−3.68)*	−1.4(−1.63)***	−3.13(−4.80)*
lnGDP	−11.58(−7.54)*	−5.5 (−0.88)	−16.4 (−12.40)*
DC	0.01(0.27)	−0.07(−0.81)	−0.05(−0.92)
Opness1	0.003(0.08)	−0.034(−0.98)	−0.07(−1.81)***
Opness2	0.074(0.4)	−0.01(−0.08)	0.12 (0.58)
Inf	−0.28(−1.38)	−0.43(−2.48)***	−.31 (−1.29)
2011 year dummy	−0.43(−0.40)	−0.61(−0.82)	0.32 (0.26)
MENA	(−3.65)*	–	–
SA	2.19(0.38)	–	–
SSA	17.7(4.25)*	–	–
Eap	−1.45(−0.42)	–	–
Eca	−8.81(0.004)*	–	–
Const	111.5(8.46)*	74.76(1.71)***	156.9(16.18)***
N	115	115	115
R-squared	0.84	–	–
Hausman test	–	–	13.34(0.065)
R2 within	–	–	0.45
R2 between	–	–	0.74
R2 Overall	–	–	0.72
Prob chi2	–	–	0.000

ln_GLF design the logarithms of the gross loan portfolio; ln_GDP represents the logarithms of gross domestic product per capita; DC is the domestic credit of banks as a proportion of GDP; Opness1 is the ratio of imports and exports to GDP, Opness2 is foreign direct investment (FDI) to GDP; inf is the inflation rate; 2011 year dummy, (2011 = 1, other = 0) and finally the regional dummies with Latin America and Caribbean being the reference region: MENA is the Middle East and North Africa, SA represent South Asia, SSA is Sub-Saharan Africa, Eap represent East Asia and Pacific, and Eca is the Europe and Central Asia

*Significant at 1 %; **significant at 5 %; ***significant at 10 %

Table 4 Results based on cross-sectional regressions (dependent variable: poverty gap)

Variables	OLS (Without Region)	OLS (With Region)	VI (Without Region)	VI (With Region)
	(1)	(2)	(3)	(4)
ln_GLF	−0.74 (−1.93)***	−0.09 (−16.7)**	−1.41 (−2.03)**	−1.10 (−2.56)*
ln_PIB	−0.001(−3.04)*	−0.0002(−7.62)***	−0.001 (−3.45)*	−0.0007 (−7.45)*
DC	−5.22 (−4.02)**	0.0001 (0.01)	−0.07 (−2.07)**	−0.02 (−0.50)
Opness1	−0.085 (−1.91)***	0.001(−0.16)	0.009 (0.24)	0.02(0.76)
Opness2	0.27 (2.18)***	−0.002 (−0.27)	0.22 (1.54)	0.05(0.74)
Inf	−0.091(−0.51)	−0.008 (−1.18)	−0.09 (−0.60)	−0.09 (−1.77)***
MENA	–	−1.93 (−9.07)***	–	−4.45 (−8.42)*
SA	–	−0.42 (−4.02)	–	−4.92 (−4.97)*
SSA	–	1.75 (7.51)***	–	9.9 (8.16)*
Eap	–	−0.228 (−0.75)	–	−3.54 (−6.03)*
Eca	–	−0.66 (−4.42)	–	−2.27 (−2.42)**
Cons	14.1 (3.04)***	1.4 (62.68)*	14.97 (0.001)	8.66 (0.23)*
N	40	40	40	40
R-squared 0.5	0.63	0.62	0.82	
Under identification test	–	–	14.023[0.0009]	13.467[0.0012]
Weak identification test	–	–	24.77 [0.000]	37.98 [0.000]
Over identification test	–	–	6.38[0.01]	0.031[0.86]
Hausman test	–	–	4.97[0.6636]	6.89[0.86]

ln_GLF design the logarithms of the Gross Loan Portfolio; ln_GDP represents the logarithms of gross domestic product per capita; DC is the domestic credit of banks as a proportion of GDP; Opness1 is the ratio of imports and exports to GDP, Opness2 is foreign direct investment (FDI) to GDP; inf is the inflation rate; and finally the regional dummies with Latin America and Caribbean being the reference region: MENA is the Middle East and North Africa, SA represent South Asia, SSA is Sub-Saharan Africa, Eap represent East Asia and Pacific, and Eca is the Europe and Central Asia

*Significant at 1 %; **significant at 5 %; ***significant at 10 %

Table 5 Results based on panel data regressions (dependent variable: poverty gap)

Variables	Pool OLS	Fixed Effect	Random Effect
	(1)	(2)	(3)
ln_GLF	−1.09 (−2.71)*	−0.32(−0.68)	−1.47(−3.60)*
ln_PIB	−4.1 (−4.07)*	2.75(−0.77)	−6.31(−7.60)*
DC	−0.0033(−0.09)	−0.05(−1.00)	−0.06 (−1.62)***
Opness1	−0.003(−0.12)	−0.0005(−0.03)	−0.03 (−1.25)
Opness2	0.007(0.O5)	−0.06(−0.77)	0.08 (0.59)
Inf	−0.069(−0.50)	−0.24(−2.49)**	−0.097(−0.63)
2011_year dummy	−0.15 (−0.21)	−0.31(−0.72)	0.048(0.06)
MENA	−8.12(−2.42)***	–	–
SA	−4.57 (−1.19)	–	–
SSA	8.64 (3.09)	–	–
Eap	−3.38(−1.45)	–	–
Eca	−4.68(−2.36)**	–	–
Const	42.67(4.83)*	33.83(1.36)	62.32(10.23)*
N	115	115	115
R-squared	0.66	–	
Hausman test	–	–	13.64(0.06)
R2 within	–	–	0.35
R2 between	–	–	0.54
R2 Overall	–	–	0.53
Prob chi2	–	–	0.000

ln_GLF design the logarithms of the Gross Loan Portfolio; ln_GDP represents the logarithms of gross domestic product per capita; DC is the domestic credit of banks as a proportion of GDP; Opness1 is the ratio of imports and exports to GDP, Opness2 is foreign direct investment (FDI) to GDP; inf is the inflation rate; 2011 year dummy, (2011 = 1, other = 0) and finally the regional dummies with Latin America and Caribbean being the reference region: MENA is the Middle East and North Africa, SA represent South Asia, SSA is Sub-Saharan Africa, Eap represent East Asia and Pacific, and Eca is the Europe and Central Asia.

*Significant at 1 %; **significant at 5 %; ***significant at 10 %

Table 6 Results based on cross-sectional regressions (dependent variable: squared poverty gap)

Variables	OLS (Without Region)	OLS (With Region)	VI (Without Region)	VI (With Region)
	(1)	(2)	(3)	(4)
ln_GLF	−0.53 (−2.29)***	−0.18 (−16.7)**	−34.8 (−1.96)**	−23.29 (2.43)*
ln_PIB	−0.017 (−1.9)***	−0.0004(−7.62)***	−0.02(−2.15)**	−0.007 (−1.09)
DC	−2.46 (−1.91)***	0.0002 (0.01)	−2.08 (−1.87)***	−1.20 (−0.76)
Opness1	−0.4 (−0.41)	−0.002 (−0.16)	0.36 (0.39)	0.64 (0.77)
Opness2	7.07 (1.68)***	−0.004 (−0.27)	5.25 (1.19)	1.9 (1.09)
Inf	−1.56(−0.28)	−0.015 (−1.18)	−1.64 (−0.30)	−1.48 (−1.04)
MENA	–	−3.86 (−9.07)***	–	−31.1 (−2.69)*
SA	–	−0.85 (−4.02)	–	−83.98 (4.09)*
SSA	–	3.5(7.51)***	–	249.5 (8.74)*
Eap	–	−0.45 (−0.75)	–	−32.48 (−0.8)
Eca	–	−1.31 (−4.42)	–	−29.3 (−1.51)
Cons	281.05 (2.06)***	2.81 (62.68)*	281.65 (1.05)*	124.48 (17.48)*
N	40	40	40	40
R-squared	0.4	0.63	0.43	0.63
Under Id test	–	–	14.023[0.0009]	13.467[0.0012]
Weak id test	–	–	24.77 [0.000]	37.98 [0.000]
Over id test	–	–	0.410 [0.5220]	0.667[0.41]
Hausman test	–	–	4.10[0.77]	3.39[0.9]

ln_GLF design the logarithms of the Gross Loan Portfolio; ln_GDP represents the logarithms of gross domestic product per capita; DC is the domestic credit of banks as a proportion of GDP; Opness1 is the ratio of imports and exports to GDP, Opness2 is foreign direct investment (FDI) to GDP; inf is the inflation rate; and finally the regional dummies with Latin America and Caribbean being the reference region: MENA is the Middle East and North Africa, SA represent South Asia, SSA is Sub-Saharan Africa, Eap represent East Asia and Pacific, and Eca is the Europe and Central Asia

*Significant at 1 %; **significant at 5 %; ***significant at 10 %

Table 7 Results based on panel data regressions (dependent variable: squared poverty gap)

Variables	Pool OLS	Fixed Effect	Random Effect
	(1)	(2)	(3)
ln_GLF	−0.31(−2.93)*	−0.39(−1.92)***	−0.4(−3.26)*
ln_PIB	−2.36(−8.62)*	−1.07(−0.70)	−2.2(−6.24)*
DC	0.005(−0.52)	−0.02(−1.03)	−0.009(0.47)
Opness1	−0.009(−1.32)	−0.012(−1.41)	−0.017(2.53)*
Opness2	0.041(1.23)	0.06(1.79)***	0.043(1.40)
Inf	−0.04(−1.07)	−0.03(−0.67)	−0.025(−0.7)
2011_year dummy	−0.16(−0.87)	−0.22(−1.23)	−0.14(−0.85)
MENA	−6.26(−7.00)*	–	–
SA	−3.04(−2.96)*	–	–
SSA	−1.99(−2.68)*	–	–
Eap	−1.06(−1.71)***	–	–
Eca	−5.02(−9.51)*	–	–
Const	23.26(9.90)*	12.35(1.15)	20.44(8.38)*
N	115	115	115
R-squared	0.8	–	–
Hausman test	–	–	4.49 (0.72)
R2 within	–	–	0.46
R2 between	–	–	0.58
R2 Overall	–	–	0.55
Prob chi2	–	–	0.000

ln_GLF design the logarithms of the Gross Loan Portfolio; ln_GDP represents the logarithms of gross domestic product per capita; DC is the domestic credit of banks as a proportion of GDP; Opness1 is the ratio of imports and exports to GDP, Opness2 is foreign direct investment (FDI) to GDP; inf is the inflation rate; 2011 year dummy, (2011 = 1, other = 0) and finally the regional dummies with Latin America and Caribbean being the reference region: MENA is the Middle East and North Africa, SA represent South Asia, SSA is Sub-Saharan Africa, Eap represent East Asia and Pacific, and Eca is the Europe and Central Asia

*Significant at 1 %; **significant at 5 %; ***significant at 10 %

Table 8 Results based on cross-sectional regressions (dependent variable: expenditure of consumption)

Variables	OLS (Without Region)	OLS (With Region)	VI (Without Region)	VI (With Region)
	(1)	(2)	(3)	(4)
ln_GLF	0.16(2.17)***	0.1(12.88)**	0.17(1.87)***	0.15(314)**
ln_GDP	0.0002(1.61)	0.45(7.93)***	0.0002(1.83)***	0.0002(17.42)*
DC	−2.46(−1.91)***	0.01(2.2)	0.01(1.12)	0.012(3.00)*
Opness1	−0.4(−0.41)	0.0006(1.39)	0.002(0.7)	0.0003(0.15)
Opness2	7.07(1.68)***	0.012 (6.1)***	0.004(0.24)	0.007(1.7)***
Inf	−1.56(−0.28)	−0.06(−0.7)	−0.07(−1.69)***	−0.07(0.206)
MENA	–	−0.3(−2.23)	–	−0.12(−0.98)
SA	–	0.6(2.03)	–	0.6(2.29)**
SSA	–	0.02(2.93)	–	−0.10(−1.08)
Eap	–	−0.5(−7.46)***	–	−0.42(−6.59)*
Eca	-	0.33(11.59)**	–	0.30(2.97)*
Cons	281.05(2.06)***	3.23(2.42)	5.96(17.46)*	6.15(11.30)*
N	40	40	40	40
R-squared	0.4	0.53	0.51	0.98
Under identification test	–	–	14.023[0.0009]	13.467[0.0012]
Weak identification test	–	–	24.77 [0.000]	37.98 [0.000]
Over identification test	–	–	3.208 [0.07]	3.208 [0.07]
Hausman test	–	-	0.39 [0.9]	0.19[0.9]

ln_GLF design the logarithms of the Gross Loan Portfolio; ln_GDP represents the logarithms of gross domestic product per capita; DC is the domestic credit of banks as a proportion of GDP; Opness1 is the ratio of imports and exports to GDP, Opness2 is foreign direct investment (FDI) to GDP; inf is the inflation rate; and finally the regional dummies with Latin America and Caribbean being the reference region: MENA is the Middle East and North Africa, SA represent South Asia, SSA is Sub-Saharan Africa, Eap represent East Asia and Pacific, and Eca is the Europe & Central Asia

*Significant at 1 %; **significant at 5 %; ***significant at 10 %

Table 9 Results based on panel data regressions (dependent variable: expenditure of consumption)

Variables	Pool OLS	Fixed Effect	Random Effect
	(1)	(2)	(3)
ln_GLF	2.00(2.43)*	−0.26 (−0.35)	1.9(2.70)*
ln_GDP	−3.07(−1.46)	−6.50(−1.16)	−4.24(−2.96)*
DC	−0.16(−2.14)**	0.03(0.48)	−0.14(−2.36)**
Opness1	0.07(1.37)	0.01(0.34)	0.06(1.34)
Opness2	−0.20 (−0.80)	−0.18(−1.50)	−0.17(−0.73)
Inf	0.46 (1.64)***	0.41(2.58)**	0.42(−0.73)
2011 year dummy	−0.15(−0.11)	−0.34(−0.53)	−0.38(−0.28)
MENA	8.55(1.25)	–	–
SA	7.6(0.97)	–	–
SSA	3.36(0.59)	–	–
Eap	−2.22(−0.47)	–	–
Eca	1.2(0.30)	–	–
Const	86.17(4.79)*	115.5(2.96)**	97.11(9.23)*
N	114	114	114
R-squared	0.16	–	–
Hausman test	–	–	10.01 (0.18)
R2 within	–	–	0.13
R2 between	–	–	0.12
R2 Overall	–	–	0.16
Prob chi2	–	–	0.000

*Significant at 1 %; **Significant at 5 %; ***Significant at 10 %

ln_GLF design the logarithms of the Gross Loan Portfolio; ln_GDP represents the logarithms of gross domestic product per capita; DC is the domestic credit of banks as a proportion of GDP; Opness1 is the ratio of imports and exports to GDP, Opness2 is foreign direct investment (FDI) to GDP; inf is the inflation rate; 2011 year dummy, (2011 = 1, other = 0) and finally the regional dummies with Latin America and Caribbean being the reference region: MENA is the Middle East and North Africa, SA represent South Asia, SSA is Sub-Saharan Africa, Eap represent East Asia and Pacific, and Eca is the Europe and Central Asia

Table 10 First stage regression (dependent variable: log of glf per capita)

Variable	Coefficients
lnw6lagglf	0.75 (5.83)*
CE	−0.04 (−2.25)*
lnGDP	−0.00013 (−1.46)
DC	0.006 (0.68)
Opness1	0.011 (1.46)
Opness2	−0.014 (−0.44)
Inf 0.034	(0.92)
N	40
_cons	−.087 (0.913)

lnw6lagglf is the weighted 6 year average lag of Gross Loan Portfolio; CE is the enforcing contracts at the country level; ln_GDP represents the logarithms of gross domestic product per capita ; DC is the domestic credit of banks as a proportion of GDP; Opness1 is the ratio of imports and exports to GDP, Opness2 is foreign direct investment (FDI) to GDP and finally inf represents the inflation rate

*Significant at 1 %; **significant at 5 %; ***significant at 10 %

Table 11 List of regions and countries

N°	Pays	Region	N°	Pays	Region	N°	Pays	Region
1	Bangladesh	SA	17	Egypte	MENA	36	Jordan	MENA
2	Népal	SA	18	Pakistan	SA	37	Morocco	MENA
3	Benin	SSA	19	Cameroun	SSA	38	Cambodge	EAP
4	Burkina Fasso	SSA	20	Sierra Leone	SSA	39	China	EAP
5	Congo Démocratique	SSA	21	Sénégal	SSA	40	Argentina	EAP
6	Ethiopie	SSA	22	Nigeria	SSA	41	Bolivia	EAP
7	Mozambique	SSA	23	Zambie	SSA	42	Chile	EAP
8	Rwanda	SSA	24	India	EAP	43	Domeneca	EAP
							Republique	
9	Tanzanie	SSA	25	Indonésie	EAP			
						44	Jamaica	ALC
10	Mali	SSA	26	Philippine	EAP			
						45	Panama	ALC
11	Madagascar	SSA	27	Vietnam	EAP			
						46	Peru	ALC
12	Malawi	SSA	28	El Salvador	ALC			
13	Uganda	SSA	29	Guatemala	ALC	47	Mexico	ALC
14	Haiti	ALC	30	Honduras	ALC	48	Brazil	ALC
15	Kyryz Republic	ECA	31	Nicaragua	ALC	49	Colombia	ALC
16	Tajikstan	ECA	32	Paraguay	ALC	50	Costa Rica	ALC
			33	Armenia	ECA	51	Albania	ECA
			34	Moldova	ECA	52	Azarbaijan	ECA
			35	Giorgia	ECA	53	Bosnia et Herzegovina	ECA
							Kazakhstan	
					Bulgarie	54		ECA
							Romania	
					Macedonia	55		ECA
							Russian Federation	
						56		ECA
							Serbia	
						57		ECA

SA South Asia, *SSA* Sub-Saharan Africa, *EAP* East Asia and Pacific, *LAC* Latin America and Caribbean, *ECA* Europe and Central Asia, *MENA* Middle East and North Africa

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