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# Financial development, institutions and poverty alleviation: an empirical analysis

Alessandra Cepparulo, Juan Carlos Cuestas and Maurizio Intartaglia\*

## Abstract

The aim of this paper is to analyse empirically whether the level of institutional quality influences how financial development affects poverty for a sample of developing countries covering the period from 1984 to 2012. Using an interaction term constructed as a product between financial development and institutional quality we find that the pro-poor impact of financial development decreases as the quality of institutions rises. Such a differential effect can be ascribed to the capacity of banks to provide functions that mimic those performed by an institutional framework that works well. The results of this paper can be used for policy management.

JEL Codes: G20, I32, O17

Keywords: financial development, institutional quality, poverty alleviation, developing countries

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The views expressed are those of the author and do not necessarily represent the official views of Eesti Pank or the Eurosystem.

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## **Non-technical summary**

Since the crisis that started in 2008, an increasing amount of literature has focused on the role of financial institutions in the causes and consequences of the crisis for developed economies. However, very little work has been done recently on the interaction between financial development and the institutional framework.

Our paper draws from both these sides of the literature to assess whether the institutional framework plays any role in mediating the influence of financial development on poverty. In principle, it could be expected that financial development would go hand in hand with a more efficient allocation of resources and access to funds by all income groups, and would result in resources being devoted to productive investment. In addition, the underlying idea is that the financial and institutional systems interact in affecting the poverty rate because they can work as complements or as substitutes. If financial systems and institutions complement each other, then the pro-poor effect of financial development is amplified by the operation of a sound institutional framework. Conversely, if finance and institutions work as substitutes, then the effect of financial development on poverty alleviation is reduced as the level of institutions increases. Knowing whether and how financial development and institutional quality interact in their effect on poverty is crucial in deciding the most desirable allocation of available resources between these two priorities. If the functioning of the financial sector complements that of the institutions in terms of poverty alleviation, then the highest pay-out in terms of poverty alleviation from an improvement in the financial system will be obtained in the countries with the best institutional set-up.

This paper investigates whether financial development and institutional development interact in their effects on poverty. We take data for up to 58 countries spanning 1984 to 2012 and we use three financial measures together with an institutional variable to assess whether the effect of financial development on poverty varies across different levels of institutional quality.

We find that financial development has a significant and positive effect on poverty alleviation. This result holds across all alternative measures of financial development and poverty. Secondly and similarly, the estimates show that the development of the institutional framework also has a significant and positive effect on poverty alleviation. However, we find that the pro-poor impact of financial development is weaker where institutions work better, and stronger where they work less well.

These findings provide evidence in favour of a substitution effect between finance and institutions. One possible reason for this effect is that some of the

limitations associated with a weak institutional framework might be alleviated by how the banking system works. In terms of policy implications, our findings indicate that the highest returns in terms of poverty alleviation are obtained from allocating the resources either to institution-building or to the banking sector. This is particularly relevant in countries where economic resources and funds are scarce and funds are devoted to satisfying the basic needs of the population. A proper rationing of these funds between financial development and improving the quality of institutions is then key to aiding poverty alleviation and enhancing economic growth. Of course, the decision of whether to devote funds to one or the other depends on the current levels of financial development and the quality of the institutions, a finding which is corroborated by other authors who take threshold effects into account.

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## 1. Introduction

In this paper we aim to analyse whether financial development and the quality of institutions together have a positive effect on poverty alleviation for a group of developing countries for the period 1984 to 2012. Poverty and ways to ease it have attracted the attention of researchers for a long time. In recent years a growing body of literature has focused on pinpointing the factors that underlie poverty alleviation. A number of empirical papers have investigated the impact of financial development on the incidence of poverty (Honohan (2004), Beck et al. (2007), Akter et al. (2010), Perez-Moreno (2011), Jeanneney and Kpodar (2011)).<sup>1</sup> Other authors have analysed the linkage between financial development and poverty within single countries (e.g. Quartey (2005), Odhiambo (2009), Inoue and Hamori (2012), Ho and Odhiambo (2011), Uddin et al. (2014)). Another strand of literature has examined whether a successfully functioning institutional framework affects the standard of living for the poor (Chong and Calderón (2000), Hasan et al. (2007), Tebaldi and Mohan (2010), Perera and Lee (2013)).

Since the crisis that started in 2008, an increasing amount of literature has focused on the role of financial institutions in the causes and consequences of the crisis for developed economies. However, very little work has been done recently on the interaction between financial development and the institutional framework. Our paper draws from both these sides of the literature to assess whether the institutional framework plays any role in mediating the influence of financial development on poverty. In principle, it could be expected that financial development would go hand in hand with a more efficient allocation of resources and access to funds by all income groups, and would result in resources being devoted to productive investment. In a related fashion, Mishkin (2009) claims that financial globalisation can be very beneficial for the poor as it should encourage a financial system that works well and through that should encourage financial development. In addition, the underlying idea is that the financial and institutional systems interact in affecting the poverty rate because they can work as complements or as substitutes. If financial systems and institutions complement each other, then the pro-poor effect of financial development is amplified by the operation of a sound institutional framework. Conversely, if finance and institutions work as substitutes, then the effect of financial development on poverty alleviation is reduced as the level of institutions increases. Following a similar line of reasoning to ours, Compton and Giedeman (2011) have focused on the interaction between finance and institutions in relation to the process of economic growth. The authors find that the growth effect of financial development weakens as institutional quality rises. They see their finding as

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<sup>1</sup> All these studies are based on large sample of countries.

evidence in favour of a substitution effect between financial development and institutions.

This paper investigates whether financial development and institutional development interact in their effects on poverty. We take data for up to 58 countries spanning 1984 to 2012 and we use three financial measures together with an institutional variable to assess whether the effect of financial development on poverty varies across different levels of institutional quality. We assess this differential effect using both cross-section and panel analysis. Our results corroborate the existence of a substitutability effect between financial and institutional development, but they contradict to some extent those found by Gries et al. (2009), who discovered only limited support in favour of finance-led growth. We contribute to the existing empirical studies on poverty by allowing for a flexible functional form based on an interaction term between financial development and institutions.

Assessing whether the impact of financial development on poverty is influenced by institutions has important policy insights; it is no coincidence that two of the World Bank's top priorities are the development of the financial sector and institution-building.<sup>2,3</sup> So knowing whether and how financial development and institutional quality interact in their effect on poverty is crucial in deciding the most desirable allocation of available resources between these two priorities. If the functioning of the financial sector complements that of the institutions in terms of poverty alleviation, then the highest pay-out in terms of poverty alleviation from an improvement in the financial system will be obtained in the countries with the best institutional set-up; in this case the policy maker will resolve to invest in both finance and institutions. On the other hand, if finance and institutions are substitutes, then financial development in the countries with the worst institutional framework will give the highest pay-out; consequently, the policy maker will find it more sensible to invest in only one of the two dimensions.

We find that financial development has a clear positive impact on poverty alleviation, and this finding is robust to different definitions of financial state and poverty. Interestingly, our results also show that the pro-poor impact of financial development is less clear where institutions work better and more clear where they are worse. This means that we find financial development and institutions to be substitutes. This paper then has clear policy implications, since a few lessons for policy making could potentially be learnt from the analysis.

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<sup>2</sup> See footnote 2 of Compton and Giedeman (2011) and the references cited therein.

<sup>3</sup> The terms institutional development and institution-building are used interchangeably in this study. Equally "finance" is sometimes used to denote financial development.



The rest of the paper is organised as follows. Section 2 deals with the empirical model and the methodology. Section 3 describes the data. Section 4 summarises the empirical findings of the analysis. Finally, section 5 provides some concluding remarks.

## 2. The empirical model and the estimation method

The main aim of this study is to examine whether the level of institutional quality affects how financial development impacts poverty. We start our analysis from a cross-section model specified as follows:

$$Pov_i = \alpha + \beta_0 Pov_i^0 + \beta_1 FD_i + \beta_2 INS_i + \beta_3 FD_i * INS_i + X_i \Gamma + \varepsilon_i \quad [1]$$

where subscript  $i$  represents a country.  $Pov_i$  is a measure of the incidence of poverty averaged for the years 1984–2012. As poverty rates are expected to display some degree of inertia, its initial level in 1984 ( $Pov_i^0$ ) has also been included in the set of regressors.  $FD_i$  is financial development and  $INS_i$  is the institutional quality indicator, both measured in 1984 in order to minimise concerns about reverse causation. The idea is that poverty can prevent the financial sector from developing insofar as the development of the financial sector is driven by the demand for financial services. Similarly, poverty might give rise to conditions that avert the development of the institutional set-up. The variable  $FD_i * INS_i$  represents the interaction term between financial development and institutional quality. Following Dollar and Kraay (2002) and Arestis and Caner (2010) we include a vector of three additional explanatory variables,  $X_i$ , namely *education*, the logarithm of *public spending* over GDP, and the Gini index of *income inequality*, all calculated as their 1984–2012 average.  $\varepsilon_i$  denotes the error term.

The schooling variable is included to control for human capital. Its sign is expected to be negative as a higher level of education should be associated with lower poverty rates. Public spending is a proxy for the overall size of the government. It has been included to control for public policies which transfer income from the wealthy to the poor, such as state subsidies or public expenditure on education. The impact of public consumption expenditure is a priori ambiguous because it depends largely on the extent to which public resources are employed for uses which primarily benefit the poor. Finally, the Gini variable is included as the beneficial impact of financial development on the poor is thought to depend on the level of inequality. This is because a higher share of benefits from financial development are expected to accrue to the poorest if inequality is low.

The coefficients  $\alpha$ ,  $\beta_0$ ,  $\beta_1$ ,  $\beta_2$ ,  $\beta_3$  and  $\Gamma$  denote the parameters to be estimated. A statistically significant negative sign for  $\beta_1$  provides evidence in favour of a pro-poor direct impact from financial development. Similarly, a negative sign for  $\beta_2$  implies that higher levels of institutional quality per se are conducive to lower poverty rates. As for the interaction term, a negative sign for  $\beta_3$  suggests that the working of a sound institutional framework strengthens the pro-poor impact of financial development, meaning finance and institutions are complements. Conversely, a positive sign for  $\beta_3$  means that the pro-poor effect of financial development is smaller in countries where institutions are already well developed than it is in countries with weak institutions, meaning finance and institutions are substitutes. A lack of statistical significance for  $\beta_3$  however, implies that the impact of financial development on poverty is independent of the level of institutional development. For illustrative purposes, the coefficients of the main variables of interest along with their signs and meaning are displayed in Table 1. It is important to note that if the interaction between financial development and institutions is statistically significant, then any model of poverty that excludes the interaction may be mis-specified and may be suffering from omitted variables bias.

Table 1: Sign and meaning of the coefficients associated with the main variables of interest

<b>Sign</b>	<b>Meaning</b>
$\beta_1 < 0$	Financial development is pro-poor
$\beta_2 < 0$	Institutional development is pro-poor
$\beta_3 < 0$	Financial sector and institutions are complements
$\beta_3 > 0$	Financial sector and institutions are substitutes
$\beta_3 = 0$	Neither complements nor substitutes

The cross section results obtained by running model [1], though informative, have some important shortcomings. Specifically, the inclusion of the lagged dependent variable in the right hand side of equation [1] causes the fixed effects, which is part of the error term  $\varepsilon_i$  in the cross-country regression, to be correlated with the set of regressors. Such a correlation biases the cross section estimates. Furthermore, cross-sectional analyses are unable to exploit any piece of information available in the time-series dimension of the data. In order to overcome these difficulties, we also use a panel approach. The model takes the following form:

$$\begin{aligned}
Pov_{it} = & \alpha + \beta_0 Pov_{it-1} + \beta_1 FD_{it-1} + \beta_2 INS_{it-1} + \beta_3 FD_{it-1} * INS_{it-1} + \\
& + X_{it}\Gamma + \lambda_t + \eta_i + \varepsilon_{it}
\end{aligned}
\tag{2}$$

where  $t$  represents the time period,  $\lambda_t$  is a time fixed effect,  $\eta_i$  is the country-specific effect and  $\varepsilon_{it}$  is the disturbance. This panel model coupled with the system GMM estimator (explained in the following section) allows us to deal with the fixed effect and to assess whether changes in financial development or institutional quality have any effect on poverty within a country over time.

Before concluding this section we would like to highlight that the presence of the interaction term means the overall impact of financial development on poverty has to be assessed by computing the marginal effect of financial development as shown in the equation below:

$$\frac{\partial Pov_{it}}{\partial FD_{it}} = \widehat{\beta}_1 + \widehat{\beta}_3 \times INS^*
\tag{3}$$

where  $\widehat{\beta}_1$  and  $\widehat{\beta}_3$  are the estimated coefficients of financial development and the interaction term respectively.  $INS^*$  is the particular level of institutional development. Using equation [3] we calculate the elasticity at the 10<sup>th</sup>, 25<sup>th</sup>, 50<sup>th</sup>, 75<sup>th</sup> and 90<sup>th</sup> percentiles of the underlying institution variable.

## 2.1. The estimator

To run the cross-country regression [1] we use a simple OLS estimator, and for the panel analysis [2] we use a system GMM panel estimator to deal with the potential endogeneity issues of the variables (Arellano and Bover (1995), Blundell and Bond (1998)). This technique runs a system of two equations, one in levels and the other in first-differences. The estimator uses the lagged values of the explanatory variables, in levels as well as in first-differences, as IV instruments, or “internal” instruments for the two equations. The system GMM estimator controls effectively for unobserved country-specific effects and mitigates the problem of measurement error. Furthermore, and unlike the within estimators, system GMM leads to consistent parameter estimates in the presence of the lagged dependent variable on the right hand side of the equation.

In order to be a valid IV variable, the set of instruments has to satisfy the population moment conditions used by the estimation process. The validity of this assumption can be assessed empirically by checking the Hansen test of over-identifying restrictions. Failure to reject the null hypothesis supports the overall validity of the instruments. An additional assumption has to be satisfied to generate consistent GMM estimates, which is that the error term  $\varepsilon_{it}$  is required to exhibit no serial correlation higher than order one. This assumption can be tested with the Arellano and Bond test. If the null hypothesis is not rejected, then second-order serial correlation can be discarded.

### 3. The data and variable definitions

Our investigation focuses on a set of 58 countries over the period 1984–2012. The size of the sample is limited mainly by the availability of data for the poverty and institution variables. In keeping with the literature, the panel data are averaged over five-year periods, and the last period is of four years. This allows us to avoid short run disturbances. The panel dataset is unbalanced and it includes observations with a maximum of six non-overlapping periods.

The complete list of countries is displayed in the Appendix in Table A.1. Most of the data are collected from the World Development Indicators. Table A.2 in the Appendix provides a description of the main variables with data sources.

In line with the standard development literature, we use the headcount index, taking \$2 as a measure of poverty. This index counts the number of people with per capita consumption or income below the poverty line. Data on poverty rates for developed countries are not available, so the sample contains only developing countries.

The institution variable is from the International Country Risk Guide. We use an aggregate measure of institutions based on the rule of law, corruption in government, and quality of bureaucracy. This variable has been used by Law et al. (2013) and Compton and Giedeman (2011) to analyse the role played by institutions in the finance-growth nexus. The variable has been re-scaled from 0 to 1, where higher values imply better institutional quality and lower values imply worse quality.

Since the bulk of financial services in developing countries are provided by banks, we assess financial development from the most-commonly used bank-based measures of financial development, which are private credit, liquid liabilities and deposit money bank assets, all expressed as a share of

GDP. Private credit gauges the amount of credit that banks other than monetary authorities allocate to the private sector. This is a standard variable in the finance literature and it has been used by Honoan (2004) and Beck et al. (2007) among others to analyse the impact of financial development on the poverty rate. Liquid liabilities (M3) is a measure of broad stock money and it has been used by King and Levine (1993) and Masih and Khan (2011) among others. Deposit money bank assets (bank assets) equal the claims on the nonfinancial real sector by banks. In contrast to private credit, this proxy accounts for credit to government and state-owned enterprises. This measure has been used as a proxy measure of financial development by Clarke et al. (2006) and Kim and Lin (2011) among others.

## 4. Estimation results

### 4.1. Overview of the data

Table 2 illustrates descriptive statistics for the largest sample available. As can be seen, rates of poverty vary considerably across countries. For example, the headcount index at \$2 a day ranges from virtually zero (no poor) for Hungary to 0.98 (almost all poor) for Tanzania. Financial development and institutional quality also show considerable variation across the sample. Hungary is the country with the highest institutional quality. The countries that have the highest score for financial development are Malaysia, China and Thailand.

Table 2: Summary statistics for the main variables (1984–2012)

<b>Variables</b>	<b>Mean</b>	<b>Std.Dev.</b>	<b>Min</b>	<b>Max</b>
Headcount (\$2 a day)	0.371	0.286	0.003	0.915
Private Credit	26.484	18.032	1.6	82.8
M3	31.624	20.286	0.25	96.15
Bank Assets	29.859	21.181	0.13	103.96
Institution	0.404	0.191	0.056	0.833
Education	2.527	0.298	1.567	3.139
Public Spending	6.368	2.377	1.197	10.63
Gini index	0.425	0.089	0.269	0.608

Notes: The table illustrates summary statistics of the main variables used for empirical analysis. Poverty ratio is the dependent variable.

Table 3 displays the correlations between the index of poverty and the independent variables. The proxies for financial development and the institutional variable are all significantly correlated with the headcount ratio, though the sizes of the correlations are not high. Private credit is highly correlated with both liquid liabilities and bank assets. Surprisingly, the correlation between education and poverty is not statistically significant. Though informative, these simple correlations provide little insight in terms of causal effect. In order to investigate causality we have to turn on the regression function [1] and [2].

Table 3: Correlation Matrix

	<b>Head- count (\$2 a day)</b>	<b>Private Credit</b>	<b>M3</b>	<b>Bank Assets</b>	<b>Insti- tutions</b>	<b>Edu- cation</b>	<b>Public Spending</b>
Private Credit	-0.380 (0.003)						
M3	-0.314 (0.016)	0.587 (0.000)					
Bank Assets	-0.322 (0.014)	0.806 (0.000)	0.807 (0.000)				
Institutions	-0.317 (0.015)	0.360 (0.005)	0.236 (0.074)	0.398 (0.002)			
Education	-0.211 (0.113)	0.227 (0.086)	0.285 (0.030)	0.253 (0.056)	0.348 (0.007)		
Public Spending	-0.721 (0.000)	0.267 (0.043)	0.149 (0.266)	0.153 (0.251)	0.179 (0.180)	0.233 (0.079)	
Gini index	-0.058 (0.664)	0.045 (0.739)	-0.119 (0.373)	0.010 (0.943)	-0.053 (0.692)	0.023 (0.867)	-0.141 (0.293)

Notes: The table shows simple correlations between the main variables used for empirical analysis. P-values are in parentheses.

## 4.2. Estimation results

As explained in section 2, we start our empirical investigation by running the cross-section function as described by model [1]. The results are illustrated in Table 4. The estimates with the set of controls come out in line with our expectations and show that education has a statistically significant impact on poverty alleviation, as would be expected. The sign for public spending is

positive, meaning that government intervention in our sample has adversely affected the poor. However the coefficient is not statistically significant. This may be because spending has not been helpful in developing areas which would aid in poverty reduction. Contrary to expectations, Gini has a negative sign, yet it fails to achieve any conventional level of significance.

Table 4: Cross-section estimates

<b>Proxies of Fin. Dev.:</b>	<b>Private Credit</b>	<b>M3</b>	<b>Bank Assets</b>
	<b>[1]</b>	<b>[2]</b>	<b>[3]</b>
Pov0	0.731*** (0.049)	0.718*** (0.052)	0.730*** (0.048)
Education	-0.015** (0.007)	-0.019*** (0.007)	-0.017** (0.006)
Public Spending	0.061 (0.044)	0.080 (0.048)	0.073 (0.046)
Gini	-0.041 (0.136)	-0.100 (0.142)	-0.046 (0.135)
Institutions	-0.222** (0.085)	-0.226** (0.091)	-0.195** (0.076)
Interaction	0.005** (0.002)	0.004** (0.002)	0.004** (0.002)
Fin. Dev.	-0.003** (0.001)	-0.003*** (0.001)	-0.003*** (0.001)
Observations	58	59	60
Adj R squared	0.920	0.923	0.924

Notes: The table reports the estimates from the OLS estimator. The dependent variable is the \$2 a day headcount index over the period 1984 to 2012. Interaction corresponds with the interaction term between financial development and the institution variable. Robust standard errors in parenthesis. \*\*\*, \*\* and \* denote statistical significance at the 1%, 5% and 10% level respectively.

Moving our focus to the main variables of interest, we notice that the coefficients associated with financial development are statistically significant, regardless of the individual financial measure adopted. This result provides evidence in favour of a pro-poor impact from financial development, which is the expectation and is in line with the findings of previous studies on the financial development-poverty nexus. Similarly, the coefficient of the institutional variable is negative and statistically significant, meaning that the impact of institutional development is also pro-poor. This finding is in line with Tebaldi and Mohan (2010) and Chong and Calderon (2000), who show that institutional quality has a statistically significant impact on poverty alleviation.

To assess the overall impact of finance on poverty we now turn to the interaction term between financial development and institutional quality. As can be seen, the coefficient associated with the interaction term is positive and statistically significant, regardless of the proxy for financial development. This result reveals a substitution effect whereby the impact of financial development on poverty alleviation weakens as the level of institutional quality rises. By the same token, the pro-poor impact of institutional building is weaker when the financial sector is highly developed. As will be explained below, one possible interpretation of this finding is that some of the roles associated with well-functioning institutions are also performed by the financial sector.

We now turn our attention to the panel regression function illustrated in model [2]. As can be seen from Table 5, the panel estimates generally mirror the cross section results. In an interesting contrast to the cross-section, the panel estimate for public spending turns out to be statistically significant. Statistical tests looking at the consistency of the estimator show that the assumptions underlying Arellano and Bover's estimators are met. Specifically, the test for second-order serial correlation cannot reject the null hypothesis that the error term is not serially correlated at order 2 and higher orders. Furthermore, the Hansen test of overidentifying restrictions does not invalidate the set of instruments used in the estimation.

To get more precise findings we compute the elasticities of poverty with respect to financial development. Because of the presence of the interaction between financial development and institutional quality, the estimates of elasticity have to be computed using Equation 3. Table 6 illustrates the point estimates of the elasticities along with their standard errors and p-values. For visual analysis, the estimates are also plotted in Figures 1 to 3. As can be seen, the elasticity is negative and significantly different from zero over most of the range of the institutional variable. The table clearly illustrates that the impact of financial development on poverty varies across different percentiles of institutions. Specifically, the estimates show that the pro-poor impact of financial development weakens as the institutional framework improves.

The economic relevance of the differential effect across different levels of institutional development is quite large. To give a numerical example, a country which is at the 10<sup>th</sup> percentile of our institutional measure, for example Armenia, will see its poverty rate decrease by 0.26% as its private credit increases by 1%. Meanwhile, the same increase in private credit in a country such as Costa Rica which is at the 90<sup>th</sup> percentile will have no tangible effect on poverty.



Table 5: Panel estimates

<b>Proxies of Fin. Dev.:</b>	<b>Private Credit [1]</b>	<b>M3 [2]</b>	<b>Bank Assets [3]</b>
Poverty <sub>t-1</sub>	0.683*** (0.112)	0.653*** (0.085)	0.694*** (0.084)
Education <sub>t</sub>	-0.031** (0.013)	-0.028** (0.013)	-0.028*** (0.009)
Public Spending <sub>t</sub>	0.111*** (0.038)	0.114*** (0.034)	0.117*** (0.036)
Gini <sub>t</sub>	0.035 (0.232)	0.010 (0.182)	0.037 (0.166)
Institutions <sub>t-1</sub>	-0.475** (0.190)	-0.428** (0.171)	-0.373*** (0.100)
Interaction <sub>t-1</sub>	0.011** (0.004)	0.007* (0.004)	0.007*** (0.002)
Fin. Dev <sub>t-1</sub>	-0.006*** (0.002)	-0.004** (0.002)	-0.004*** (0.001)
Observations	191	180	180
Countries	58	56	56
Instruments	25	25	25
AR(2) test	0.128	0.572	0.534
Hansen J test	0.721	0.822	0.852

Notes: The table reports the estimates from the two-step system GMM estimator. The dependent variable is the \$2 a day headcount index over five-year intervals spanning 1984 to 2012. The interaction corresponds with the interaction term between the financial development and institution variables. The interaction term, education and Gini are treated as endogenous. A constant term and a set of time dummy variables are included in all regressions but not reported. The last two rows report the p-values of the Arellano and Bond test and Hansen test respectively. Robust standard errors in parenthesis. \*\*\*, \*\* and \* denote statistical significance at the 1%, 5% and 10% level respectively.

Table 6: Elasticity of poverty with respect to financial development

<b>Panel A – Private Credit</b>					
	<b>P10</b>	<b>P25</b>	<b>P50</b>	<b>P75</b>	<b>P90</b>
Institutions	0.330	0.406	0.472	0.546	0.610
Elasticity	-0.261	-0.169	-0.090	-0.002	0.075
Std. Err	0.083	0.050	0.032	0.043	0.068
p-value	0.009	0.006	0.018	0.968	0.299
<b>Panel B – M3</b>					
Institutions	0.333	0.408	0.472	0.541	0.611
Elasticity	-0.224	-0.161	-0.107	-0.049	0.01
Std. Err	0.077	0.049	0.031	0.035	0.057
p-value	0.014	0.007	0.006	0.190	0.867
<b>Panel C – Bank Assets</b>					
Institutions	0.333	0.408	0.472	0.536	0.611
Elasticity	-0.219	-0.155	-0.100	-0.045	0.019
Std. Err	0.052	0.038	0.029	0.028	0.036
p-value	0.001	0.002	0.006	0.131	0.599

Notes: The table reports the percentiles of the institution variable, estimates of the elasticities of poverty with respect to financial development at particular levels of institutional quality, standard errors, and p-values.

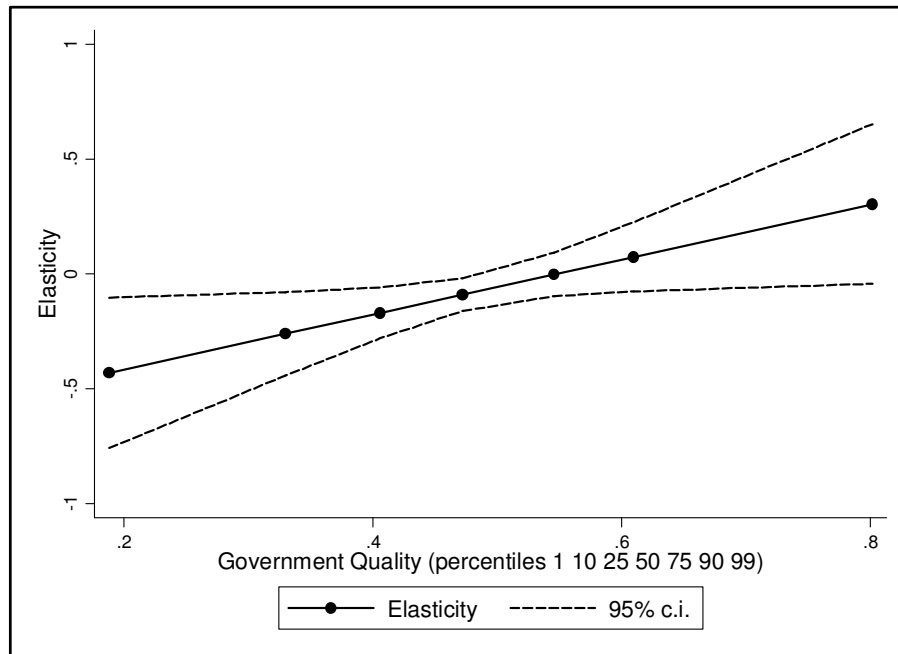


Figure 1: Plot of Elasticities – Private Credit

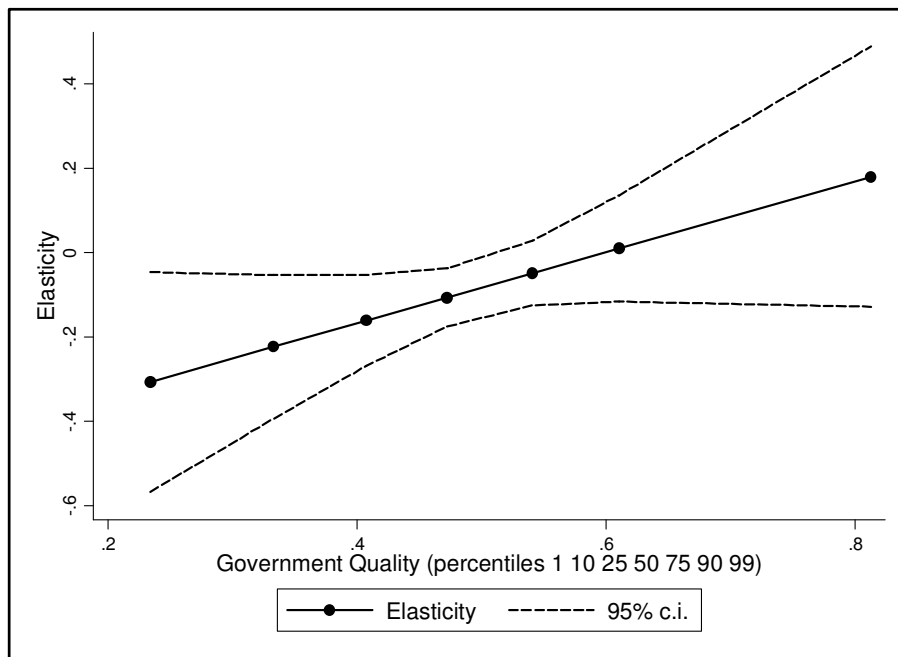


Figure 2: Plot of Elasticities – M3

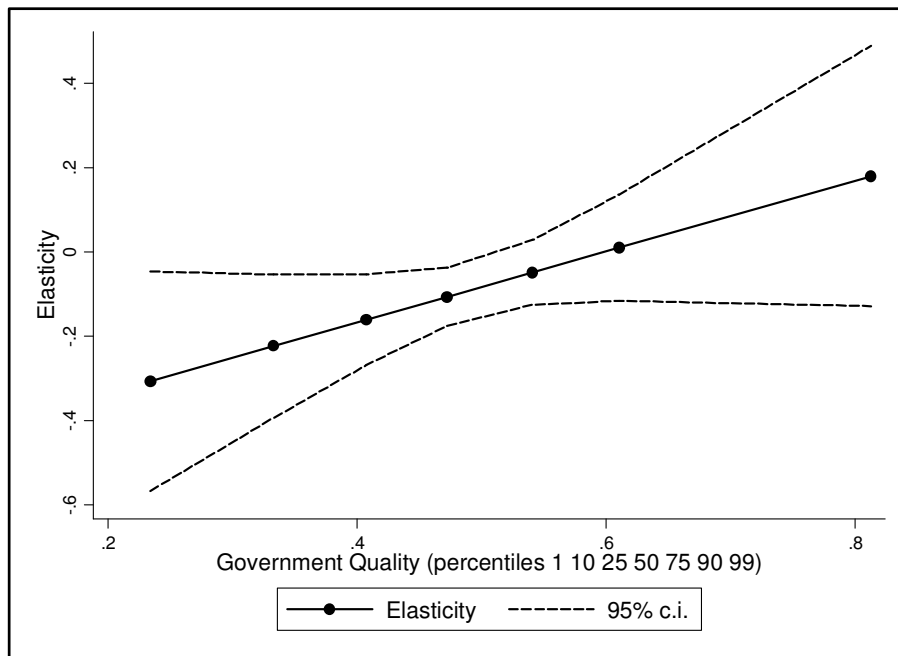


Figure 3: Plot of Elasticities – Bank Assets

To sum up, our findings suggest that both financial and institutional development appear to relieve poverty effectively. However, the findings also indicate that the less progress has been achieved in the institutional set-up, the higher the marginal benefit is from improving the financial sector and the more the progress, the lower the benefit. One possible reason underlying this differential effect is that a well-functioning banking sector could provide functions that mimic those performed by institutions. In an institutional setting characterised by weak legal enforcement and ill-defined property rights, the severity of the transaction and information costs make it difficult for the individual, and especially for the poor, to contract and raise funds from the market. Here banking relationships, because they are personal and self-reinforcing, can lower these costs, thus patching up the deficiencies in the institutional framework. In this sense, banks can act as a surrogate for the functions provided by formal institutions. In this case, the highest rewards from promoting a banking sector that works well might arise precisely where the need for reducing transaction costs is more pressing, which is where institutions are weak. Alternatively, the benefit from quality improvements in institutions might be greater in financially underdeveloped economies than in countries with high levels of banking development. Kim and Lin (2011) provide a thorough analysis of the existence of thresholds in the relationship between financial development and poverty. Essentially they find that financial development helps the poor disproportionately only once a certain degree of financial development has been reached. This may explain the need to reinforce first the good quality of institutions, which in a way can provide a more stable framework for financial institutions and can lead to the resources devoted to the development of the financial system having a positive impact.

It is important to note that we are in no way proposing that the banking sector and institutions are perfect substitutes. Rather we are suggesting that some of the positive effects that well-functioning institutions have on transaction and information costs might also stem from a developed banking sector.

### **4.3. Robustness check and extensions**

In this section we perform some further regression analysis in order to test the robustness of the empirical results. First, we select a more conservative poverty line at the threshold of \$1.25. We also use the poverty gap as an alternative index of poverty. This index gauges the breadth and intensity of poverty, so that the higher the index, the farther the average poor person is from the poverty line. The empirical estimates are shown in Table 7. To save space we have reported only the results for the regression with private credit

as the financial measure, but similar results apply to M3 and bank assets (results available upon request). As can be seen, financial development and institutions still exhibit substitutability in their effect on poverty alleviation, regardless of the index and the threshold line used to define poverty.

Table 7: Robustness analysis - Alternative indices of poverty

	<b>Headcount (\$1.25)</b>	<b>Poverty gap (\$2)</b>	<b>Poverty gap (\$1.25)</b>
	<b>[1]</b>	<b>[2]</b>	<b>[3]</b>
$y_{t-1}$	0.662*** (0.117)	0.711*** (0.110)	0.560*** (0.107)
Education <sub>t</sub>	0.002 (0.015)	-0.005 (0.009)	-0.005 (0.004)
Public Spending <sub>t</sub>	0.148*** (0.046)	0.008 (0.025)	0.012 (0.014)
Gini <sub>t</sub>	0.061 (0.309)	0.106 (0.139)	0.062 (0.068)
Institutions <sub>t-1</sub>	-0.422** (0.160)	-0.130* (0.075)	-0.084* (0.049)
Interaction <sub>t-1</sub>	0.010** (0.004)	0.003** (0.001)	0.002** (0.001)
Private Credit <sub>t-1</sub>	-0.006** (0.003)	-0.002** (0.001)	-0.001** (0.001)
Observations	191	191	191
Countries	58	58	58
Instruments	25	32	32
AR(2) test	0.230	0.195	0.485
Hansen J test	0.239	0.831	0.958

Notes: The table reports the estimates from the two-step system GMM estimator. The dependent variables are the \$1.25 a day headcount index, the \$2 a day poverty gap and the \$1.25 a day poverty gap over five-year intervals spanning 1984 to 2012. The interaction corresponds with the interaction term between the finance and institution variables. The interaction term, education and Gini are treated as endogenous. A constant term and a set of time dummy variables are included in all regressions but not reported. The last two rows report the p-values of the Arellano and Bond test and Hansen test respectively. Robust standard errors in parenthesis. \*\*\*, \*\* and \* denote statistical significance at the 1%, 5% and 10% level respectively.

Next, we have included one-by-one additional control variables that represent potentially important factors underlying poverty, which are economic growth, the fertility rate, trade openness, inflation, the age dependency ratio, and an index gauging the degree of civil liberties. The results are displayed in Table 8. As might be expected, the estimates show a positive and significant

impact from per capita GDP growth on poverty alleviation (column 1). This finding provides evidence in favour of a pro-poor impact from growth, meaning that poverty alleviation and growth are likely to go hand in hand. Not surprisingly, this result is in line with several empirical studies, such as Dollar and Kraay (2002), Jalilian and Kirkpatrick (2005), and Kraay (2006). As can be seen, the inclusion of the growth variable does not affect the sign or the statistical significance of financial development and institutions. This means that the improvements in the financial sector and institutions alleviate poverty via channels other than the one working through growth.

As for civil liberties, the variable is constructed in such a way that a higher level for the index corresponds to a lower degree of freedom. The positive sign means that a rise in the degree of civil liberties leads to lower poverty rates, as would be expected (column 6). With regard to financial development, institutions and the interaction between them, the sign, and the statistical significance of the associated coefficients are preserved across all the specifications. The main variables of interest maintain their sign and statistical significance when we run a regression accounting for all the explanatory variables (column 7).

We have also included the squared term of private credit as an additional regressor (column 8). In line with Greenwood and Javonavic's (1990) hypothesis, the idea is that in the early stages of development, improvement of the financial sector might be regressive in terms of income inequality. This would mean that the pro-poor impact of financial development could manifest itself only in later stages. The estimates are shown in the last column of Table 8. We note that the square term is statistically significant but the size is zero, so we can safely omit it when assessing the financial development-poverty nexus.

Another concern with the estimations is the potential influence of outliers. We have used the Hadimvo procedure for outlier detection available in Stata for multivariate data (Hadi (1994)). The procedure yields no outliers.

Table 8: Robustness Analysis - Additional Explanatory Variables

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Poverty <sub>t-1</sub>	0.722*** (0.128)	0.688*** (0.108)	0.715*** (0.158)	0.689*** (0.166)	0.698*** (0.108)	0.694*** (0.167)	0.779*** (0.128)	0.661*** (0.112)
Education <sub>t</sub>	-0.022 (0.014)	-0.024* (0.012)	-0.028* (0.015)	-0.031* (0.016)	-0.024* (0.013)	-0.022 (0.014)	-0.023 (0.019)	-0.035** (0.013)
Public Spending <sub>t</sub>	0.032 (0.029)	0.038 (0.027)	0.039 (0.034)	0.056 (0.036)	0.041 (0.026)	0.045 (0.037)	0.049 (0.041)	0.101*** (0.036)
Gini <sub>t</sub>	0.036 (0.247)	0.061 (0.214)	0.166 (0.246)	0.217 -0.241	0.034 (0.234)	0.081 (0.270)	0.131 (0.281)	-0.021 (0.213)
Institutions <sub>t-1</sub>	-0.422*** (0.134)	-0.411*** (0.127)	-0.420** (0.163)	-0.431*** -0.14	-0.407*** (0.148)	-0.434** (0.203)	-0.439*** (0.118)	-0.509*** (0.159)
Private Credit <sub>t-1</sub>	-0.005*** (0.001)	-0.005*** (0.002)	-0.006** (0.002)	-0.005** -0.002	-0.005** (0.002)	-0.006** (0.002)	-0.005** (0.002)	-0.004** (0.002)
Interaction <sub>t-1</sub>	0.009*** (0.003)	0.009*** (0.003)	0.011** (0.004)	0.009** -0.004	0.009** (0.004)	0.011** (0.005)	0.009** (0.004)	0.012*** (0.004)
Growth <sub>t</sub>	-0.007** (0.003)						-0.002 (0.004)	
Fertility <sub>t</sub>		0.011 (0.010)					0.014 (0.017)	
Openness <sub>t</sub>			0.032 (0.049)				0.001 (0.041)	
Inflation <sub>t</sub>				0.027* (0.014)			0.020 (0.015)	
Age Dependency <sub>t</sub>					0.001 (0.001)		-0.001 (0.002)	
Civil Liberties <sub>t</sub>						0.019* (0.011)	-0.004 (0.007)	

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Private Credit <sub>t</sub> <sup>2</sup>								0.000** (0.000)
Observations	190	191	191	181	191	191	181	191
Countries	58	58	58	56	58	58	56	58
Instruments	26	26	26	26	26	26	30	26
AR(2) test	0.497	0.092	0.058	0.445	0.089	0.091	0.443	0.342
Hansen J test	0.711	0.660	0.634	0.676	0.650	0.413	0.740	0.698

Notes: The table reports the estimates from the two-step system GMM estimator. The dependent variable is the \$2 a day headcount index over five-year intervals spanning 1984 to 2012. The interaction corresponds with the interaction term between the financial development and institution variables. The interaction term, education and Gini are treated as endogenous. A constant term and a set of time dummy variables are included in all regressions but not reported. The last two rows report the p-values of the Arellano and Bond test and Hansen test respectively. Robust standard errors in parenthesis. \*\*\*, \*\* and \* denote statistical significance at the 1%, 5% and 10% level respectively.



## 5. Concluding remarks

In the economic literature on poverty, a large amount of work has been done on the effect of financial development and institutional frameworks on poverty. These earlier empirical studies have generally provided evidence of a pro-poor impact from financial development and from institutions. Notwithstanding these results, the interaction effect between finance and institutions has been left out. The aim of this study is consequently to reassess the causal link from financial development to poverty for a sample of developing countries, while allowing an interaction effect between the financial sector and the institutional framework, which we believed may be causing some omitted variable bias.

We have applied OLS regressions for panels and GMM regressions to take into account the possibility of endogeneity, along with different specifications and robustness checks to strengthen the validity of our results. The main results from this empirical investigation can be summarised as follows. First, we find that financial development has a statistically significant and positive impact on poverty alleviation. This result holds across all alternative measures of financial development and poverty. Secondly and similarly, the estimates show that the development of the institutional framework also has a significant and positive effect on poverty alleviation. However, we also find that the pro-poor impact of financial development is weaker where institutions work better and stronger when institutions work less well.

These findings provide evidence in favour of a substitution effect between finance and institutions. One possible reason behind such an effect is that some of the limitations associated with a weak institutional framework might be alleviated by the working of the banking system. Furthermore, the statistical significance of the substitution effect means that previous empirical models of poverty which fail to account for an interaction between financial development and institutions may be essentially mis-specified. In terms of policy implications our findings indicate that the highest returns in terms of poverty alleviation are obtained from allocating resources to either institution-building or the banking sector. This is particularly relevant in countries where economic resources and funds are scarce and funds are devoted to satisfying the basic needs of the population. A proper rationing of these funds between financial development and improving the quality of institutions is then a key to aiding poverty alleviation and enhancing economic growth. Of course, the decision of whether to devote funds to one or the other depends on the current levels of financial development and the quality of institutions, a finding which is corroborated by other authors who take account of threshold effects.

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## Appendix

Table A-1: List of Countries

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Albania	Hungary	Philippines
Argentina	India	Romania
Armenia	Indonesia	Senegal
Bangladesh	Iran	Serbia
Bolivia	Jamaica	South Africa
Brazil	Jordan	Sri Lanka
Bulgaria	Kazakhstan	Tanzania
Cameroon	Kenya	Thailand
China	Malawi	Togo
Colombia	Malaysia	Tunisia
Costa Rica	Mali	Turkey
Cote d'Ivoire	Mexico	Uganda
Dominican Republic	Moldova	Ukraine
Ecuador	Morocco	Venezuela
Egypt	Mozambique	Vietnam
El Salvador	Nicaragua	Zambia
Gambia	Niger	
Ghana	Pakistan	
Guatemala	Panama	
Guyana	Paraguay	
Honduras	Peru	

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Notes: The table illustrates the largest sample of countries used in the empirical investigation.

Table A-2: Description of Variables

<b>Variable</b>	<b>Description</b>	<b>Source</b>
Poverty headcount (\$2)	Share of the population living on less than \$2 per day at 2005 PPP	World Development Indicators (World Bank)
Poverty headcount (\$1.25)	Share of the population living on less than \$1.25 per day at 2005 PPP	
Poverty gap (\$2)	Mean shortfall from the poverty line of \$2 per day measured as a share of the poverty line	
Poverty gap (\$1.25)	Mean shortfall from the poverty line of \$1.25 per day measured as a share of the poverty line	
Private Credit	Domestic credit to the private sector by banks (% of GDP)	
Growth	Percentage change of per capita GDP per capita based on constant local currency	
Public spending	General government final consumption expenditure (% of GDP)	
Inflation	Percentage change in the consumer price index	
Gini	Ratio of the area between the Lorenz curve and the line representing perfect equality	
Age Dependency	Age dependency ratio (% of working-age population)	
Openness	Sum of exports and imports (% of GDP)	Financial Structure Database 2010
Fertility	Fertility rate, total (births per woman)	
M3	Liquid liabilities (% of GDP)	Barro and Lee (2010)
Bank Assets	Deposit Money Bank Assets (% of GDP)	
Education	Average schooling in years for the total population aged 15 and over	Freedom House
Civ. Lib.	Civil Liberties	
Institutions	Arithmetic average of the ICRG variables "Corruption", "Law and Order" and "Bureaucracy Quality"	International Country Risk Guide

Notes: Data on institutions, education and civil liberties have been retrieved from Teorell, Jan, Marcus Samanni, Sören Holmberg and Bo Rothstein (2011). The Quality of Government Dataset, version 6Apr11. University of Gothenburg: The Quality of Government Institute [access via: <http://www.qog.pol.gu.se>.]

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