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Financial Development, Institutional Quality and Poverty Reduction: Worldwide Evidence

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Abstract This paper tests the relationship between financial development, quality of institutions and poverty. To this end, we reviewed the literature and selected indicators of poverty, financial development and quality of institutions. Empirically, we used the three-stage least squares method to examine a sample of 132 countries observed over the 1980–2014 period. First, we proved that financial development does not improve the situation of the poor, while the effect of institution quality on poverty and financial development depends on the choice of indicators. Our robustness analysis pointed to the sensitivity of our results to the different financial development, quality of institutions and poverty indicators.

Keywords Financial development · Quality of institutions · Poverty · 3SLS · Simultaneous equation modeling

JEL Classification G20 · I32 · O17

1 Introduction

Reducing poverty is a serious challenge for the international communities and in particular developing countries. This issue has been heavily discussed in economics calling for enabling the most deprived of populations access to the financial system, through financial institutions. Nevertheless, the poor faces two major problems. First, the inability of lower social classes to provide investment guarantees, and second the high investment rates.

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Financial development (FD) can contribute to poverty reduction in various ways. On the one hand, it can do so by improving the poor's access to financial services, in particular through specialized financial institutions. On the other hand, it can do so by reducing income inequalities through economic growth, known in the literature as the «*Trickle Down*[1]*» economy. According to* Beck et al. (2007): "If financial development intensifies income inequality, this income distribution effect will mitigate—or even negate—the beneficial effects of financial development on the poor". Many authors examined the relation between financial development (FD) and poverty like Jeanneney and Kpodar (2008), Sehrawat and Giri (2015), Abdin (2016), Abosedra et al. (2016), Ho and Njindan Iyke (2017), to mention but few.

During the last decade, many authors were set to examine the role of institutions quality in the relationship between financial development and economic growth like Hasan et al. (2009), Minea and Villieu (2010), Aggarwal and Goodell (2010), Rachdi and Mensi (2012) and Effiong (2016). The main result shared by these authors is that the financial system, set into a well-organized institutional framework, has a positive impact on economic growth.

North (1990) reviewed a number of studies that highlighted the role of institutions in determining economic growth rate or income per capita. Mauro (1995) and Knack and Keefer (1995) were the first to adopt relevant indicators to measure quality of economic institutions to empirically show that countries with performing institutions have the highest economic growth rates.

It is worth noting that few studies have focused on Institutions Quality (IQ) to examine the relationship between FD and poverty (e.g., Huang and Sing 2015; Cepparulo et al. 2017; Rashid and Intartaglia 2017). Another fringe of authors has been interested in testing the direct impact of IQ on FD such as Girma and Shortland (2008), Huang (2010a), Law et al. (2012) and Hafer (2013). Most of these authors confirmed a strong correlation between IQ and FD and concluded that quality of institutions improves the development of the financial sector.

In this study, we are interested in examining the relation between FD and poverty by taking into consideration the simultaneous effect of quality of institutions. We consider Banking and stock market indicators to measure the FD variable. We used various poverty indicators and two different databases of IQ rarely used in the literature, notably the Economic Freedom of the World from Fraser Institute, and Polity2 from Polity4 Project[2] database. To test this relationship, we have chosen the three-stage least squares (3SLS) method to estimate an international sample of 132 countries, observed over the 1980–2014 period. According to our model outputs, we concluded that FD failed to reach the poorest segments of society of the international sample. According to the institutional indicators, we noticed that the impact of the variable Eco_Freedom on poverty and FD is sensitive to the choice of financial indicators, used in the main model. Nevertheless, the second institutional variable Polity2, has an overall negative impact on FD and poverty.

The rest of the paper is structured as follows: Sect. 2 reviews the relationship between FD, IQ, and poverty. Section 3, we specify the model and choose the variables and used

[1] The Trickle Down's theory of development is widely used in the 70th with the liberal politics of Ronal Reagan. This approach is recommended by The Chicago School guaranteeing that the wealth of the upper social classes would eventually benefit society as a whole. The main idea was to demonstrate that tax policies favoring the rich always end up favoring the poorest.

[2] It should be noted that some authors preferred the use of the six indicators of Kauffman et al. (2009) from the Worldwide Governance Indicators, Heritage Foundation, International Country Risk Guide.

sources. Section 4 presents the model outputs and discusses the econometric results. Section 5, we conclude the paper.

2 Literature Review

The literature on the impact of FD on economic growth and poverty, through the IQ channel, is abundant. We classify the literature review into three main trends. The first trend measures the direct effect of IQ on FD (e.g., Baltagi et al. 2009; Law et al. 2012; Hafer 2013). Nevertheless, the main conclusions shared by these authors indicate that an improvement in the quality of institutions plays a determining role for the proper functioning of the financial sector. The second trend deals with the interactive impact of FD and IQ on economic growth (e.g., Habibullah and Law 2006; Law et al. 2012…). In fact, the adoption of effective policies, that target public institutions, promotes FD, increasing thereby economic growth (e.g., Hasan et al. 2009; Minea and Villieu 2010; Aggarwal and Goodell 2010). The third trend includes authors such as Huang and Sing (2015) and Cepparulo et al. (2017). It accounts for the interactive impact of FD and IQ on poverty. Indeed, the choice of the institutional variable in these studies (ownership rights, rule of law, corruption in government, quality of bureaucracy…) differs from one author to another and the empirical results are mixed, which calls for further scrutinizing the issue.

2.1 Institutional Quality and Financial Development

In the first trend, the authors considered the bidirectional relationship between institutions and finance while testing the direct effect of IQ on FD. La Porta et al. (1997, 1999) indicated that the origins of the legal code significantly influence the treatment of Shareholders and Creditors and the Contracts' execution effectiveness. The authors found that low levels of Shareholders Rights are associated with small stock markets, particularly in countries adopting French civil law. However, the countries adopting common law offer relatively more rights to Shareholders and dispose of more developed stock market. Levine (1998) found that countries, which adopt legal and regulatory systems that favor creditors receiving the total current value of their claims on companies, are endowed with more efficient financial intermediaries than countries adopting a legal system that provides lower support to creditors. Moreover, the latest author noticed that contracts execution and information disclosure are key factors behind reinforcing FD. Rajan and Zingales (2003) brought into doubt the link between legal origins and FD, and highlighted the central role of political forces regarding putting down policies regulating financial markets and their development. Indeed, according to these authors, FD requires institution improvement, which might promote market efficiency and slow down rent-seeking activities of interest groups. Baltagi et al. (2009) tested the impact of institutions quality and financial/trade openness on FD for developed and developing countries over the 1980–2003 period. The authors argued that those two dimensions seem to influence FD. Nevertheless, quality of institutions, by itself, is not significant for the development of the banking sector. Girma and Shortland (2008) examined the impact of democracy characteristics and change of political regime on FD. The study covered developed and developing countries over the 1975–2000 period, and used the generalized method of moments (GMM) as an estimation method. The authors concluded that the degree of democracy and political stability are important factors for FD. Indeed, according to the previous study, the banking sector blossomed in a stable political

system and democracy, while market capitalization develops faster in full democracies. Huang (2010a, b) highlighted the short-term virtues of improving institutions on FD, for low-income economies. The study covered 90 developed and developing countries over the 1960–1999 period. Law et al. (2012) examined the relationship between quality of institutions and FD. The study covered a sample of developed and developing countries over the 1996–2004 period, GMM was used as an estimation method. The authors included the squaring of digital institutions quality in their model, to test the nonlinear relationship. The authors conclude that IQ indicators follow the U-Normal shape with the development of the stock market. The results of the model indicate that IQ leads to better development of the banking sector. Hafer (2013) measured the impact of economic freedom on FD. The study covered 80 countries over the 1980–2009 period. The results indicate that countries with higher levels of economic freedom have higher levels of FD.

2.2 Financial Development, Institutional Quality and Economic Growth

Habibullah and Law (2006) tested the effect of the stock market development and the quality of institutions, on the economic performance of eight countries of East Asia, over the 1980 and 2001 period. The latest authors argued that FD, combined with good IQ, positively impact the economic growth. Hasan et al. (2009) examined a panel, of 31 provinces in China over the period 1986–2002, to study the relations between, legal institutions, FD, and economic growth. Empirical evidence suggests that the development of financial markets, the legal environment, awareness of property rights and political pluralism are associated with higher growth. Yahyaoui and Rahmani (2009) analyzed the relations between FD, IQ, and economic growth, in a panel of 22 developing countries over the period 1990–2006. The main empirical results of this model suggested that the quality of governance, in its various aspects, is a key to FD. The authors concluded that the FD, through a sound institutional framework, has a significant effect on economic development. Rachdi and Mensi (2012) examined the relation between FD and economic growth, by introducing five institutional variables in a panel of 13 countries in the MENA region over the period 1990–2008. Authors concluded that FD and IQ, jointly impact economic growth in a positive manner. Law et al. (2012) proved that FD positively and significantly impacts economic growth only when the level of institutional development reaches a certain threshold. Balach and Law (2015) analyzed the relationship between FD, the quality of institutions, human capital, and economic performance, in four countries of the South Asian Association for Regional Cooperation (SAARC) over the period 1984–2008. The authors argued that the IQ has a significant impact on economic performance, especially when the financial sector is linked to a stable institutional framework and has adequate human capital. The results also revealed that the combination of good FD, good institutions, and good human capital, added significant value to economic development. Effiong (2016) studied the direct effect of FD on economic growth and examined as well the indirect effect through the IQ channel. This study covered 21 countries of sub-Saharan Africa over the period 1986–2010. The empirical results indicate that FD has no significant impact on economic growth, while IQ positively and significantly influences economic growth. Results also suggest that the indirect joint effect of FD and IQ, positively impact economic growth. However, this insignificant effect suggests that the institutions did not improve the relationship between finance and growth in this region.

2.3 Financial Development, Institutional Quality and Poverty

We have noticed that studies studying this relationship are few in number. Huang and Sing (2015) tested the indirect effect of FD on poverty, through ownership rights. This study covered 37 countries in Sub-Saharan Africa for the period between 1992 and 2006. The estimations specified that, if it is not supported by substantial ownership rights, FD leads to exacerbating income inequalities and increasing poverty. Cepparulo et al. (2017) studied the relationship between FD, IQ and poverty. The study covered a set of developed countries observed over the 1984–2012 period. The results indicate that FD reduces poverty. The authors also showed that institutional effectiveness reduces the impact of FD on poverty. Recently, Rashid and Intartaglia (2017) has examined this relationship in a panel of 60 developing countries, observed over the 1985–2008 period. Their results indicate that the financial sector development has larger effects on poverty reduction when institutional arrangements are sound or/and when economic growth is high.

We notice that the empirical evidence of the studies cited above did not highlight the impact of banks and stock markets on poverty reduction. To bridge this gap, we used banking and stock markets development dimensions to examine this relationship. Moreover, our interest is to take account of the simultaneous effect of IQ on FD and Poverty. To our knowledge, there is no study that has examined this relationship using simultaneous equation modeling (SEM).

3 Methodology

3.1 The Specification of the Simultaneous Equation Model

In this section, we present our equations to test the relationship between FD, IQ and poverty. To do so, we used SEM to write our equations as follows:

$$POV_{it} = \alpha_0 + \alpha_1 FD_{it} + \alpha_2 INST_{it} + \alpha_3 GDP_{it} + \alpha_4 School\_enr_{it} + \alpha_5 T\_Openness_{it} + \alpha_6 INF_{it} + \alpha_7 POP_{it} + \alpha_8 Gov\_exp_{it} + \varepsilon_{it} \quad (1)$$

$$FD_{it} = \lambda_0 + \lambda_1 INST_{it} + \lambda_2 GDP_{it} + \lambda_3 T\_Openness_{it} + \lambda_4 F\_Openness_{it} + \lambda_5 INF_{it} + \lambda_6 POP_{it} + \varepsilon_{it} \quad (2)$$

Note that all variables are expressed in logarithms, with *POV* denoting poverty indicator, FD is the financial development indicator [banking and stock market (% of GDP)], *INST* is quality of institutions, *GDP* is Gross Domestic Product per capita, *School_enr* is education level, *T_Openness* represents trade openness (% of GDP), *F_Openness* represents Financial openness, *INF* is inflation rate, *POP* is total population, *Gov_exp* represents expenditure on government's final consumption (% of GDP), α's and λ's are the parameter vectors; and ε_{it} are unobserved noise.

Simultaneous equations can be estimated empirically by applying the two-stage least squares (2SLS) or the three-stage least squares (3SLS) regression analysis (Hair et al. 2010; Baltagi 2011). First, we made sure that our two equations are over-identified before estimating them. We opted for the 3SLS method to test the relationship between our primary variables, which are FD, IQ, and poverty. Nevertheless, the 3SLS technique provides more coherent and accurate estimation than the tow-stage least squares (2SLS) technique (e.g., Cameron and Trivedi 2005; Deng et al. 2007; Mantecon 2009…).

3.2 Data and Variables Sources

This study examines a sample of 132 countries. We tested the relationship between FD, IQ, and poverty, during the 1980–2014 period. The POV_{it} indicator is measured in different ways in the literature. It is measured by the variable that represents the percent of people living on $1 or less per day (e.g., Beck et al. 2007; Perez-Moren 2011; Singh and Huang 2015…). It is also measured by the percent of people living on $2 or less per day (e.g., Perez-Moren 2011; Johansson and Wang 2012…), or by average income per capita of 20% of the poorest population (e.g., Jeanneney and Kpodar 2008; Shahbaz 2009; Singh and Huang 2015; Seven and Coskun 2016…). In this study, we used household final consumption expenditure (HFCE) as poverty variable taken from the World Development Indicators Database of the World Bank, since this indicator is available for the entire study period. Moreover, this variable was used by several authors, like Datt and Ravallion (2002), Quartey (2005), Odhiambo (2009), Shahbaz and Ur Rehman (2013), Chemli (2014), Uddin et al. (2014), Dhrifi (2015) and Sehrawat and Giri (2015).

FD was also measured by a number of variables; either by banking indicators such as bank credits to the private sector as a percent of GDP, and liquid liabilities (M3) as a percent of GDP, or by stock market indicators such as market capitalization of listed companies as a percent of GDP and the Turnover ratio as a percent of GDP.

As for IQ, we used two variables: the World Index Economic Freedom of Fraser Institute, like Compton et al. (2011), Wang et al. (2015) and Effiong (2016), and the Polity2 variable derived from the Polity4 Project database, like Girma and Shortland (2008), Huang (2010a) and Effiong (2016).

The World Economic Freedom Index measures the extent to which Policies and institutions are promoting economic freedom. Forty-two data points are used to construct a summary index and to measure the degree of economic freedom in five broad areas: (1) size of government (expenditures, taxes, and enterprises); (2) legal structure and security of ownership rights; (3) access to sound money; (4) freedom to trade internationally; and (5) regulation of credit, labor, and business. The index of economic freedom is available from 1970, for 157 countries. We also used the Polity2 score, which is a derivation of democracy and autocracy index. This index is used to measure the democracy level of institutions in a given country. The index ranges from − 10 (strongly autocratic) to 10 (highly democratic). The Polity4 Project codes the authority characteristics of states at a given moment, as a reference to the institutionalization of democracy.

4 The Results and Discussion

4.1 Descriptive Analysis

Tables 1 and 2 respectively report the descriptive statistics and the correlation coefficients of the variables used in our model. For each variable, the mean, standard deviation (SD), Min and Max were calculated. The correlation matrix shows a relatively low correlation between the variables.

Table 1 Descriptive statistics

Variable	Obs	Mean	SD	Min	Max
ln HFCE	4178	4.17	0.24	2.41	5.60
ln Cred	4100	3.42	0.96	− 0.22	5.74
ln M3/PIB	1454	3.75	0.60	1.88	5.48
ln Market_cap	1822	3.35	1.50	− 5.29	11.53
ln Turnover	1438	2.99	1.69	− 9.49	9.78
ln Eco_Freedom	3657	6.18	1.30	2.47	9.17
ln Polity2	4148	3.55	6.67	− 10.00	10.00
ln GDP	4343	24.25	2.28	18.77	30.41
ln POP	4620	15.98	1.74	11.07	21.03
ln T_Openness	4272	4.22	0.59	1.84	6.28
ln F_Openness	3805	0.08	1.55	− 1.86	2.44
ln INF	3990	1.93	1.42	− 13.50	9.65
ln School_enr	3307	4.03	0.75	0.91	5.11
ln Gov_exp	4203	2.69	0.39	0.72	4.44

All variables are in logarithms

Table 2 Correlation coefficients matrix

	HFCE	Cred	M3/GDP	Market_cap	Turnover	Eco_Freedom	Polity2
HFCE	1.0000						
ln Cred	− 0.355***	1.000					
ln M3/GDP	− 0.467***	0.773***	1.000				
ln Market_cap	− 0.340***	0.550***	0.449***	1.000			
ln Turnover	− 0.209***	0.320***	0.298***	0.047**	1.000		
ln Eco_Freedom	− 0.326***	0.634***	0.444***	0.499***	0.168***	1.000	
ln Polity2	− 0.172***	0.419***	0.262***	0.114***	0.134***	0.522***	1.000

***, **, * Significance at 1, 5, and 10%, respectively

Table 3 reports a summary of the unit root test results at levels and first differences. Overall, the results reject the null hypothesis of a unit-root. Hence, one can assume that most of the variables under analysis are stationary at their levels as well as at the first difference I(1).

4.2 The Results

Table 4 summarizes all the 8 estimated regressions on the international sample. Referring to the results of the core variables, we noted that all FD variables, namely banking indicators and stock market indicators, significatively impact, at the 1% level, household final consumption expenditure in all regressions. This result shows the solidity and robustness of our outputs. Banking indicators have a positive and significant impact on poverty. On the other hand, the signs of stock market variables are mixed. We can conclude that FD, broadly, does not improve the situation of the poor in the international sample. Economically, this effect can be explained by a dysfunctioning of the financial sphere, which suffers from an imbalance in capital distribution between social classes. Access to the stock

Table 3 Panel-based unit root test

Variables	ADF	ADF First difference
Fisher type tests		
ln HFCE	538.9187***	432.0115***
ln Cred	231.9254	284.3989
ln M3/PIB	114.4169	349.9166***
ln Market_cap	628.3173***	385.2703***
ln Turnover	307.3476***	294.0316***
ln Eco_Freedom	237.0594	149.0063
ln Polity2	372.4136***	367.8017***
ln GDP	154.3495	130.9462
ln POP	3703.7525***	548.2478***
ln T_Openness	353.0766***	328.8471***
ln F_Openness	701.0372***	438.6844***
ln INF	1106.4181***	541.9535***
ln School_enr	375.8652***	302.0768**
ln Gov_exp	455.2006***	498.9013***

***, **, * Significance at 1, 5, and 10%, respectively

exchange is partly restricted to companies' shareholders, while households do not have this privilege. When it comes to bank-based financing via loans and other instruments, they are mostly intended for the wealthy, who possess guarantees. As they cannot hold guarantees, the poor are unable to invest to increase their productive assets and incomes and build a safer future.

For IQ indicators, we noticed that, when we use banking indicators, the variable Eco_Freedom significantly and positively impacts household final consumption expenditure, especially in the first equation. Several authors have opted to the World Economic Freedom database to test the impact of economic freedom on poverty indicators. These authors concluded that countries with institutions and policies which support economic freedom saw a rapid reduction in poverty rates (Gwartney et al. 2015).[3] Being itself an institutional variable, Polity2 negatively impacts poverty, except for the sixth regression. Those results are consistent with those of Huang and Sing (2015). On the other hand, when we use stock market indicators, the impact of Economic Freedom turns positive, while the impact of Polity2 on poverty remains negative.

We noticed that our first institutional variable, Eco_Freedom is sensitive to the choice of financial indicators in this model. According to Cepparulo et al. (2017), in an institutional setting characterized by poor law enforcement and ill-defined ownership rights, seriousness of transaction and information costs makes it difficult for the individual, and in particular for the poor, to contract and raise funds from the market. Because they are personal and self-reinforcing, banking relationships can lower these costs, thus patching up the deficiencies in the institutional framework. Accordingly, banks can act as a surrogate for the functions provided by formal institutions. In this case, the highest rewards from promoting a

[3] Readers interested in the subject may consult the following literature review: Hall and Lawson (2014). Economic Freedom of the World: An Accounting of the Literature.

Table 4 3SLS estimation results from the international panel

Equation 1	HFCE							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Cred	− 0.13*** (− 4.11)	–	–	–	− 0.21*** (− 5.68)	–	–	–
M3/GDP	–	− 0.21*** (− 2.56)	–	–	–	− 0.24*** (− 3.86)	–	–
Market_cap	–	–	0.08*** (4.25)	–	–	–	0.30*** (3.81)	–
Turnover	–	–	–	− 0.18*** (− 4.76)	–	–	–	− 0.22*** (− 3.83)
Eco_Freedom	0.04*** (6.69)	0.04*** (4.28)	− 0.02*** (− 2.57)	− 0.009 (− 0.90)	–	–	–	–
Polity2	–	–	–	–	0.004*** (4.39)	− 0.0002 (− 0.12)	0.009*** (3.19)	0.003 (1.08)
GDP	− 0.02*** (− 5.06)	− 0.008 (− 0.85)	− 0.06*** (− 10.51)	0.05*** (2.65)	− 0.01 (− 1.37)	0.004 (0.50)	− 0.16*** (− 5.40)	0.06** (2.17)
School_enr	− 0.001 (− 0.16)	− 0.07*** (− 3.53)	− 0.04*** (− 2.64)	0.01 (0.60)	0.01 (1.40)	− 0.04** (− 2.21)	− 0.05*** (− 2.90)	− 0.01 (− 0.52)
INF	− 0.02*** (− 3.51)	− 0.01 (− 1.24)	0.004 (0.86)	− 0.01** (− 2.05)	− 0.05*** (− 6.16)	− 0.03*** (− 4.39)	0.08*** (3.53)	− 0.01 (− 1.47)
Gov_exp	− 0.13*** (− 9.02)	− 0.17*** (− 6.46)	− 0.12*** (− 9.40)	− 0.09*** (− 6.36)	− 0.11*** (− 6.90)	− 0.18*** (− 7.65)	− 0.12*** (− 5.36)	− 0.07*** (− 4.88)
T_Openness	− 0.07*** (− 4.92)	0.05 (1.50)	− 0.18*** (− 12.63)	− 0.01 (− 0.62)	− 0.01 (− 0.94)	0.09*** (3.35)	− 0.33*** (− 6.77)	− 0.009 (− 0.21)
Constant	5.75*** (38.63)	5.51*** (26.42)	7.13*** (32.38)	3.54*** (5.97)	5.56*** (30.78)	5.33*** (26.19)	9.14*** (12.34)	3.46*** (4.20)
Nbr of Obs	2234	823	1120	929	2304	802	1123	924
R squared	0.29***	0.24***	0.11***	− 0.91***	0.03***	0.17***	− 4.14***	− 1.94***

Table 4 (continued)

Equation 2	FD							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Eco_Freedom	0.13*** (8.50)	− 0.06*** (− 3.38)	0.57*** (11.12)	− 0.09* (− 1.86)	–	–	–	–
Polity2	–	–	–	–	− 0.002 (− 0.88)	− 0.01*** (− 5.52)	− 0.1 (− 1.25)	− 0.01 (− 1.53)
GDP	0.32*** (32.09)	0.24*** (20.21)	0.21*** (7.29)	0.72*** (20.47)	0.37*** (35.81)	0.29*** (22.95)	0.29*** (8.77)	0.65*** (16.32)
T_Openness	0.31*** (10.81)	0.35*** (8.33)	0.65*** (8.68)	0.61*** (7.62)	0.29*** (10.28)	0.28*** (7.32)	0.69*** (8.30)	0.57*** (6.54)
F_Openness	− 0.04*** (− 4.64)	− 0.02*** (− 2.79)	− 0.10*** (− 3.18)	− 0.03* (− 1.89)	− 0.02*** (− 3.51)	− 0.07*** (− 7.58)	0.008 (0.30)	− 0.04** (− 2.33)
INF	− 0.14*** (− 12.33)	− 0.11*** (− 7.53)	− 0.12*** (− 3.59)	− 0.03 (− 0.95)	− 0.19*** (− 17.78)	− 0.10*** (− 7.99)	− 0.32*** (− 9.49)	− 0.01 (− 0.46)
POP	− 0.22*** (− 18.23)	− 0.18*** (− 11.23)	0.13*** (4.07)	− 0.24*** (− 6.13)	− 0.25*** (− 18.18)	− 0.24*** (− 12.40)	0.13*** (4.11)	− 0.24*** (− 5.26)
Constant	− 2.71*** (− 11.40)	− 0.12 (− 0.34)	− 11.07*** (− 13.39)	− 13.37*** (− 15.17)	− 2.56*** (− 10.09)	− 0.37 (− 1.06)	− 8.88*** (− 10.54)	− 11.96*** (− 13.27)
Nbr of Obs	2234	823	1120	929	2304	802	1123	924
R squared	0.61***	0.46***	0.36***	0.42***	0.58***	0.50***	0.30***	0.35***

T-statistics are presented in parentheses

***, **, * Significance at 1, 5, and 10%, respectively

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 benefits from institutional quality improvements might be greater in financially underdeveloped economies than in countries with high levels of banking development.

In the second equation, the impact of the Eco_Freedom variable on FD is reversed, but significant in all regressions at the 1 and 10% levels. Eco_Freedom has a positive impact on bank lending to the private sector and the market capitalization of listed companies. These results are consistent with the literature and authors such as Huang (2010a), Hafer (2013), Law et al. (2012) and so forth. We also noted a negative impact on liquid liabilities (M3/GDP) and turnover ratio as a percentage of GDP. We finally conclude that the impact of the institutional variable Eco_Freedom depends on the choice of chosen financial indicators. As for the second institutional variable, Polity2, it negatively impacts FD in all regressions. However, this impact is not significant except in the sixth regression, in which the impact is significant at the 1% level. We can explain this result by the political regime of our sample. Indeed, the average of Polity2 in our selected nations is 4. Consequently, this result can lead us to conclude that most nations in our sample adopt a democratic political system. Boudriga and Ghardallou (2012) showed that below a certain threshold democratic institutions could create problems for the functioning of a financial system. Rajan and Ramcharan (2011) found that elites can block the development of the financial sector, to prevent access to finance, even in highly democratized countries. Moreover, Cherif and Gazdar (2010) found that institutional environment as captured by a composite policy risk index does not seem to be a powerful mechanism affecting the development of the stock market in the Middle East and North Africa (MENA) region.

For the control variables, we noted that most coefficients are significant in all the regressions of the two equations. When we use the Eco_Freedom variable as an institutional indicator, we noticed that GDP per capita impacts negatively, and significantly at the 1% level, household final consumption expenditure. The Eco_Freedom impact remains negative when we use the Polity2 variable as an institutional indicator in regressions 5 and 7. This output implies an imbalanced distribution of wealth in favor of the rich and at the expense of the poor. According to Todaro (2007), the growth process touches exclusively the middle class and the very wealthy population. In the second equation, GDP per capita positively impacts FD. This impact is significant at the 1% level in all regressions. These results, corroborate those of Colombage (2009) and Huang (2010a). Indeed Jaffee and Levonian (2001) proved that GDP per capita and the savings rate have an upward effect on the structure of the banking system. As for the variable INF, its impact is negative and significant, at the 1 and 5% levels in all the regressions of the first equation, except in regressions 2, 3, 7 and 8. Poverty worsened due to inflation because the latter exerts an adverse impact on the real value of assets and household purchasing power (Kpodar and Jeanneney 2006). Thus, inflation negatively affects FD at the 1% level, except in regressions 4 and 8, in which it turns out to be insignificant. Indeed, Huybens and Smith (1999) and Boyd et al. (2001) concluded that economies with higher inflation rates are likely to have less active and less efficient banks and stock markets. Regarding the T_Openness variable, it seems to have a downward effect on poverty in all our results except in regressions 2 and 6, precisely when we use the Turnover variable as an FD indicator. According to the United Nations Conference on Trade and Development (UNCTAD 2004), trade liberalization and facilitation of market access do not necessarily reduce poverty. In the second equation, T_Openness has a positive and statistically significant effect on all FD indicators at the 1% level. This result is consistent with that Baltagi et al. (2009), Huang (2010a)… The Rajan and Zingales (2003) and Huang and Temple (2005) indicate that the efficiency of the financial

system positively correlates with greater trade openness. Unlike the literature, enrollment rate has a negative and statistically significant impact at the 1% and 5% levels on household final consumption expenditure in almost all regressions. According to the literature, a higher level of education should be associated with lower poverty rates. Government final consumption expenditure (% of GDP) increases poverty in all regressions, at the 1% level. We can, therefore assume that income redistribution policies, through state interventions, social transfers, and the tax system are pro-rich in our sample. The F_Openness variable has a negative and statistically significant impact on household final consumption expenditure at the 1, 5 and 10% levels, except in regression 7. This result corroborates those of Law et al. (2012). Finally, population size is also closely related to FD indicators. Indeed, smaller countries tend to have higher liquid liabilities and private credits ratios, with the potential of significantly affecting the overall results (Huang 2010b). In our study, we observed that the POP variable negatively and significantly impacts the banking indicators. Nevertheless, the impact of POP on the stock market indicators is mixed.

4.3 Robustness Analysis

In this section, we conducted a robustness analysis on the four selected poverty variables, namely poverty gap at $1.90 per day (2011 PPP), poverty gap at $3.90 per day (2011 PPP), percentage of poverty with less than $1.90 per day and percentage of poverty with less than $3.10 per day. Due to lack of data, we selected 73 countries from the 132 countries surveyed over the 1981–2013 period.

As Tables 5, 6, 7 and 8 show, FD indicators have a significant impact on poverty variables in all the results, except in the two regressions in Table 5 (Regressions 3 and 5). As for the banking indicators, we noted that their impact is positive and significant at the 1% level in all regressions, especially when we use the variable Eco_Freedom as an institutional indicator in the model. This result corroborates our findings in the main analysis. However, when we use Polity2 as an institutional indicator in the specified model, the sign of the Cred variable turns out to be negative and significant at the 1% level. This change in the effect is steady in all the outputs, with the exception of regression 5 in Table 5, in which it turns out to be not significant. Consequently, we can conclude that the Polity2 variable affects the overall results of our model. The impact of Cred depends on the choice of the institutional variable. This finding does not corroborate our findings in the main analysis. Regarding M3/GDP, its impact on poverty remains positive even when we changed the institutional variable. This finding corroborates the main analysis. It indicates that banks, in the core sample, have not positively contributed to improve the situation of the poor. Such an assumption can be explained by a lack of a banking policy that aims to support the poor and improve their social conditions. As for the stock market indicators, their impact on poverty is mixed. We noticed a positive and a significant impact of Market_cap on all poverty indicators in all regressions except in regression 3 in Table 5. We also found a negative and a significant impact of Turnover on all poverty indicators at the 1% level. Accordingly, we can assume that the poor are excluded and at best scenarios they benefit little from the financial advantage of the stock market, when we use Market_cap as an FD indicator. Nevertheless, Turnover plays a beneficial role for the poor. These results do not

Table 5 3SLS estimation results from the international restricted panel

Equation 1	Poverty gap at $1.90 a day (2011 PPP)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Cred	9.82** (2.21)	–	–	–	− 1.53 (− 1.64)	–	–	–
M3/GDP	–	7.87*** (2.92)	–	–	–	11.98** (2.22)	–	–
Market_cap	–	–	0.49 (1.44)	–	–	–	3.44** (2.27)	–
Turnover	–	–	–	− 2.00*** (− 3.35)	–	–	–	− 2.44*** (− 3.38)
Eco_Freedom	− 1.13* (− 1.73)	− 0.10 (− 0.40)	0.03 (0.15)	0.01 (0.07)	–	–	–	–
Polity2	–	–	–	–	− 0.02 (− 1.40)	0.29* (1.94)	0.13* (1.69)	− 0.04 (− 0.79)
GDP	− 1.96*** (− 2.61)	− 0.66*** (− 3.86)	− 0.66** (− 3.41)	1.06** (2.39)	− 0.01 (− 0.08)	− 0.95*** (− 3.55)	− 2.20*** (− 2.74)	1.06** (2.30)
School_enr	− 1.10*** (− 3.68)	− 0.68 (− 1.48)	− 1.55*** (− 3.13)	− 0.99* (− 1.76)	− 1.49*** (− 7.84)	− 1.08* (− 1.67)	− 1.38* (− 1.69)	− 1.25** (− 1.98)
INF	1.84** (2.11)	0.30 (0.97)	− 0.04 (− 0.34)	− 0.19 (− 0.93)	− 0.46** (− 2.02)	0.84 (1.63)	1.00* (1.85)	− 0.03 (− 0.19)
Gov_exp	− 1.17 (− 1.00)	− 0.31 (− 0.65)	− 0.83** (− 2.02)	− 0.75 (− 1.56)	− 0.91*** (− 3.18)	− 0.10 (− 0.22)	− 0.53 (− 0.86)	− 0.56 (− 1.24)
T_Openness	− 6.88*** (− 3.01)	− 5.62*** (− 3.79)	− 2.09*** (− 7.47)	− 0.58 (− 0.87)	0.05 (0.08)	− 7.69*** (− 2.85)	− 4.52*** (− 3.53)	− 0.20 (− 0.26)
Constant	55.70*** (3.19)	15.87*** (2.94)	32.97*** (5.93)	− 13.09 (− 1.12)	15.40*** (3.36)	14.60** (2.16)	69.48*** (3.76)	− 12.40 (− 1.03)
Nbr of Obs	448	171	270	206	480	178	279	212
R squared	− 6.76***	− 2.82***	0.33***	− 0.62***	0.27***	− 5.81***	− 4.03***	− 1.57***

Table 5 (continued)

Equation 2	FD							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Eco_Freedom	0.11*** (3.49)	0.01 (0.30)	0.75*** (6.43)	− 0.12 (− 0.96)	–	–	–	–
Polity2	–	–	–	–	− 0.01*** (− 2.66)	− 0.02*** (− 3.35)	− 0.02 (− 0.91)	− 0.03 (− 1.38)
GDP	0.12*** (3.96)	− 0.01 (− 0.35)	0.13 (1.40)	0.96*** (8.98)	0.28*** (9.19)	0.03 (1.07)	0.36*** (4.13)	0.82*** (8.50)
T_Openness	0.60*** (9.17)	0.56*** (7.97)	0.64*** (3.93)	0.70*** (3.86)	0.62*** (10.04)	0.55*** (8.55)	0.87*** (5.08)	0.67*** (3.52)
F_Openness	0.01* (1.86)	0.01 (1.13)	− 0.08 (− 1.27)	− 0.09* (− 1.65)	0.005 (0.26)	0.008 (0.57)	0.10* (1.91)	− 0.14** (− 2.19)
INF	− 0.19*** (− 6.81)	− 0.03 (− 1.03)	− 0.12 (− 1.47)	− 0.09 (− 0.98)	− 0.24*** (− 8.94)	− 0.06** (− 2.25)	− 0.28*** (− 3.47)	− 0.04 (− 0.51)
POP	0.06* (1.65)	0.08** (2.08)	0.43*** (4.25)	− 0.34*** (− 2.88)	− 0.10*** (− 2.76)	0.04 (1.10)	0.22** (2.13)	− 0.33*** (− 2.82)
Constant	− 3.56*** (− 6.21)	0.07 (0.12)	− 15.38*** (− 8.25)	− 17.92*** (− 8.71)	− 3.84*** (− 6.80)	− 0.003 (− 0.00)	− 13.20*** (− 7.28)	− 14.97*** (− 7.53)
Nbr of Obs	448	171	270	206	480	178	279	212
R squared	0.43***	0.32***	0.35***	0.46***	0.42***	0.35***	0.29***	0.36

T-statistics are presented in parentheses

***, **, * Significance at 1, 5, and 10%, respectively

Table 6 3SLS estimation results from the international restricted panel

Equation 1	Poverty gap at $3.10 a day (2011 PPP)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Cred	11.16*** (2.96)	–	–	–	− 3.63*** (− 3.00)	–	–	–
M3/GDP	–	6.21*** (2.91)	–	–	–	11.41** (2.25)	–	–
Market_cap	–	–	1.63*** (3.63)	–	–	–	3.61*** (2.75)	–
Turnover	–	–	–	− 3.79*** (− 4.09)	–	–	–	− 2.02*** (− 3.79)
Eco_Freedom	− 1.32** (− 2.40)	0.03 (0.16)	− 0.61* (− 1.81)	− 0.51 (− 1.19)	–	–	–	–
Polity2	–	–	–	–	− 0.09*** (− 4.39)	0.25* (1.77)	0.06 (0.85)	− 0.13** (− 2.38)
GDP	− 2.16*** (− 3.41)	− 0.42*** (− 3.31)	− 1.12*** (− 4.44)	2.45*** (3.50)	0.42 (1.57)	− 0.73*** (− 3.29)	− 2.27*** (− 3.16)	0.78** (2.37)
School_enr	− 0.77*** (− 3.67)	− 0.93*** (− 2.69)	− 1.39*** (− 2.83)	− 1.43** (− 2.37)	− 1.09*** (− 5.64)	− 1.13* (− 1.92)	− 1.16 (− 1.28)	− 1.64*** (− 2.73)
INF	1.90*** (2.64)	0.11 (0.50)	0.19 (1.12)	− 0.48 (− 1.38)	− 0.89*** (− 3.25)	0.58 (1.31)	1.18** (2.29)	− 0.03 (− 0.20)
Gov_exp	− 1.29* (− 1.70)	0.02 (0.06)	− 1.04** (− 2.46)	− 0.93** (− 2.10)	− 0.99*** (− 3.71)	0.09 (0.27)	− 0.97 (− 1.40)	− 0.60 (− 1.58)
T_Openness	− 7.07*** (− 3.76)	− 4.08*** (− 3.75)	− 2.40*** (− 6.38)	0.94 (0.98)	1.49* (1.84)	− 6.47*** (− 2.76)	− 4.41*** (− 3.80)	− 0.37 (− 0.66)
Constant	57.89*** (4.06)	10.26** (2.40)	47.46*** (6.31)	− 42.68*** (− 2.70)	6.22 (1.11)	7.75 (1.17)	71.87*** (4.39)	− 2.29 (− 0.28)
Nbr of Obs	449	177	268	203	482	184	278	210
R squared	− 10.51***	− 2.06***	− 0.38***	− 4.46***	− 0.65***	− 7.00***	− 4.85***	− 1.49***

Table 6 (continued)

Equation 2	FD							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Eco_Freedom	0.13*** (3.79)	0.01 (0.29)	0.66*** (5.83)	− 0.24** (− 1.96)	–	–	–	–
Polity2	–	–	–	–	− 0.02*** (− 3.83)	− 0.02*** (− 3.50)	− 0.01 (− 0.78)	− 0.05** (− 2.03)
GDP	0.10*** (3.37)	− 0.01 (− 0.48)	0.05 (0.54)	0.96*** (8.73)	0.33*** (12.48)	0.03 (1.14)	0.28*** (3.25)	0.98*** (9.80)
T_Openness	0.57*** (8.87)	0.51*** (7.65)	0.71*** (4.43)	0.65*** (3.69)	0.55*** (9.33)	0.51*** (8.41)	0.94*** (5.47)	0.53*** (2.63)
F_Openness	0.006 (1.06)	0.01 (0.74)	− 0.001 (− 0.03)	− 0.02 (− 0.84)	− 0.01 (− 0.93)	0.007 (0.57)	0.06 (1.33)	− 0.12* (− 1.85)
INF	− 0.17*** (− 5.93)	− 0.03 (− 1.04)	− 0.11 (− 1.33)	− 0.14 (− 1.44)	− 0.23*** (− 8.84)	− 0.06** (− 2.23)	− 0.32*** (− 3.98)	− 0.03 (− 0.33)
POP	0.08** (2.25)	0.08** (2.06)	0.56*** (5.80)	− 0.32*** (− 2.62)	− 0.18*** (− 5.83)	0.03 (0.83)	0.32*** (2.98)	− 0.59*** (− 4.79)
Constant	− 3.50*** (− 6.18)	0.43 (0.70)	− 15.16*** (− 8.21)	− 17.22*** (− 8.58)	− 3.50*** (− 6.36)	0.32 (0.53)	− 13.25*** (− 7.38)	− 13.87*** (− 6.74)
Nbr of Obs	449	177	268	203	482	184	278	210
R squared	0.40***	0.31	0.35***	0.48***	0.38***	0.34***	0.31***	0.31***

T-statistics are presented in parentheses

***, **, * Significance at 1, 5, and 10%, respectively

Table 7 3SLS estimation results from the international restricted panel

Equation 1	Poverty headcount ratio at $1.90 a day PPP (%)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Cred	14.97*** (2.65)	–	–	–	− 3.27*** (− 3.15)	–	–	–
M3/GDP	–	8.35*** (3.20)	–	–	–	12.01** (2.30)	–	–
Market_cap	–	–	1.60*** (3.54)	–	–	–	3.52*** (2.60)	–
Turnover	–	–	–	− 3.36*** (− 4.19)	–	–	–	− 2.26*** (− 3.76)
Eco_Freedom	− 1.82** (− 2.14)	− 0.08 (− 0.32)	− 0.58* (− 1.69)	− 0.10 (− 0.30)	–	–	–	–
Polity2	–	–	–	–	− 0.08*** (− 4.02)	0.26* (1.83)	0.07 (0.96)	− 0.12** (− 1.99)
GDP	− 2.77*** (− 2.97)	− 0.60*** (− 3.71)	− 1.15*** (− 4.59)	2.08*** (3.45)	0.32 (1.39)	− 0.89*** (− 3.51)	− 2.23*** (− 3.08)	0.89** (2.38)
School_enr	− 0.81*** (− 2.75)	− 0.81* (− 1.90)	− 1.28*** (− 2.59)	− 0.91 (− 1.63)	− 1.23*** (− 6.26)	− 1.04* (− 1.71)	− 1.21 (− 1.55)	− 1.25** (− 2.00)
INF	2.77** (2.59)	0.28 (0.94)	0.21 (1.34)	− 0.18 (− 0.61)	− 0.81*** (− 3.29)	0.77 (1.55)	1.11** (2.22)	0.06 (0.32)
Gov_exp	− 1.82 (− 1.26)	− 0.34 (− 0.84)	− 1.33*** (− 3.18)	− 1.38*** (− 2.78)	− 1.13*** (− 3.90)	− 0.24 (− 0.60)	− 1.11** (− 2.11)	− 1.09** (− 2.54)
T_Openness	− 9.70*** (− 3.36)	− 5.57*** (− 3.94)	− 2.50*** (− 6.92)	0.65 (0.71)	1.25* (1.71)	− 7.41*** (− 2.86)	− 4.41*** (− 3.76)	− 0.26 (− 0.39)
Constant	74.24*** (3.38)	14.04*** (2.73)	48.62*** (6.58)	− 37.51** (− 2.47)	9.30* (1.84)	13.47** (2.09)	71.68*** (4.35)	− 5.32 (− 0.55)
Nbr of Obs	457	172	279	214	490	179	289	221
R squared	− 15.93***	− 3.66***	− 0.21***	− 2.55***	− 0.27***	− 7.15***	− 3.78***	− 1.38***

Table 7 (continued)

Equation 2	FD							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Eco_Freedom	0.12*** (3.85)	0.01 (0.40)	0.68*** (6.11)	− 0.16 (− 1.34)	–	–	–	–
Polity2	–	–	–	–	− 0.02*** (− 3.63)	− 0.01*** (− 3.30)	− 0.01 (− 0.64)	− 0.05* (− 1.88)
GDP	0.11*** (3.87)	− 0.009 (− 0.30)	0.08 (0.91)	0.97*** (9.35)	0.32*** (12.14)	0.02 (1.04)	0.28*** (3.56)	0.91*** (9.43)
T_Openness	0.60*** (9.19)	0.55*** (7.91)	0.68*** (4.28)	0.69*** (3.91)	0.58*** (9.61)	0.55*** (8.57)	0.91*** (5.41)	0.58*** (2.95)
F_Openness	0.007 (1.32)	0.01 (0.88)	0.01 (0.24)	− 0.04 (− 1.23)	− 0.01 (− 0.91)	0.004 (0.32)	0.08 (1.60)	− 0.13** (− 2.02)
INF	− 0.18*** (− 6.60)	− 0.03 (− 1.13)	− 0.10 (− 1.26)	− 0.09 (− 0.98)	− 0.24*** (− 9.22)	− 0.7** (− 2.40)	− 0.29*** (− 3.69)	− 0.01 (− 0.18)
POP	0.06* (1.67)	0.08** (1.99)	0.52*** (5.62)	− 0.34*** (− 2.98)	− 0.18*** (− 5.60)	0.04 (1.12)	0.32*** (3.30)	− 0.50*** (− 4.16)
Constant	− 3.55*** (− 6.25)	0.16 (0.26)	− 15.27*** (− 8.40)	− 17.92*** (− 8.94)	− 3.54*** (− 6.40)	0.04 (0.06)	− 13.09*** (− 7.37)	− 14.11** (− 7.02)
Nbr of Obs	457	172	279	214	490	179	289	221
R squared	0.42***	0.32***	0.34***	0.47***	0.40***	0.35***	0.29***	0.32***

T-statistics are presented in parentheses

***, **, * Significance at 1, 5, and 10%, respectively

Table 8 3SLS estimation results from the international restricted panel

Equation 1	Poverty headcount ratio at $3.10 a day PPP (%)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Cred	12.89*** (3.00)	–	–	–	− 4.23*** (− 3.42)	–	–	–
M3/GDP	–	6.53*** (3.28)	–	–	–	11.72** (2.37)	–	–
Market_cap	–	–	1.95*** (4.09)	–	–	–	3.62*** (3.00)	–
Turnover	–	–	–	− 4.84*** (− 3.43)	–	–	–	− 2.16*** (− 3.38)
Eco_Freedom	− 1.50** (− 2.43)	− 0.03 (− 0.20)	− 0.77** (− 2.13)	− 0.61 (− 1.09)	–	–	–	–
Polity2	–	–	–	–	− 0.11*** (− 5.07)	0.24* (1.75)	0.05 (0.69)	− 0.16*** (− 2.60)
GDP	− 2.37*** (− 3.34)	− 0.41*** (− 3.53)	− 1.18*** (− 4.41)	3.29*** (3.11)	0.59** (2.14)	− 0.76*** (− 3.42)	− 2.17*** (− 3.31)	0.93** (2.39)
School_enr	− 0.46** (− 2.51)	− 0.71** (− 2.27)	− 0.93** (− 2.06)	− 1.02 (− 1.46)	− 0.73*** (− 3.96)	− 0.88 (− 1.57)	− 0.72 (− 0.89)	− 1.10* (− 1.89)
INF	2.33*** (2.82)	0.14 (0.64)	0.37** (2.08)	− 0.29 (− 0.67)	− 0.95*** (− 3.41)	0.65 (1.50)	1.26*** (2.70)	0.11 (0.55)
Gov_exp	− 1.33 (− 1.57)	− 0.15 (− 0.55)	− 1.06*** (− 2.59)	− 1.02** (− 2.32)	− 0.87*** (− 3.34)	− 0.11 (− 0.41)	− 1.06 (− 1.60)	− 0.69** (− 2.03)
T_Openness	− 7.72*** (− 3.65)	− 3.99*** (− 3.86)	− 2.23*** (− 5.70)	1.67 (1.33)	2.00*** (2.43)	− 6.36*** (− 2.79)	− 3.99*** (− 3.84)	− 0.08 (− 0.14)
Constant	60.27*** (3.79)	9.28** (2.37)	47.07*** (5.87)	− 64.49*** (− 2.78)	1.54 (0.27)	7.33 (1.19)	66.99*** (4.49)	− 7.87 (− 0.85)
Nbr of Obs	454	178	272	206	487	185	282	213
R squared	− 18.57***	− 3.54***	− 1.03***	− 10.73***	− 1.59***	− 11.47***	− 5.99***	− 2.69***

Table 8 (continued)

Equation 2	FD							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Eco_Freedom	0.12*** (3.80)	0.01 (0.32)	0.63*** (5.74)	− 0.20 (− 1.64)	–	–	–	–
Polity2	–	–	–	–	− 0.02*** (− 4.15)	− 0.02*** (− 3.41)	− 0.01 (− 0.73)	− 0.06** (− 2.17)
GDP	0.10*** (3.52)	− 0.01 (− 0.41)	0.05 (0.55)	0.91*** (8.17)	0.34*** (14.23)	0.03 (1.19)	0.26*** (3.04)	0.96*** (10.32)
T_Openness	0.56*** (8.82)	0.51*** (7.73)	0.70*** (4.41)	0.57*** (3.15)	0.53*** (9.12)	0.51*** (8.39)	0.92*** (5.40)	0.44** (2.15)
F_Openness	0.004 (0.87)	0.01 (0.85)	0.01 (0.38)	− 0.02 (− 1.10)	− 0.2 (− 1.38)	0.002 (0.20)	0.06 (1.25)	− 0.10 (− 1.53)
INF	− 0.17*** (− 6.20)	− 0.03 (− 1.08)	− 0.11 (− 1.47)	− 0.09 (− 0.88)	− 0.23*** (− 9.10)	− 0.06** (− 2.36)	− 0.32*** (− 4.07)	0.01 (0.15)
POP	0.07** (2.11)	0.08** (2.11)	0.56*** (6.06)	− 0.26** (− 2.10)	− 0.21*** (− 7.66)	0.03 (0.84)	0.35*** (3.28)	− 0.57*** (− 5.00)
Constant	− 2.43*** (− 6.09)	0.37 (0.61)	− 14.95*** (− 8.15)	− 17.10*** (− 8.30)	− 3.34*** (− 6.14)	0.28 (0.47)	− 13.00*** (− 7.29)	− 13.55*** (− 6.44)
Nbr of Obs	454	178	272	206	487	185	282	213
R squared	0.40***	0.31***	0.34***	0.46***	0.37***	0.34***	0.31***	0.29***

T-statistics are presented in parentheses

***, **, * Significance at 1, 5, and 10%, respectively

corroborate our findings in the main analysis, but indicate that the stock market variables are not sensitive to the choice of the institutional indicators.

Regarding institutional indicators, the impact of Eco_Freedom generally remains negative on our poverty indicators. This finding is in line with the main analysis results, when we use banking indicators. Therefore, when we use banking variables as FD indicators, we notice that, the more freedom policies and institutions support economic freedom, the lower poverty decreases. However, the impact of Polity2 on poverty is mixed. Indeed, Polity2 negatively and significantly affects poverty when we use the Cred and Tunover variables as FD indicators. This is true in all our outputs, except in regressions 5 and 8 in Table 5. Nevertheless, Polity2 positively and significantly impacts poverty when we use M3/GDP and Market_cap as FD indicators except in regression 7 in Tables 6, 7 and 8.

In Eq. 2, we noticed that compared to the main analysis a small change in the sign of Eco_Freedom. Generally, Eco_Freedom, indicating their positive impact on FD indicators. However, this effect is not significant for M3/GDP. On the other hand, the impact of Polity2 remains negative in all regressions.

5 Conclusion and Policy Implications

The aim of this paper is to test the relationship between FD, IQ, and poverty. Our international sample consists of 132 countries observed over the 1980–2014 period. In the primary analysis of the global sample, in which we selected the household consumption expenditure variable as a proxy for poverty, we concluded that FD does not improve the poor's situation. This result is consistent with that of Charlton (2008), Noreen et al. (2012) and Seven and Coskun (2016). For the institutional indicators, we noted that the Eco_Freedom variable has a positive and significant impact, when we introduce banking indicators. However, the Eco_Freedom variable negatively affects household final consumption expenditure when we use stock market indicators. We conclude that Eco_Freedom is sensitive to the choice of financial indicators. However, the second institutional variable, Polity2, has an overall negative impact on poverty. As for the impact of institutional variables on FD, we conclude that the impact of Eco_Freedom is sensitive to the choice of financial indicators. However, the impact of Polity2 is negative on FD but not significant in almost all regressions.

One of the main contributions of our study is the robustness analysis we conducted on the choice of poverty indicator. To this end, we follow the same method of the primary analyses. However, to test robustness, we referred to four different poverty indicators, namely poverty gap at $1.90 per day (2011 PPP), poverty gap at 3.90 $ per day (2011 PPP), percentage of poverty with less than $1.90 per day and percentage of poverty with less than $3.10 per day. Due to insufficient data, we selected 73 countries from the initial 132 countries. The sample covered the 1983–2013 period. The primary results show that, when we introduce Polity2 to the model, the impact of Cred becomes negative and significant on all poverty indicators at the 1% level in almost all regressions. This result indicates that bank lending to the private sector reduces poverty, which does not corroborate that found in the primary analysis. Nevertheless, Cred has a positive and a significant impact on all poverty indicators at the 1% level, when we use the Eco_Freedom variable as an institutional indicator in the model. As for the effect of the M3/GDP variable on poverty, we note that it has retained the same positive poverty sign even when we change the institutional variable. This finding is consistent with that found in the primary analysis. Regarding the stock market indicators, their impact on poverty is mixed. For the institutional indicators, the impact

of Eco_Freedom on poverty indicators generally remains negative. This finding is in line with our outputs in the primary analysis when we use banking indicators. Nevertheless, the impact of Polity2 on poverty is mixed. As for the impact of institutional indicators on FD, we proved that the overall impact of Eco_Freedom on FD indicators is positive, but not significant on M3/GDP. However, the impact of Polity2 remains negative in all regressions.

Holding all other parameters constant, economic theory suggests that policy makers need to better gear their policies and actions towards reforming the financial system to reduce poverty. Hence, it is necessary for monetary authorities, in most of the studied countries, to reduce interest rates of bank loans, and to reallocate funding and to revise financial conditions to provide less restrictive guarantees. Moreover, it is necessary for public authorities to develop policies and institutional reforms to promote economic freedom in order to stimulate economic growth and reduce poverty. We recall that the policies undertaken by the state towards the poor is unfavorable in our sample. Thus, it is important to pursue redistribution policies that target poor incomes through state intervention, social transfers, and tax reforms. Political institutions, in particular, need to establish an appropriate political regime to foster FD and reduce poverty. Thus, it is necessary to facilitate political decisions, fill the gap in financial policies and rethink the management of pro-poor activities.

Appendix

See Tables 9 and 10.

Table 9 Variable, definitions and their sources

Variable	Definition	Source
Poverty Index	Household final consumption expenditure	World Development Indicators, World Bank database
	Poverty headcount ratio at $1.90 a day PPP (%)	World Development Indicators, World Bank database
	Poverty headcount ratio at $3.10 a day PPP (%)	World Development Indicators, World Bank database
	Poverty gap at $1.90 a day (2011 PPP)	World Development Indicators, World Bank database
	Poverty gap at $3.10 a day (2011 PPP)	World Development Indicators, World Bank database
Cred	Bank credits to the private sector (as percentage of GDP)	World Development Indicators, World Bank database
M3/GDP	Liquid liabilities M3 (as a percentage of GDP)	World Development Indicators, World Bank database
Market_cap	Market capitalization of listed companies (as percentage of GDP)	World Development Indicators, World Bank database
Turnover	Turnover ratio (as a percentage of GDP).	World Development Indicators, World Bank database
Eco_freedom	Measures the degree to which the policies and institutions of countries are supportive of economic freedom.	Economic Freedom of the World
Polity2	Measures the quality of political institutions in a country	Polity4 Project
GDP	GDP per capita (constant 2010 US$)	World Development Indicators, World Bank database
POP	Total Population	World Development Indicators, World Bank database
School_enr	enrollment in high school (% gross)	World Development Indicators, World Bank database
INF	Inflation, GDP deflator (% annual)	World Development Indicators, World Bank database
Gov_exp	Government final consumption expenditure (as percentage of GDP)	World Development Indicators, World Bank database
T_Openness	Total exports and imports by GDP	World Development Indicators, World Bank database
F_Openness	Capital account openness	The Graduate Institute Geneva (The Chinn-Ito index, KAOPEN)

All variables are in logarithms

Table 10 Sample. *Source*: Authors

Austria, Argentina, Armenia, Australia, Albania, Algeria, Angola, Azerbaijan, Bangladesh, Belize, Bulgaria, Botswana, Brazil, Bhutan, Benin, Burkina Faso, Burundi, the Bahamas, Belgium Ask, Canada, Cabo Verde, Cameroon, Central African Republic, China, Colombia, Costa Rica, Chile, Croatia, Cyprus, Denmark, Dominica, Ecuador, Estonia, Ethiopia, El France, Guinea-Bissau, Gambia, Russia, Finland, Hungary, Germany, Georgia, Ghana, Greece, Guatemala, Guyana, Egypt, Equatorial Guinea, Fiji, Iceland, Haiti, Honduras, Hong Kong, Ireland, India, Indonesia, Iran, Ivory Coast, Israel, Islamic Republic of, Italy, Japan, Jamaica, Jordon, Kenya, Kazakhstan, Lebanon, Lesotho, Lithuania, Libya, Luxembourg, Malta, Malaysia, Madagascar, Mauritius, Mexico, Morocco, Mozambique, Malawi, Mali, Mauritania, Macedonia, Moldova, Nicaragua, Mongolia, Namibia, New Zealand, Netherlands, Nepal, Niger, Nigeria, Norway, Panama, Papua New Guinea, Paraguay, Peru, Rwanda, Pakistan, Portugal, Poland, Salvador, Senegal, Sierra Leone, Slovenia, Sweden, Singapore, Tanzania, Tajikistan, Thailand, Trinidad and Tobago, Tunisia, Turkey, South Africa, Spain, Sri Lanka, Seychelles, Switzerland, Romania, Uganda, Ukraine, United Kingdom, United States, Uruguay, Slovakia, Swaziland, Syria, Venezuela, Vietnam, the former Yugoslav Republic, Republic of Yemen, Zambia, Zimbabwe

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