The Quality of Institutions and Financial Development

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1. Introduction

One of the most notorious features of the financial economics literature in the decade has been the increase importance of financial markets in promoting growth, and the relative importance of banks and stock markets in influencing economic development[1]. The frontier of the literature in this field is shifting towards providing answers to the question of why some countries are more financially developed than others. In this context, a deeper understanding of the sources of financial market development is becoming more and more relevant for the design of successful policies to promote financial development, since higher financial depth would facilitate economic growth, as shown by the extensive empirical literature.

While the existing literature has focused mainly on the roles of financial liberalization, legal system (La Porta *et al*. 1997, 1998; Roe, 2008), government ownership of banks (La Porta *et al*. 2000; Andrianova *et al*. 2008), political economy (Girma and Shortland, 2008; Roe and Siegel, 2008), trade openness (Beck 2001, 2002; Rajan and Zingales, 2003; Baltagi *et al*. 2007) as the sources of financial development[2], we contribute to the literature by examining the impact of institutional quality on financial development. The importance of institutional quality factor has caught the attention of economists in a variety of fields. North (1990) defines institutions as the human constraints that structure political, economic and social interaction. They comprise both formal rules (property rights, constitutions and laws) and informal constraints (unwritten taboos, customs, traditions and codes of conduct). When the rules change persistently or are not respected, when corruption is widespread and rule enforcement is fragile, or when property rights are not well defined, there is likely to be a problem with the quality of the institutions. Since the allocation of resources, the delivery of services and fair judgement will be less than desirable and the actual achievements will be less than the supposed aims. Problems related to institutional quality may translate into an increased degree of uncertainty that sends misleading signals to the market, thus affecting the productive economic process.

Financial economists' belief efficient working institutions are demanded to manage risk that comes from the financial markets. The quality of institutions and legal framework are likely to

[1] See Levine (1997) for an excellent review of the link between financial development and economic growth based on cross-countries, time series, panel data and firm levels empirical studies.
[2] Dematriades and Andrianova (2004) provide an excellent review of a large body of theoretical and empirical literature that tries to explain the determinants of financial development.

affect financial development through the ability of financial sector to channel resources to finance productive activities. In the absence of an adequate regulatory framework and supervision, the ability of financial markets to mobilize funds may be strongly undermined by lack of depositors' confidence. This will drift funds abroad and generally away from viable domestic investment opportunities.

Recently, a large number of papers have established that financial development fosters growth and that a country's financial development is related to its institutional characteristics, including its legal framework (Arestis and Demetriades, 1996). Claessens and Leaven (2003) point out that improved asset allocation due to better property rights has an effect on growth in sectoral value added equal to improved access to financing arising from greater financial development. Garretsen *et al.* (2004) also show that societal norms and culture help to explain differences in cross-country financial development. Demetriades and Andrianova (2004) argue that the strength of institutions, such as financial regulation and the rule of law, may determine the success or failure of financial reforms. Chinn and Ito (2006) find that financial systems with a higher degree of legal/institutional development on average benefit more from financial liberalisation than those with a lower one. So far there are only a few studies that associate institutional quality with financial development, and most of the evidence provided by all these previous studies is focused on the quality of legal systems and property rights. Thus, the role of institutions in influencing financial development still remains an open question to be addressed.

The objective of this study is to examine the effect of institutional quality on financial development based on panel data analysis across developed and developing countries. This study extends the literature in three dimensions. First, a linear and a nonlinear dynamic panel data models are set up to test the linear and non-linear financial development-institutional quality relationships. This can be considered as one of the pioneer empirical works that used the robust dynamic panel system GMM approach to estimate the nonlinear relationship. Secondly, the models are estimated based on the newly assembled institutional quality measure developed by Kaufmann *et al*. (2008) that consists of various set of institutional quality variables, which are able to assess what dimensions of the quality of institutions affect financial development. Thirdly, two sets of financial development indicators are employed; they are the private-sector credit of the banking sector, and the stock market capitalization of the stock market, in order to capture the various aspects of financial deepening.

This paper is organized as follows. Section 2 describes the dynamic panel data models and the related hypotheses. Section 3 explains the econometric method and the data employed. Section 4 reports the estimated results and interprets the findings, and the final section concludes the discussion.

2. Legal system, institutions and financial development: review of literature

Over the last decade, a literature has begun to emerge that attempts to use data from a large number of countries to establish the relevance of legal systems for financial development. The work has its origins in La Porta *et al*. (1997) who correlate the relation between the legal systems and financial intermediary development. La Porta *et al*. (1997) compares legal rules across 49 countries by dividing into four legal systems, namely: English common law; French; German and Scandinavian civil laws. The legal environment variables uses in their study are the legal and regulatory treatment of creditors, the efficiency of the legal system in enforcing contracts, and accounting standards. They find that the legal environment as described by both legal rules and their enforcement has an influenced on the size and extent of a country's capital markets, including equity and debt markets. The legal rules protecting investors and the quality of their enforcement differ greatly and systematically across countries. In other words, the quantity of external finance is, in part, determined by legal tradition. According to them, a good legal environment protects the potential financiers against expropriation by entrepreneurs; it raises their willingness to surrender funds in exchange for securities, and hence expands the scope of capital markets. Moreover, La Porta *et al*. (1997) demonstrate that in the area of protection against expropriation by insiders, common law countries protect both shareholders and creditors the most, French civil law countries the least, and German civil law and Scandinavian civil law countries somewhere in the middle.

Levine (1998) examines the connection between the legal environment and financial development, and then tracing this link through to long run economic growth. First, he finds that the legal and regulatory environment matters for financial development. Countries with legal and regulatory systems that give a high priority to creditors receiving the full present value of their claims on corporations have better functioning financial intermediaries than countries where the legal system provides much weaker support to creditors. Second, the empirical results indicate that contract enforcement is significant to determine financial development. Countries that impose compliance with laws efficiently and enforce contracts including government contract effectively

tend to have much better developed financial intermediaries than countries where enforcement is more lax. Finally, he discovers that information disclosure also plays an important role in determining financial development. For instance, countries where corporations publish relatively comprehensive and accurate financial statements have better developed financial intermediaries than countries where published information on corporations is less reliable.

Beck *et al*. (2001) examine whether cross-country differences in financial development are accounted for by cross-country differences in (i) legal tradition; (ii) political structure; (iii) initial endowments by employing cross-country regressions. Their findings are consistent with the law and finance view (La Porta *et al*. 1997). Differences in legal origin – whether a country has a British, French, German or Scandinavian legal heritage – help explain the development of financial markets today even after controlling for the level of economic development, regional dummy variables, religious composition, ethnic diversity, openness to international trade, the fraction of years the country has been independent since 1776, the transplant effect, initial endowment, and the political environment. Compared to other legal families, countries with a French legal tradition tend to have weak financial institutions. They have less transparent corporate financial statements, poorer property rights protection, weaker protection of the rights of shareholders and debt holders, and lower levels of stock market and bank development. Common law and civil law countries have comparatively strong financial institutions. Besides, the data also provide qualified support for the endowment view. Countries with high levels of settler mortality during the earlier stages of colonization tend to have substantially lower levels of financial institutions development today.

Lombardo and Pagano (2000) investigate the cross-country relationship between the quality of institutions and the rate of return on equity. Their data set includes almost all the countries of the study by La Porta *et al*. (1997). They find that indicators of the general quality of the legal environment have a consistently positive correlation with the risk-adjusted rate of return, whereas measures of the protection of shareholders rights have either no or negative impact on the return on equity. In their study, Lombardo and Pagano (2000) employ two different measures of the rate of return on equity, namely the percentage return on each market stock index and accounting measures such as the dividend yield ratio and the earnings/price ratio. In a regression that uses the percentage return on each market stock index as a dependent variable, general measures of the quality of the legal environment appear as important explanatory determinants. Variables measuring the protection of shareholder rights do not appear to have additional explanatory power. The correlation

between respect for the law or judicial efficiency and the risk-adjusted rate of return on equity is positive and statistically significant. The implied effects are economically large. Increases in the respect for the law have a comparable impact on secondary market returns. When the rate of return on equity is measured by accounting variables, they find that the effects of general measures of institutional quality are still positive and even larger statistically significant.

3. Empirical model, methodology and the data

The empirical specification is aimed at explaining the determinants of financial development by testing the role of institutions. Thus, the empirical model that employed in the analysis is as follows:

$$ln\ FD_{it} = \beta_{0i} + \beta_{1i}\ ln\ FD_{it-1} + \beta_{2i}\ ln\ INS_{it} + \beta_{3i}\ ln\ RGDPC_{it} + \mu_i + \varepsilon_{it} \quad (1)$$

where *FD* is financial development, *INS* is institutional quality, *RGDPC* is real GDP per capita, the subscripts *i* and *t* index countries and time respectively. In addition, the specification also contains an unobservable country-specific effect μ and error-term ε.

Rajan and Zingales (2003) argue that interest groups, specifically industrial and financial incumbents, frequently stand to lose from financial development, because it usually breeds competition, which erodes their rents. They argue that incumbents' opposition will be weaker when an economy is open to both trade and capital flows, hence the opening of *both* the trade and capital accounts holds the key to successful financial development. This is not only because trade and financial openness limit the ability of incumbents to block the development of financial markets but also because the new opportunities created by openness may generate sufficient new profits for them that outweigh the negative effects of increased competition. Thus, they will be more likely to support reforms that promote a deeper and more efficient financial system. In fact, research indicates that deeper financial sector is positively associated with greater trade openness (Rajan and Zingales, 2003; Svaleryd and Vlachos, 2002, Huang and Temple, 2005). Therefore, Equation (1) is extended to incorporate trade openness (*TO*) and financial openness (*FO*). Thus, the basic financial development equation is extended as follows:

$$ln\ FD_{it} = \beta_{0i} + \beta_{1i}\ ln\ FD_{it-1} + \beta_{2i}\ ln\ INS_{it} + \beta_{3i}\ ln\ RGDPC_{it} + \beta_{4i}\ ln\ TO + \beta_{5i}\ ln\ FO_{it} + \mu_i + \varepsilon_{it} \quad (2)$$

The relationship between institutional quality and financial development might be nonlinear. Institutional reforms have generally a positive effect on financial development but the magnitude might be varied with the level of economic development. We hypothesize that the effect of institutional quality on financial development is ambiguous at low levels of development, while it becomes eventually positive as development proceeds or U-shaped relationship between financial development and institutions. In order to examine the nonlinear relationship between financial development and institutions, the squared term of institutional quality variable is added and included into Equation (2), and thus regression model can be rewritten as follows:

$$ln\ FD_{it} = \beta_{0i} + \beta_{1i}\ ln\ FD_{it-1} + \beta_{2i}\ ln\ INS_{it} + \beta_{3i}\ ln\ INS^{2}_{it} + \beta_{4i}\ ln\ RGDPC_{it} + \beta_{5i}\ ln\ TO + \beta_{5i}\ ln\ FO_{it} + \mu_i + \varepsilon_{it} \quad (3)$$

The U-shaped nonlinear relationship predicts $\beta_2 < 0$ and $\beta_3 > 0$. Equations (2) and (3) provide the basis for the empirical models that are estimated in this study. The econometrics method employed to estimate the equations is based on the dynamic panel Generalized Method of Moment (GMM).

Dynamic panel system GMM estimators

The methodology of Generalized Method of Moments (GMM) for panel data analyses[3], suggested by Arellano and Bond (1991) and then further developed by Blundell and Bond (1998), is employed to control for endogeneity in the specifications. Consider the following model

$$Y_{it} = \gamma_1 EX_{it} + \gamma_2 EP_{it} + \nu_i + \eta_{it} \quad i = 1,...,N\ ;\ t = 1,...,\ T \quad (4)$$

where Y is a given dependent variable, EX is a vector of strictly exogenous covariates; EP denotes a vector of predetermined covariates and endogenous covariates (predetermined variables are assumed to be correlated with past errors, while endogenous ones are assumed to be correlated with past and present errors); ν_i is the unobserved group-level effect, and η_{it} is the error term, with the

[3] The GMM estimator has been widely employed in recent empirical works, particularly in the studies of macroeconomics and finance. This method has a number of advantages. For instance, Beck *et al*. (2000) argue that the GMM panel estimator is good in exploiting the time-series variation in the data, accounting for unobserved individual specific effects, and therefore providing better control for endogeneity of all the explanatory variables.

assumption that v_i and η_{it} are independent for each i over all t, and that there is no autocorrelation in the η_{it}.

First, in order to eliminate the unobservable group-specific effects, we difference Equation (4) and then it can be rewritten as

$$Y_{it} - Y_{it-1} = \gamma_1(EX_{it} - EX_{it-1}) + \gamma_2(EP_{it} - EP_{it-1}) + (\eta_{it} - \eta_{it}) \quad (5)$$

Second, instrumental-variable approaches are applied to deal with the endogeneity of explanatory variables in Equation (5), where the predetermined and endogenous variables in first differences are instrumented with appropriate lags of the specified variables in levels, while strictly exogenous regressors are first-differenced for use as instruments in the first-differenced equation. However, the efficiency of this instrumental approach may be relatively weak, given the fact that lagged levels are often poor instruments for first differences. Therefore, Blundell and Bond (1998) propose the System-GMM approach, in which the first-differenced estimator (i.e., Equation (5)) is combined with the estimator in levels (i.e., Equation (4)) to form a more efficient "system estimator": for the first-differenced equation, the instruments are the same as that discussed above; for the levels equation, predetermined and endogenous variables in levels are instrumented with appropriate lags of their own first differences, while the strictly exogenous regressors can directly enter the instrument matrix for use in the levels equation.

The data

The data set consists of a panel of observations for a group of (i) 63 countries – where the financial development as proxy of private sector credit; (ii) 51 countries – where the financial development as proxy of stock market capitalization. The sample period for both data sets is spanning from 1996 to 2004 but with gaps[4]. The list of countries is presented in Tables 1a and 1b.

Two financial development indicators are employed in the analysis, namely private sector credit and stock market capitalization. All these two financial development indicators are expressed as ratios to GDP. The source of these annual data is the World Development Indicators (World Bank CD-ROM 2006). Annual data on real GDP per capita (based on 2000 US dollar constant prices) and trade openness (sum of exports and imports of goods and services) are obtained from the

[4] The sample period is from 1996, then 1998, 2000, 2002, 2003 and 2004.

World Development Indicators. The financial openness indicator is from Lane and Milesi-Feretti (2006). This indicator is defined as the volume of a country's foreign assets and liabilities (% of GDP). This measure provides a useful summary of a country's history of capital account openness.

The institutional quality data sets we employed in the analysis are newly assembled dataset by Kaufmann *et al.* (2008). These indicators are constructed based on information gathered through a wide variety of cross-country surveys as well as polls of experts. Kaufmann *et al.* (2008) use a model of unobserved components, which enables them to achieve levels of coverage of approximately 212 countries for each of their indicators. They construct six different indicators, each representing a different dimension of governance: (i) *Voice and Accountability*, (ii) *Political Stability and Lack of Violence*, (iii) *Government Effectiveness*, (iv) *Regulatory Quality*, (v) *Rule of Law*, and (vi) *Control of Corruption*. This clustering of institutional indicators into different dimensions allows us to study whether some dimensions of governance matter for financial market development, while others do not. The descriptive statistics of the variables are summarized in Tables 1a and 1b, each of which corresponds to the data used in each of the two subsequent tables of estimated results. The definition of the above institutional quality indicators are provided in Table A (Appendix).

Tables 2a and 2b present the correlations between financial development and the various variables employed in the analysis. The results reveal that institutional quality variables are indeed positively correlated with financial development. For example, the government effectiveness (GE) has the highest correlation with private sector credit and stock market capitalization, with 0.78 and 0.65, respectively. Besides, the institutional quality indicators are also positively correlated with each other, where the correlation coefficient ranges between 0.67 and 0.78 in the first dataset, and 0.52 – 0.65 in the second dataset.

Table 1a: Summary of Financial development proxy: private sector credit (Annual Data: 1996 – 2004; N = 63)

Variable	Source	Unit of Measurement	Mean	Standard Deviation	Max	Min
Private Sector Credit	WDI	% of GDP	58.50	48.57	196.65	0.85
Voice and Accountability	Kaufmann *et al.* (2008)	Standard deviation	56.80	27.92	98.40	2.87
Political Stability	Kaufmann *et al.* (2008)	Standard deviation	46.76	29.01	98.23	1.83
Government Effectiveness	Kaufmann *et al.* (2008)	Standard deviation	58.56	27.96	98.56	2.6
Regulatory Quality	Kaufmann *et al.* (2008)	Standard deviation	59.89	25.86	98.20	2.7
Rule of Law	Kaufmann *et al.* (2008)	Standard deviation	55.17	29.23	99.75	0.97
Corruption	Kaufmann *et al.* (2008)	Standard deviation	55.11	29.51	99.83	1.85
Real GDP Per Capita	WDI	US$ at 2000 prices	8576.55	10932.09	37375.9	149.10
Financial Openness	Lane & Milesi-Ferreti (2006)	% of GDP	214.80	215.16	1346.50	47.79
Trade Openness	WDI	% of GDP	71.60	37.23	209.67	21.41
Countries: Algeria, Argentina, Australia, Bangladesh, Belgium, Bolivia, Brazil, Burkina Faso, Cameroon, Canada, Chile, Colombia, Democratic Republic of Congo, Denmark, Dominican, Ecuador, Egypt, Finland, France, Gabon, Gambia, Ghana, Greece, Guatemala, Honduras, Hungary, India, Indonesia, Ireland, Italy, Jamaica, Japan, Jordan, Kenya, Korea, Malawi, Malaysia, Malta, Mexico, Morocco, Netherlands, Nigeria, Norway, Pakistan, Paraguay, Peru, Philippines, Portugal, Senegal, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Syria, Thailand, Tunisia, Turkey, UK, Uruguay, US, Venezuela, Zambia, Zimbabwe.						

Table 1b: Summary of financial development proxy: stock market development (Annual Data: 1996 – 2004; N = 51)

Variable	Source	Unit of Measurement	Mean	Standard Deviation	Max	Min
Stock Market Capitalization	WDI	% of GDP	54.51	49.04	227.76	1.44
Voice and Accountability	Kaufmann *et al.* (2008)	Standard deviation	61.63	26.41	98.40	15.22
Political Stability	Kaufmann *et al.* (2008)	Standard deviation	49.84	29.58	98.23	4.71
Government Effectiveness	Kaufmann *et al.* (2008)	Standard deviation	64.12	26.13	98.56	13.18
Regulatory Quality	Kaufmann *et al.* (2008)	Standard deviation	64.66	24.19	97.72	9.11
Rule of Law	Kaufmann *et al.* (2008)	Standard deviation	60.19	28.30	99.75	6.18
Corruption	Kaufmann *et al.* (2008)	Standard deviation	59.59	29.15	99.83	5.67
Real GDP Per Capita	WDI	US$ at 2000 prices	9872.99	11429.05	37375.9	255.47
Financial Openness	Lane & Milesi-Ferreti (2006)	% of GDP	224.47	227.68	1346.50	47.79
Trade Openness	WDI	% of GDP	71.88	39.56	209.67	21.41
Countries: Argentina, Australia, Bangladesh, Belgium, Bolivia, Brazil, Canada, Chile, Colombia, Denmark, Ecuador, Egypt, Finland, France, Ghana, Greece, Hungary, India, Indonesia, Ireland, Italy, Jamaica, Japan, Jordan, Kenya, Korea, Malaysia, Malta, Mexico, Morocco, Nigeria, Norway, Pakistan, Paraguay, Peru, Philippines, Portugal, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Thailand, Tunisia, Turkey, UK, Uruguay, US, Venezuela, Zambia, Zimbabwe						

Table 2a: Correlations for financial development proxy: private sector credit

	PRI	VA	PS	GE	RQ	ROL	CORR	RGDPC	TO	FO
PRI	1.00									
VA	0.67	1.00								
PS	0.70	0.88	1.00							
GE	0.78	0.90	0.86	1.00						
RQ	0.72	0.92	0.87	0.95	1.00					
ROL	0.77	0.89	0.91	0.96	0.92	1.00				
CORR	0.75	0.88	0.89	0.96	0.93	0.97	1.00			
RGDPC	0.73	0.79	0.81	0.78	0.75	0.81	0.80	1.00		
TO	0.27	0.18	0.33	0.23	0.25	0.23	0.20	0.04	1.00	
FO	0.45	0.52	0.61	0.50	0.52	0.54	0.52	0.55	0.48	1.00

Notes: PRI = private sector credit, VA = voice and accountability; PS = political stability; GE = government effectiveness; RQ = regulatory quality; ROL = rule of law; CORR = corruption; RGDPC = real GDP per capita; TO = trade openness and FO = financial openness.

Table 2b: Correlations for financial development proxy: stock market capitalization

	SMC	VA	PS	GE	RQ	ROL	CORR	RGDPC	TO	FO
SMC	1.00									
VA	0.52	1.00								
PS	0.52	0.89	1.00							
GE	0.65	0.87	0.87	1.00						
RQ	0.58	0.90	0.86	0.95	1.00					
ROL	0.61	0.89	0.91	0.96	0.92	1.00				
CORR	0.63	0.87	0.89	0.97	0.93	0.97	1.00			
RGDPC	0.56	0.79	0.81	0.77	0.74	0.81	0.79	1.00		
TO	0.22	0.11	0.29	0.19	0.22	0.19	0.17	-0.01	1.00	
FO	0.43	0.52	0.60	0.49	0.53	0.53	0.50	0.52	0.46	1.00

Notes: SMC = stock market capitalization; VA = voice and accountability; PS = political stability; GE = government effectiveness; RQ = regulatory quality; ROL = rule of law; CORR = corruption; RGDPC = real GDP per capita; TO = trade openness and FO = financial openness.

4. Empirical results

Table 3 presents the empirical results of the linear model (Equation 2) using the dynamic panel GMM approach. The financial development indicator employed in the estimations is private sector credit. In Models 1a – 6a, we introduce Kaufmann *et al.* (2008) six institutional quality variables into specifications, whereas Model 7a consists of two institutional quality dimensions, namely political stability and freedom and government efficiency[5] in order to reduce measurement errors of the individual components. In addition, if various institutional dimensions determine simultaneously the development of financial market, by including them one by one might be an omitted variable bias.

The lagged dependent variable is statistically significant, which implies that the dynamic GMM is an appropriate estimator and the empirical results can be relied upon to carry out statistical inference. The coefficients of real GDP per capita and trade openness are positive, but only real GDP per capita is statistically significant determinant of financial development[6]. In contrast, the coefficient of financial openness is negative and significant determinant of private sector credit at conventional levels. All institutional quality indicators exert a positive effect on financial development, but only political stability, government effectiveness and rule of law are statistically determinants of financial development. The largest effect seems to be associated with government effectiveness, where the coefficient of this variable is the highest among the significant institutional

[5] The *political stability and freedom* consists of the average of voice and accountability and political stability, whereas *government efficiency* consists of the average of rule of law, corruption, government effectiveness and regulatory quality.

[6] The insignificant results of trade openness may due to the measurement utilized in the study, which is the sum of exports and imports divided by GDP. Further discussion on measuring trade openness, see Squalli and Wilson (2006).

quality indicators. The empirical result of Model 7a that incorporates two clusters of institutional quality also shows that both indicators namely *political stability and freedom*, and *government efficiency* are significant in explaining financial development.

Table 3: Financial development and institutional quality (Linear model, Equation 2)
Dependent variable: Private Sector Credit

	Model 1a	Model 2a	Model 3a	Model 4a	Model 5a	Model 6a	Model 7a
Constant	-0.39 (-0.65)	0.42 (0.73)	-0.02 (-0.03)	0.43 (0.67)	-0.004 (-0.01)	0.34 (0.56)	0.16 (0.27)
FD_{it-1}	0.73 (11.67)***	0.78 (15.10)***	0.66 (9.43)***	0.79 (12.16)***	0.69 (9.09)***	0.77 (11.16)***	0.73 (11.79)***
RGDPC	0.17 (3.21)***	0.17 (3.36)***	0.22 (2.98)***	0.23 (2.92)***	0.25 (3.42)***	0.20 (2.74)***	0.16 (3.10)***
Trade Openness	0.16 (0.98)	0.03 (0.19)	0.04 (0.30)	0.04 (0.26)	0.14 (0.86)	0.03 (0.23)	0.03 (0.20)
Financial Openness	-0.20 (-2.20)**	-0.30 (-4.06)***	-0.28 (-2.37)**	-0.37 (-3.86)***	-0.36 (-3.37)***	-0.30 (-3.28)***	-0.28 (-3.55)***
Voice & Accountability	0.09 (1.46)	-	-	-	-	-	-
Political Stability	-	0.12 (2.27)**	-	-	-	-	-
Government Effectiveness	-	-	0.21 (2.26)**	-	-	-	-
Regulatory Quality	-	-	-	0.07 (0.82)	-	-	-
Rule of Law	-	-	-	-	0.10 (2.19)**	-	-
Corruption	-	-	-	-	-	0.09 (1.43)	-
Political Stability and Freedom	-	-	-	-	-	-	0.10 (2.07)**
Government Efficiency	-	-	-	-	-	-	0.13 (2.14)**
Hansen test of Over Identifying Restrictions	57.72 (0.832)	47.95 (0.826)	60.87 (0.747)	60.29 (0.764)	60.12 (0.768)	60.11 (0.769)	56.08 (0.987)
Arellano-Bond test for AR(1)	-3.03 (0.002)***	-3.05 (0.002)***	-3.21 (0.001)***	-3.19 (0.001)***	-3.14 (0.002)***	-3.14 (0.002)***	-3.12 (0.002)***
Arellano-Bond test for AR(2)	-0.60 (0.551)	-0.57 (0.570)	-0.40 (0.691)	-0.51 (0.611)	-0.54 (0.591)	-0.34 (0.732)	-0.47 (0.640)

Notes: All models are estimated using the Arellano and Bond dynamic panel system GMM estimations (Stata xtabond2 command). Figures in the parentheses are t-statistics, except for Hansen test and Arellano-Bond test for serial correlation, which are p-values. ** and *** indicate the respective 5% and 1% significance levels. Political Stability and Freedom = average of voice & accountability and political stability. Government Efficiency = average of government effectiveness, regulatory quality, rule of law and corruption.

The estimated models in Table 3 are relatively well specified, as all the three diagnostic statistics are found to be satisfactory. The Hansen test does not reject the over-identification restrictions. As expected, the null hypothesis of absence of first order serial correlation (AR1) is rejected, but the null hypothesis of absence of second order serial correlation (AR2) is not rejected.

The significant of rule of law in determining banking sector development is consistent with La Porta *et al.* (1997) law and finance literature, as well as inline with Demetriades and Andrianova (2004), where these two studies demonstrate that legal infrastructure is robust in explaining cross-country

differences in financial development. Besides, the significant of political stability also support previous research that political stability is associated with financial development, namely Roe and Siegel (2008), who find that political instability impedes financial development, and political stability is a primary determinant of differences in financial development around the world.

Table 4: Financial Development and Institutional Quality (Linear model, Equation 2)
Dependent variable: stock market capitalization

	Model 1b	Model 2b	Model 3b	Model 4b	Model 5b	Model 6b	Model 7b
Constant	0.26 (0.22)	0.23 (0.28)	0.53 (0.58)	0.83 (7.85)***	0.30 (0.28)	0.66 (0.65)	0.63 (0.77)
FD_{it-1}	0.62 (6.62)***	0.63 (6.53)***	0.66 (6.87)***	0.67 (7.85)***	0.67 (7.85)***	0.68 (6.85)***	0.68 (7.94)***
RGDPC	0.26 (2.21)**	0.38 (2.86)***	0.26 (1.65)*	0.29 (2.13)**	0.30 (2.38)**	0.24 (2.45)**	0.29 (1.99)**
Trade Openness	0.10 (0.42)	0.14 (0.65)	0.05 (0.26)	0.02 (0.16)	0.16 (0.68)	0.01 (0.11)	0.03 (0.19)
Financial Openness	-0.36 (-1.72)	-0.39 (-1.89)	-0.38 (-1.49)	-0.38 (-1.48)	-0.41 (-1.72)	-0.23 (-1.31)	-0.41 (-1.66)
Voice & Accountability	0.13 (0.70)	-	-	-	-	-	-
Political Stability	-	-0.15 (-1.06)	-	-	-	-	-
Government Effectiveness	-	-	0.11 (0.54)	-	-	-	-
Regulatory Quality	-	-	-	0.04 (0.41)	-	-	-
Rule of Law	-	-	-	-	0.02 (0.12)	-	-
Corruption	-	-	-	-	-	-0.03 (-0.22)	-
Political Stability and Freedom	-	-	-	-	-	-	0.14 (0.44)
Government Efficiency	-	-	-	-	-	-	-0.06 (-0.22)
Hansen test of Over Identifying Restrictions	47.41 (0.959)	43.98 (0.983)	44.67 (0.980)	45.04 (0.977)	43.55 (0.985)	46.14 (0.970)	44.76 (0.999)
Arellano-Bond test for AR(1)	-2.56 (0.010)***	-2.64 (0.008)***	-2.51 (0.012)**	-2.92 (0.003)***	-2.84 (0.005)***	-2.54 (0.011)**	-2.78 (0.005)***
Arellano-Bond test for AR(2)	-0.97 (0.334)	-0.88 (0.381)	-0.97 (0.331)	-0.87 (0.384)	-1.02 (0.985)	-0.98 (0.970)	-0.92 (0.357)
N	51	51	51	51	51	51	51

Note: See Table 3.

In order to examine the extent to which the above findings vary with different aspect of financial development, we repeat the analysis but using the stock market capitalization as proxy of financial development and the results are reported in Table 4. The coefficients of real GDP per capita and trade openness are similar to those reported in Table 3, both have positive sign and again only real GDP per capita is statistically significant determinant of stock market development. The financial

openness variable remains negative but is insignificant in influencing stock market development. Surprisingly, none of the institutional quality variables is statistically significant determinant of stock market development. This finding suggests that different financial development indicator response differently to institutional quality variable, where the effect on institutional quality on financial development is only robust for banking sector development. However, as the sample consists of developing countries of which many are severely underdeveloped, the use of stock market measures might not be a good representative of financial development. The literature suggests that most developing countries go with the banking system as their choice in channelling funds between savers and investors. Only when the economy reaches a certain developmental stage, their stock markets are allowed to develop further.

Table 5 reports the estimated results of Equation (3), which examine the nonlinear relationship between financial development and institutions. In the specification, an additional squared term for the measures of institutions factor is included in the estimation to allow for the formation of the U shape movement. The empirical results indicate that the regulatory quality is the only institutions quality indicator that has nonlinear relationship, irrespective the financial development is proxied by private sector credit or stock market capitalization. The coefficients on the regulatory quality and its squared term are negative and positive, respectively. This suggests a U-shaped financial development-institutional quality relationship. Again, all three diagnostic statistics are found to be satisfactory.

Table 5: Financial development and institutional quality (Nonlinear model, Equation 3)
Dependent variable: financial development (FD)

	FD = Private Sector Credit						FD = Stock Market Capitalization					
	Model 1a	Model 2a	Model 3a	Model 4a	Model 5a	Model 6a	Model 1b	Model 2b	Model 3b	Model 4b	Model 5b	Model 6b
Constant	-0.95 (-0.62)	0.73 (1.18)	0.29 (0.47)	1.80 (2.90)***	0.58 (0.74)	1.55 (1.68)	6.61 (1.98)	1.56 (1.07)	7.43 (2.94)***	1.81 (2.33)	2.20 (1.33)	3.90 (2.71)***
FD_{it-1}	0.73 (10.58)***	0.80 (16.18)***	0.68 (11.42)***	0.76 (15.83)***	0.71 (10.43)***	0.80 (15.19)***	0.61 (7.61)***	0.61 (7.09)***	0.62 (7.20)***	0.67 (8.17)***	0.58 (8.15)***	0.64 (7.72)***
RGDPC	0.16 (2.31)**	0.12 (2.88)***	0.15 (2.27)**	0.11 (1.84)	0.17 (3.01)***	0.08 (1.76)	0.01 (0.09)	0.28 (2.02)**	0.10 (0.79)	0.24 (2.07)**	0.23 (1.85)	0.10 (0.93)
TO	0.16 (0.99)	0.05 (0.38)	0.02 (0.18)	-0.13 (-1.02)	0.07 (0.47)	0.01 (0.08)	-0.12 (-0.47)	0.06 (0.29)	-0.17 (-1.06)	-0.09 (-0.67)	0.09 (0.36)	-0.09 (-0.44)
FO	-0.17 (-1.61)	-0.31 (-3.98)***	-0.25 (-2.33)**	-0.30 (-3.21)***	-0.32 (-3.75)***	-0.27 (-3.78)***	-0.32 (-1.58)	-0.40 (-2.11)**	-0.33 (-1.90)	-0.42 (-2.14)**	-0.41 (-2.02)**	-0.28 (-1.68)
VA	0.18 (0.44)	-	-	-	-	-	-2.59 (-1.84)	-	-	-	-	-
VA^2	-0.01 (-0.14)						0.45 (1.95)					
PS	-	-0.03 (-0.29)	-	-	-	-	-	-0.46 (-1.06)	-	-	-	-
PS^2		0.03 (1.69)						0.08 (0.94)				
GE	-	-	0.12 (0.78)	-	-	-	-	-	0.48 (1.79)	-	-	-
GE^2			0.03 (0.89)						0.10 (0.79)			
RQ	-	-	-	-0.40 (-3.78)***	-	-	-	-	-	-0.28 (-2.23)**	-	-
RQ^2				0.12 (3.88)***						0.07 (2.14)**		
ROL	-	-	-	-	-0.05 (-0.28)	-	-	-	-	-	-0.81 (-1.72)	-
ROL^2					0.04 (1.14)					-	0.15 (1.59)	
CORR	-	-	-	-	-	-0.46 (-1.35)	-	-	-	-	-	-0.37 (-1.53)
$CORR^2$						0.11 (1.82)						0.25 (1.60)
Hansen test of Over Identifying Restrictions	49.89 (0.998)	54.11 (0.993)	55.99 (0.988)	53.15 (0.994)	59.79 (0.969)	56.83 (0.983)	44.92 (0.999)	45.66 (0.999)	45.70 (0.999)	45.71 (0.999)	45.68 (0.999)	27.94 (0.263)
Arellano-Bond test for AR(1)	-2.97 (0.003)	-3.12 (0.002)	-3.18 (0.001)	-2.94 (0.003)	-3.11 (0.002)	-2.99 (0.003)	-2.77 (0.006)	-2.66 (0.008)	-2.61 (0.009)	-2.85 (0.004)	-2.71 (0.007)	-1.80 (0.072)
Arellano-Bond test for AR(2)	-0.61 (0.543)	-0.40 (0.690)	-0.31 (0.756)	0.37 (0.715)	-0.35 (0.725)	-0.23 (0.816)	-0.47 (0.641)	-0.89 (0.375)	-0.91 (0.364)	-0.89 (0.376)	-0.99 (0.321)	-0.03 (0.978)

Notes: All models are estimated using the Arellano and Bond dynamic panel system GMM estimations (Stata xtabond2 command). Figures in the parentheses are t-statistics, except for Hansen test and Arellano-Bond test for serial correlation, which are p-values. ** and *** indicate the respective 5% and 1% significance levels. RGDPC = real GDP per capita; TO = trade openness and FO = financial openness. VA = voice and accountability; PS = political stability; GE = government effectiveness; RQ = regulatory quality; ROL = rule of law; CORR = corruption.

In order to shed additional light on the quantitative importance of regulatory quality for financial development under the U-shaped relationship, we try to determine the threshold level institutional quality in term of regulatory quality for the sample countries. The threshold values for both private sector credit and stock market capitalization indicators are computed as 28.03 and 54.60 of regulatory quality[7], respectively. In a scenario where the regulatory quality of the country is lower

[7] exp(3.33) = 28.03 and exp(4) = 54.60

than or equal to the threshold, the institutional quality will exert a negative effect on the financial development, meaning that the financial development will be lessened when the institutional quality improve. On the other hand, if the institutional quality overshoots the threshold, the institutions quality effect on financial development will turn positive. In other words, further institutional reforms will lead to financial development.

Based on the cross plots of financial development verses regulatory quality of the sample countries as depicted in Figures 1 and 2, we can identify the countries which are fall below the threshold level. We observe that most of the low-income countries under study are located on the left-hand side of both figures or below the threshold level. As shown in Figure 1 where the financial development is private sector credit, the countries below the threshold level include Bangladesh, Bolivia, Cameroon, Democratic Republic of Congo, Ecuador, Gabon, Guatemala, Honduras, Indonesia, Kenya, Malawi, Nigeria, Pakistan, Paraguay, Venezuela, Zambia, Zimbabwe. On the other hand, where the financial development as proxy of stock market capitalization as depicted in Figure 2, the countries below the threshold level are Argentina, Bangladesh, Ecuador, Egypt, Ghana, India, Indonesia, Kenya, Morocco, Nigeria, Pakistan, Paraguay, Venezuela, Zambia, Zimbabwe. On the other hand, the high-income countries are located on the right-hand side of both figures.

Figure 1: Private sector credit and regulatory quality

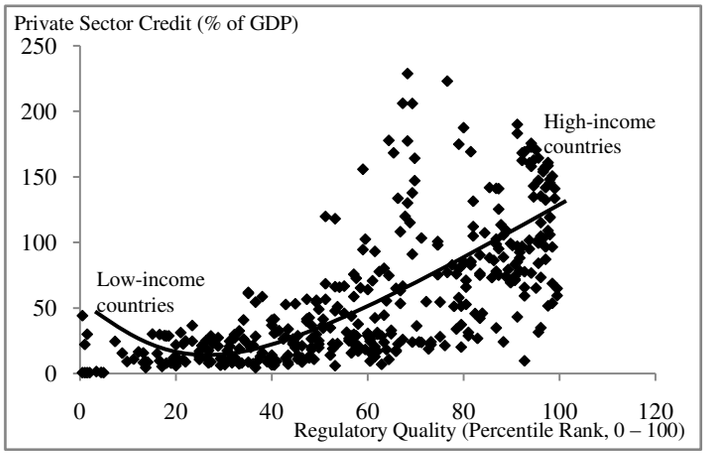
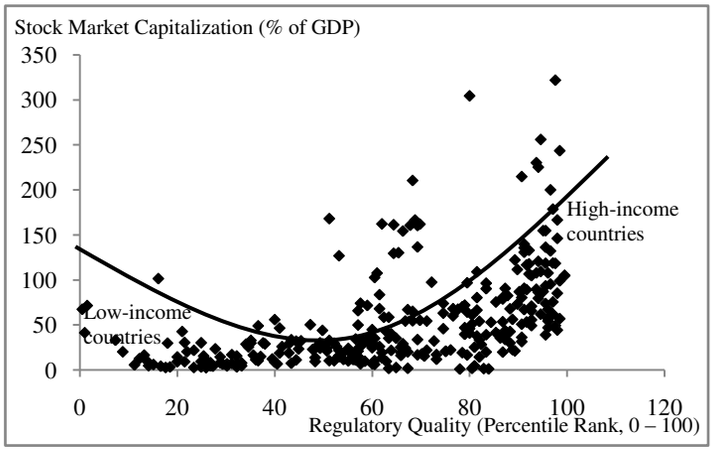


Figure 2: Stock market capitalization and regulatory quality



This finding indicates that the regulatory quality does promote financial development but only when a threshold level of regulatory quality development has been achieved, a condition which is more common among low-income countries.

4. Conclusion

This study examines the role of institutional quality in influencing financial development across developed and developing countries. Although institutional quality has been gaining popularity in recent years especially to promote economic growth, there has been no available econometric evidence to trace the link between financial development and institutional quality. As financial development and institutional quality become a reality for sources of economic growth, it is important to understand how the role of institutional quality such as rule of law, corruption, political stability and government effectiveness affects financial development.

The empirical results based on the dynamic panel data of GMM suggest that institutional quality significantly enhance financial development, especially banking sector development where the private sector credit is employed in the analysis. Nevertheless, some institutional aspects matter more than others do. Particularly, we find that rule of law, political stability and government effectiveness play a vital role in promoting banking sector development. The stock market

development indicator, on the other hand, does not show any significant influence from institutional quality. Besides institutions, real GDP per capita is also statistically significant determinant of financial development, but financial openness seem to dampen the development of financial markets.

The finding also suggests that the effectiveness of institutional quality on financial development is non-monotonic and depends upon the type of institutions. Among six institutional quality indicators, the regulatory quality indicator depicts the U-shaped relationship with financial development. The nonlinear evidence is robust to two financial development measures, regardless the financial development is proxied by banking sector development or stock market development. This result reveals that the regulatory quality does contribute to financial development but only when a threshold level of regulatory quality development has been attained, a condition which is more prevalent among low-income economies. Most of the low-income countries are located at the low side of regulatory quality, which suggested that further improvement of regulatory quality is crucial to further develop their financial markets. The government of these economies should impose well-regulated policies on financial market activities to private sector, and less restrictive regulatory regimes to keep away from poorly functioning financial systems. Overall, in terms of policy implication, the findings suggest that enhancing institutional infrastructure and identifying the beneficial aspects of particular institutions, would encourage the development of financial markets.

Appendix

Table A: Definition of institutional quality indicators (Kaufmann *et al.*, 2008)

Indicators	**Definition**
Voice and Accountability (VA)	The extent to which country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media
Political Stability (PS)	The perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including domestic violence and terrorism
Government Effectiveness (GE)	The quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies
Regulatory Quality (RQ)	The ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development
Rule of Law (ROL)	The extent to which agents have confidence in and abide by the rules of society, in particular the quality of contract enforcement, the police, and the courts, as well as the likelihood of crime and violence
Corruption (CORR)	The extent to which public power is exercised for private gain, including petty and grand forms of corruption, as well as "capture" of the state by elites and private interests