FDI and stock market development in developing countries: The role of governance environment

Nguyen Van Bon
University of Finance Marketing (UFM), Ho Chi Minh City, Vietnam
Email: bonvnguyen@gmail.com; boninguyen@gmail.com

Received July 16, 2020
Revised October 13, 2020
Accepted November 5, 2020

Abstract

Does the governance environment influence the relationship between FDI and stock market development in developing countries? We find the answer by using the two-step GMM estimators (system and difference) for a balanced panel data of 36 developing countries over the period 2002 – 2017. The empirical results show that the governance environment and FDI positively affect stock market development, but the interaction between them oppositely influences. The robustness of these estimates is confirmed by using the PMG estimator. Besides, money supply, exchange rate, trade openness, economic growth, private credit, domestic investment, and inflation are the significant determinants of stock market development. These findings suggest some policy implications for governments in developing countries in promoting stock market development.

Keywords: FDI, Stock market development, developing countries, GMM estimator, PMG estimator.
JEL Classification Code: G15, G18, G20

1. Introduction

The influence of FDI inflows on stock market development is one of the most interesting themes in countries worldwide, especially developing ones. The two-gap model developed by Chenery & Strout (1966) emphasizes the necessity of foreign capital, for example FDI, to fill the "saving - investment" gap and the "trade" gap in developing countries. As a result, FDI inflows are particularly important in these countries. DI is the fixed form of transnational business activities made mostly by the multi-national corporations by which FDI investors get benefits from popularizing their brand name, marketing, and purchasing their products in other countries (Agosin and Machado, 2005). The great contribution of FDI inflows in host countries is expected to emerge as innovative capacity, capital accumulation, know-how acquisition, technology transfer, and economic growth eventually. Hence, governments in all countries, especially developing countries, always try to reform the institutional settings and adjust the policies to attract more FDI inflows. Meanwhile, the stock market is one of the crucial channels to provide capital for domestic enterprises, improving the efficiency of capital use in the economy, thus promoting economic development and growth. FDI inflows can promote or decrease the development of the stock market as mentioned in related literature. Therefore, institutional settings are particularly noted because they greatly contribute to the effect of FDI inflows on stock market development.

Given the relevance of this topic, there are two official views on the FDI inflows and stock market development. The first one developed by Hausmann & Fernandez-Arias (2000) with the observations that FDI seems to be larger in countries that are financially underdeveloped, riskier, and institutionally weak. Domestic enterprises will attempt to use FDI as alternatives to poor financial markets for both debt and equity. Therefore, FDI will be negatively associated with stock market development. In contrast, the second view suggested by Claessens et al. (2001) argues that FDI will flow to countries having good institutional settings with strict rules and fundamentals. It can be attributed to the main idea that matching foreign currency assets to foreign currency liabilities is to offset exchange rate risk. It stems from FDI investors who finance a part of their investment with external capital or sell equity in capital markets. As a result, investors partly invest via buying existing equity which leads to improving the liquidity of stock markets and increasing the value traded domestically.

Motivated by the fact that the governance environment importantly contributes to the FDI – stock market development relationship, we empirically investigate the effects of FDI, governance and their interactions on stock market development in 36 developing countries from 2002 to 2017 using the two-step GMM Arellano-Bond estimators (both system and difference). In particular, the Pooled Mean Group (PMG) estimator is used to check the robustness of these estimates.

The paper is constructed in the following way. Section 2 is a literature review that shows the relationship between FDI and stock market development. The model specification and research data are given in Section 3 that especially emphasizes the characteristics and appropriateness of the two-step GMM Arellano-Bond estimators and the PMG estimator. Section 4 presents the empirical results consisting of the two-step GMM Arellano-Bond estimates and the robustness check by the PMG estimator. The final section (Section 5) concludes and suggests some important policy implications.

2. Literature review

Given the relevance of the topic, there are three major strands. The first one follows the effects of institutional quality on stock market development while the second one investigates the macroeconomic determinants of stock market development. The third focuses on the role of FDI inflows in the development of the stock market.

In the first strand, most studies have been recently carried out. Gani & Ngassam (2008) use GLS, fixed effects, and fixed effects corrected for AR(1) errors for a sample of eight Asian countries between 1996 and 2005 and find that rule of law and political stability have positive effects while poor regulatory quality and government effectiveness have negative impacts on stock market development. These authors emphasize the important role of institutional quality in improving the stock market. Similarly, Yartey (2010) reports that institutional factors such as political risk, law and order, democratic accountability, and bureaucratic quality promote stock market development via enhancing the viability of external finance using difference panel GMM Arellano-Bond estimator for a panel data of 42 emerging economies over the period between 1990 and 2004. Meanwhile, Asongu (2012) shows that the quality of government institutions has a positive impact on stock market performance for a panel of 14 African countries from 1990 to 2010 with instrumental variable estimation technique. These findings demonstrate countries with better government institutional environments will favor stock markets with higher value in shares traded, higher market capitalization, better turnover ratios, and a greater number of listed companies.

Apart from institutional quality, corruption, democracy, and trust are also different measures of institutions. Ayaydın & Baltacı (2013) indicate that the negative impact of corruption and the positive effect of bank sector development on stock market development for a panel data of 42 emerging economies over the period 1996 to 2011 with fixed effects estimator. Recently, Biswas & Ofori (2015) find that democracy and constitutional limits on the number of years a chief executive allowed to serve significantly promote stock market development by applying the random effects GLS methodology for a sample of 22 African countries from 1985 to 2011. More lately, Ng et al. (2016) use the relevance of social capital in stock market development as a proxy for social institutions (trust). Through Bayesian model averaging (BMA) on 37 variables across 60 countries from 2000 to 2006, Ng et al. (2016) find that trust is a positive determinant of stock market development and also the most relevant component of social capital in market development. Moreover, the estimated results show the association between social capital, particularly trust, and market development is strong countries with a lower formal institutional environment.

Unlike the above-mentioned studies, in the second strand, most of the investigations indicate that economic growth, saving rate, investment rate, development of financial intermediaries, and capital market liquidity are the critical determinants of stock market development. Quartey & Gaddah (2007) note that economic growth, credit to the private sector, exchange rate, gross domestic savings have positive effects while interest rate has a negative impact on stock market development in Ghana over the period of 1991-2004 using VECM model with Johansen cointegration test. Using the same empirical model as Quartey & Gaddah (2007), El-Nader & Alraimony (2013) conclude that money supply, capital market liquidity, investment rate, inflation and credit to private sector positively influence while nominal gross domestic product and net remittances negatively affect stock market development in Jordan from 1990 to 2011. Meanwhile, Evrim-Mandaci et al. (2013) analyze the key determinants of stock market development in 30 advanced and emerging countries during the period between 1960 and pre-financial global meltdown (2007) via random-effect SUR estimation. The results show that credit to the private sector, foreign direct investment, and remittances are the positive determinants of stock market development. Similarly, Phan & Vo (2013) recognize that economic growth rate, stock market, gross domestic savings, credit to the private sector, M2 money supply, and inflation change are critical determinants of stock market development by applying the constant coefficients model using pooled OLS for 6 Southeast Asian countries over the period of 1990-2008. Accordingly, macroeconomic instability (inflation change) has a negative impact while the remaining variables have positive effects on stock market capitalization. Conversely, the empirical results from

Shahbaz et al. (2015) show inflation has a significantly positive impact on stock market development in Pakistan from 1974 to 2010 through the VECM model with the ARDL bounds test. In addition to inflation, economic growth, credit to the private sector and investment rate have positive effects while trade openness has a negative impact on stock market development. More recently, using the Structural Equation Modeling approach (SEM) for quarterly secondary data spanning from 1991 to 2011 in Ghana, Acquah-Sam (2016) provide empirical evidence that the effects of investment rate and economic growth on stock market development are significantly positive while that of interest rates negatively.

In parallel, some studies of this strand also find financial intermediary development and stock market capitalization are complements instead of substitutes. The estimated results from Garcia & Liu (1999) confirm financial intermediary development positively enhances stock market development in 15 industrial and developing countries during the period from 1980 to 1995 using the fixed effects method. Moreover, economic growth rate, saving rate, investment rate, and stock market liquidity are the positive determinants of stock market development in these countries. With the same methodology and results as Garcia & Liu (1999), Ben Naceur et al. (2007) also show financial intermediaries and stock markets are complements rather than substitutes in the growth process in 12 Middle Eastern and North African (MENA) region countries from 1979 to 1999. In addition, Ben Naceur et al. (2007) also confirm the saving rate, credit to the private sector, stock market liquidity and inflation change are the significant determinants of stock market development. Meanwhile, Cherif & Gazdar (2010) improve the methodology in treating the endogenous phenomena between variables. Through the methods of IV-fixed effects and IV-random effects, these authors conclude that the relationship between financial intermediaries and stock markets is complementary in 14 MENA countries over the period of 1990-2007. Besides, economic growth, savings rate, credit to the private sector, stock market liquidity, and interest rate have significant influences on stock market development.

The similarities in the above-mentioned studies are policy implications. According to these authors, to promote the stock market development, governments should encourage domestic savings, improve capital market liquid, develop financial intermediaries, and control inflation.

In the third strand, nearly all papers except Raza & Jawaid (2014) find FDI significantly promotes stock market development. Claessens et al. (2001) confirm FDI is a compliment and not a substitute of domestic stock market development for a sample of 77 countries in the period 1975-2000 with estimation methods of random effects and random effects while Jeffus (2004) shows the impact of FDI inflows on stock market development is significantly positive in four Latin American countries for the period 1988–2002. Similarly, Raza *et al.* (2012) conclude FDI inflows foster stock market development in Pakistan over the period of 1988-2009 with OLS estimation. Meanwhile, Abdul Malik & Amjad (2013) also provide empirical evidence to support the hypothesis of the positive role of FDI inflows in boosting stock market development in Pakistan during the period 1985-2011 via Johansen co-integration approach. Recently, Raza et al. (2015) use estimation methods of ARDL bound testing cointegration approach, DOLS technique and FMOLS technique for the annual time series data of Pakistan from the period of 1976 to 2011 and also find FDI has a positive impact on stock market capitalization in both long run and short run. Conversely, the estimated results from Raza & Jawaid (2014) indicate FDI has a significantly negative effect on the stock market capitalization in both the long run and short run by applying the VECM model with ARDL bound test for 18 Asian countries over the period 2000–201.

From the literature review perspective, in summary, so far there is no investigation to use the twostep GMM Arellano-Bond estimators (both system and difference) and PMG estimator to study the role of governance environment in the FDI – stock market development

relationship for a group of developing countries. It is the main research gap to which the study will address.

3. Methodology and research data

3.1 Methodology

Based on the work developed by Abdul Malik & Amjad (2013), the empirical equation is extended as follows:

$$SMD_{it} = \beta_0 + \beta_1 SMD_{it-1} + \beta_2 FDI_{it} + \beta_3 GOV_{it} + \beta_4 (FDI \times GOV)_{it} + X_{it}\beta' + \eta_i + \xi_{it}, \quad (1)$$

where subscript *i* and *t* are the country and time index, respectively. SMD_{it} is proxy for stock market development [stocks traded (total value), stocks traded (turnover ratio of domestic shares), and market capitalization of listed domestic companies], SDM_{it-1} is proxy for the initial level of stock market development, FDI_{it} is net FDI inflow, GOV_{it} is governance environment (six dimensions of governance), and $(FDI*GOV)_{it}$ is the interaction of FDI and GOV. X_{it} is a set of control variables such as money supply, exchange rate, real gdp per capita, private credit, trade openness, domestic investment, and inflation; η_i is an unobserved time-invariant, country-specific effect and ζ_{it} is an observation-specific error term; β_0, β_1, β_2, β_3, β_4 and β' are estimated coefficients.

Improving and reforming the institutional settings in host countries lead to attracting more FDI inflows. These additional FDI inflows will have certain impacts on stock market development, thus the interaction term is introduced into the model to capture these impacts. For the control variables in the model, we base on the previous related studies such as exchange rate (Raza et al., 2012; Abdul Malik & Amjad, 2013), private credit (Ben Naceur et al., 2007; Quartey & Gaddah, 2007; Yartey, 2010; Ayaydın & Baltacı, 2013; El-Nader & Alraimony, 2013; Phan & Vo, 2013; Shahbaz et al., 2015), domestic investment (Cherif & Gazdar, 2010; Yartey, 2010; El-Nader & Alraimony, 2013; Shahbaz et al., 2015; Acquah-Sam, 2016), economic growth (Quartey & Gaddah, 2007; Yartey, 2010; Ayaydın & Baltacı, 2013; Phan & Vo, 2013; Shahbaz et al., 2015; Acquah-Sam, 2016), money supply (Cherif & Gazdar, 2010; Ayaydın & Baltacı, 2013; El-Nader & Alraimony, 2013; Phan & Vo, 2013), trade openness (Ramos, 2009), inflation (Ben Naceur et al., 2007; Ayaydın & Baltacı, 2013; Phan & Vo, 2013).

We apply Equation (1) to investigate the effects of FDI, governance, and their interaction on stock market development for the group of 36 developing countries. Six dimensions of governance constructed by the Worldwide Governance Indicators project will be used to define the governance environment (Kaufmann et al. 2011). These dimensions of governance are measured in the standard normal units of the governance indicator, ranging from around –2.5 to 2.5. In particular, Hope Sr (2009) notes that the lack of good governance in most developing countries leads to adverse effects on the economic development perspective; thus, enhancing the governance environment in these countries plays a crucial role in the development agenda.

There are four serious problems of econometrics from estimating Equation (1). First, some variables such as economic growth, FDI and domestic investment may be endogenous. These variables can correlate with the error term η_i, which leads to the endogenous phenomenon. Second, some unobserved time-invariant, country-specific characteristics (fixed effects) like geography and anthropology can correlate with the independent variables. These fixed effects exist in the error term η_i. Third, the presence of the lagged dependent variable SMD_{it-1} results in a high autocorrelation. Finally, the panel data has a short observation length (T = 16) and a relatively large unit of countries (N = 36). These problems may cause the OLS estimator inconsistent and biased. The fixed effects model (FEM) and the random effects model (REM) cannot deal with endogenous phenomena and autocorrelation while the IV-2SLS estimator requires some suitable instrumental variables

which are out of independent variables in the model. Therefore, we decide to select the system and difference GMM estimators as suggested by Judson and Owen *(*1999) for estimation and the Pooled Mean Group (PMG) estimator for robustness check.

We use the general method of moments (GMM) Arellano and Bond (1991) estimators first proposed by Holtz-Eakin et al. (1988) for estimation. For Equation (1), we take the first difference to remove country-specific effects. Then, the regressors in first difference are used as instrumented by their lags under the assumption that time-varying disturbances in the original models are not serially correlated (Judson and Owen, 1999). This strategy is the difference GMM Arellano and Bond estimator (D-GMM), which is well-known to be able to deal with simultaneity biases in regressions.

Equation (1) can be transformed into an equation in first difference as follows:

$$\begin{aligned}\mathrm{SMD}_{it} - \mathrm{SMD}_{it-1} = {} & \beta_1(\mathrm{SMD}_{it-1} - \mathrm{SMD}_{it-2}) + \beta_2(\mathrm{FDI}_{it} - \mathrm{FDI}_{it-1}) \\ & + \beta_3(\mathrm{GOV}_{it} - \mathrm{GOV}_{it-1}) + \beta_4[(\mathrm{FDI} \times \mathrm{GOV})_{it} - (\mathrm{FDI} \times \mathrm{GOV})_{it-1}] \\ & + (\mathrm{X}_{it} - \mathrm{X}_{it-1})\beta_4' + (\xi_{it} - \xi_{it-1}), \quad (2)\end{aligned}$$

In case variables are persistent, their past values indicate little information about their future changes, making their lags be weak instruments for their differenced series. Thus, Arellano and Bover (1995) suggest a combination of Equation (1) and Equation (2) to form a system of two equations, an equation in difference series instrumented by lagged levels and an equation in levels instrumented by lagged differences, to which GMM is applied. It is known as the system GMM Arellano and Bond estimator (S-GMM), a strategy which is able to enhance the efficiency via its reduction in biases and solve the problem of the weak instrument in D-GMM (Blundell and Bond, 1998). The consistency of S-GMM is obviously based on the assumption that the error terms are uncorrelated, the instruments are valid, and the changes in additional instruments are not correlated with country-fixed effects.

In comparison with the one-step GMM estimators, the two-step GMM estimators are more asymptotically efficient. However, the application of the two-step GMM estimators in small samples, as in our study, has some problems (Roodman, 2006). These problems are set up by the proliferation of instruments, which quadratically increase as the time dimension increases. It can cause the number of instruments to be very large relative to the number of countries. To avoid it, the rule of thumb should be applied to maintain the number of instruments less than or equal to the number of countries (Roodman, 2006).

The validity of instruments in S-GMM and D-GMM is assessed through Sargan statistic, Hansen statistic, and Arellano-Bond statistic. The Sargan and Hansen tests with null hypothesis H_0: the instrument is strictly exogenous, which means that it does not correlate with errors. The Arellano-Bond test is used to detect the autocorrelation of errors in first difference. Thus, the test result of first autocorrelation of errors, AR(1) is ignored while the second autocorrelation of errors, AR(2), is tested on the first difference series of errors to detect the phenomenon of first autocorrelation of errors, AR(1).

To check the robustness of S-GMM and D-GMM estimates, we use the PMG estimator developed by Pesaran et al. (1999). The PMG estimator allows the short-term parameters to be heterogeneous between groups while imposing homogeneity of the long-term coefficients between countries. It is one advantage of the PMG estimator. Furthermore, the PMG estimator highlights the adjustment dynamic between the short-run and the long-run. The heterogeneity of short-run slope coefficients allows the dynamic specification to differ across countries. However, the drawback of the PMG estimator is that it cannot deal with the endogeneity of variables in the model.

The PMG estimator – based error correction model as follows:

$$\Delta Y_{it} = \emptyset S_{it-1} + \sum_{j=1}^{p} \delta_{ij} \Delta X_{it-j} + \eta_{it} + \xi_{it} \text{ where } S_{it-1} = Y_{it-1} - \theta X_{it-1}, (3)$$

where Y is stock market development; S_{it-1} is the deviation from long-run equilibrium at any period for group i, and ϕ is the error-correction coefficient (speed of adjustment). The vector θ captures the long-run coefficients which do not vary across groups; these coefficients represent the long-run elasticity of private investment with respect to each variable in X_{it-1}. The short-run responses of the X variables are captured by the vector δ. η_i is an unobserved time-invariant, country-specific effect, and ζ_{it} is an observation-specific error term. The validity of the PMG estimates is based on the level and significance of the error-correction coefficient ϕ (negative, smaller than 1).

3.2 Research data

The variables are stocks traded (total value), stocks traded (turnover ratio of domestic shares), market capitalization of listed domestic companies, FDI, six dimensions of governance, money supply, exchange rate, real gdp per capita, private credit, trade openness, domestic investment, and inflation. Data are taken from the World Bank World Development Indicators (WDI) and Worldwide Governance Indicators (WGI) database. The research sample contains 36 developing countries[1] from 2002 to 2017. Due to the unavailability of data in other developing countries, the sample ends at 36 ones.

The definition and descriptive statistics of data are presented in Appendix A. The results in App 2 indicate that most developing countries have a poor governance environment, which is completely consistent with that in the approach of Li (2003) and Li and Filer (2007) that most developing countries are those with relation-based governance. The matrix of correlation coefficients is presented in App 3 and App 4. Correlation coefficients between variables in App 3 have values lower than 0.8, which removes the possibility of co-linearity between variables in the empirical models. Meanwhile, Correlation coefficients between dimensions of governance have values higher than 0.8, so these dimensions are separately used in the empirical equations.

4. Results and discussion

4.1 GMM estimates

The results are presented in Table 1, Table 2, Table 3 (S-GMM), and in Table 4, Table 5, Table 6 (D-GMM). Stock market development is respectively proxied by stocks traded, total value (Table 1, Table 4), stocks traded, turnover ratio of domestic shares (Table 2, Table 5), and Market capitalization of listed domestic companies (Table 3, Table 6). In each table, each column is the model in correspondence with each dimension of governance. In all estimation procedures, we detect that FDI is endogenous, thus we use FDI as instrumented in the GMM-style and the remaining variables (governance, money supply, exchange rate, real GDP per capita, private credit, trade openness, domestic investment, and inflation) as instruments in the IV-style.

The estimated results by both S-GMM and D-GMM show that FDI and governance stimulate stock market development but their interaction reduces it. All these results are highly consistent for all six dimensions of governance and 3 proxies of stock market development. The positive effect of FDI on stock market development can be found in Jeffus

[1] Argentina, Bahrain, Bangladesh, Brazil, Chile, China, Colombia, Croatia, Egypt, Hungary, India, Indonesia, Iran, Jordan, Kazakhstan, Kenya, Lebanon, Malaysia, Mauritius, Mexico, Morocco, Namibia, Nigeria, Oman, Pakistan, Panama, Peru, Philippines, Poland, Saudi Arabia, South Africa, Sri Lanka, Thailand, Turkey, United Arab Emirates, and Vietnam.

(2004), Raza et al. (2012), Abdul Malik & Amjad (2013), Ayaydın & Baltacı (2013), Raza et al. (2014), which supports the view by Claessens et al. (2001). FDI is one of the official channels to provide capital for the development of the stock market, meeting the demand for capital for domestic enterprises. In particular, developing countries lack physical capital and human capital management, so governments in these countries try to reform and improve the regulations and policies to attract more FDI inflows. FDI inflows can be green-field FDI or FII (Foreign Indirect Investment). The effects of green-field FDI on stock market development can be the horizontal and vertical spillovers gradually into the economy through economic activities of cooperation between FDI enterprises and domestic enterprises while the influences of FII can be the transactions of M&A to merge and acquire domestic enterprises by purchasing shares of enterprises on the stock market. Meanwhile, Ramos (2009) and Yartey (2010) indicate that governance has a positive impact on stock market development. Improving governance environment leads to the design, formulation, and implementation of appropriate rules and policies to support stock market development. Developing countries look at stock market development as one of the important channels to provide the capital for domestic enterprises and promote economic growth. However, why does the interaction between FDI and governance hinder stock market development? Does it stem from conducting the "race to the top" on tax competition or lowering the related standards among developing countries to attract more FDI inflows? In fact, FDI inflows can come in the form of foreign indirect investment (FII), which can be used to conduct the transactions of M&A to merge and acquire domestic enterprises and then transform these domestic enterprises into foreign enterprises. If it is the case, reforming and improving governance environment in developing countries should be carefully considered to avoid these negative effects.

The results from 6 tables also show that money supply, trade openness, economic growth, private credit, and domestic investment significantly increase stock market development while the exchange rate and inflation hinder it. The money supply is one of the important instruments of governments to promote stock market development. The positive contribution of the money supply is shown in Cherif & Gazdar (2010), Ayaydın & Baltacı (2013), El-Nader & Alraimony (2013), and Phan & Vo (2013). The openness of the economies will attract more foreign capital from other countries to the host countries (Ramos, 2009). The indirect impact of trade openness is to provide favorable conditions for domestic enterprises to receive FDI inflows. Economic growth increases people's income and enhances savings - investment. Part of this savings will enter the stock market and be received by the domestic enterprises for investment and thus promote stock market development. This finding is empirically approved by Quartey & Gaddah (2007), Yartey (2010), Ayaydın & Baltacı (2013), Phan & Vo (2013), Shahbaz et al. (2015), and Acquah-Sam (2016). Meanwhile, credit for the private sector is part of the government's fiscal policy to support the economic activities and investment of domestic enterprises to promote economic growth, create more jobs, and stabilize social security. The government's policy is to require banks to provide credit to domestic enterprises with room that may vary depending on the economic situation. Domestic enterprises use the granted credit to carry out investment activities, improve profits and increase market capitalization, which stimulates the development of the stock market. Ben Naceur et al. (2007), Quartey & Gaddah (2007), Yartey (2010), Ayaydın & Baltacı (2013), El-Nader & Alraimony (2013), Phan & Vo (2013), and Shahbaz et al. (2015) note that credit for the private sector has a positive impact on stock market development. Similarly, investment is also a way for domestic enterprises to increase their market capitalization through making profits, or they can make investments through M&A to increase their competitiveness. Therefore, domestic investment increases the market capitalization of enterprises in the stock market. Therefore, Cherif & Gazdar (2010), Yartey

(2010), El-Nader & Alraimony (2013), Shahbaz et al. (2015), and Acquah-Sam (2016) provide empirical evidence to show that an increase in domestic investment leads to promote stock market development.

Contrary to the positive effects of the above-mentioned variables, exchange rate and inflation have negative effects on stock market development. The negative effect of inflation may come from the increase in transaction costs, which reduces enterprises' profits and thereby lowers the market capitalization. This result is indicated in Ben Naceur et al. (2007), Ayaydın & Baltacı (2013), and Phan & Vo (2013). This finding also sends a signal to policy-makers that control of inflation is necessary to develop the stock market better, especially to limit the adverse effects of inflation on economic activities of enterprises.

Table 1. FDI, governance and stock market development: S-GMM estimations, 2002 – 2017
Dependent variable: Stock Market Development (SMD) - Stocks traded, total value (% of GDP)

Variables	**GOV1**	**GOV2**	**GOV3**	**GOV4**	**GOV5**	**GOV6**
SMD (-1)	0.519*** (0.014)	0.545*** (0.021)	0.530*** (0.018)	0.570*** (0.020)	0.529*** (0.012)	0.525*** (0.017)
FDI	0.717*** (0.111)	1.712*** (0.162)	0.959*** (0.106)	1.556*** (0.174)	1.262*** (0.113)	1.034*** (0.065)
Governance	1.829** (0.756)	4.411*** (0.797)	0.066 (0.762)	1.863* (1.041)	4.006*** (0.780)	-0.562 (0.681)
FDI*Governance	-0.348*** (0.069)	-2.342*** (0.191)	-1.007*** (0.100)	-1.480*** (0.158)	-1.099*** (0.080)	-1.338*** (0.081)
Money supply	-0.002 (0.012)	-0.063 (0.035)	-0.093 (0.052)	-0.078 (0.048)	-0.036 (0.027)	-0.079 (0.044)
Exchange rate	-0.016*** (0.001)	-0.010*** (0.002)	-0.017*** (0.001)	-0.011*** (0.002)	-0.012*** (0.001)	-0.009*** (0.002)
Trade openness	-0.145 (0.080)	-0.129 (0.076)	-0.128 (0.073)	-0.145 (0.088)	-0.159 (0.086)	-0.170 (0.099)
Economic growth	-0.001 (0.002)	-0.0002 (0.003)	0.001 (0.003)	0.005 (0.003)	0.0002 (0.003)	0.006* (0.003)
Private credit	0.275*** (0.022)	0.299*** (0.020)	0.318*** (0.019)	0.301*** (0.016)	0.292*** (0.017)	0.339*** (0.017)
Domestic investment	0.350*** (0.048)	0.189** (0.085)	0.307*** (0.049)	0.044 (0.078)	0.253*** (0.074)	0.042 (0.069)
Inflation	0.340 (0.187)	0.031 (0.094)	0.039 (0.118)	0.232 (0.156)	0.245** (0.098)	0.100 (0.085)
Instrument	36	36	36	36	36	36
Country/Observation	36/504	36/504	36/504	36/504	36/504	36/504
AR(2) test	0.925	0.970	0.960	0.994	0.965	0.984
Sargan test	0.870	0.978	0.940	0.941	0.934	0.658
Hansen test	0.424	0.387	0.533	0.681	0.428	0.826

Note: ***, ** and *denote significance at 1 percent, 5 percent and 10 percent respectively

Table 2. FDI, governance and stock market development: S-GMM estimations, 2002 – 2017

Dependent variable: Stock Market Development (SMD) - Stocks traded, turnover ratio of domestic shares (%)

Variables	**GOV1**	**GOV2**	**GOV3**	**GOV4**	**GOV5**	**GOV6**
SMD (-1)	0.605*** (0.016)	0.594*** (0.013)	0.621*** (0.015)	0.608*** (0.014)	0.605*** (0.015)	0.620*** (0.014)
FDI	0.299*** (0.036)	0.745*** (0.08)	0.615*** (0.070)	0.496*** (0.091)	0.750*** (0.087)	0.748*** (0.058)
Governance	10.115*** (2.233)	17.029*** (2.691)	4.563*** (0.616)	11.093*** (1.902)	10.033** (2.579)	0.210 (1.056)
FDI*Governance	-0.119 (0.139)	-0.595*** (0.161)	-0.550*** (0.123)	-0.230** (0.111)	-0.315** (0.129)	-0.966*** (0.100)
Money supply	0.084*** (0.022)	0.093*** (0.023)	0.028 (0.026)	0.097*** (0.021)	0.074*** (0.019)	0.009 (0.016)
Exchange rate	-0.018*** (0.003)	-0.019*** (0.003)	-0.021*** (0.003)	-0.022*** (0.002)	-0.020*** (0.002)	-0.021*** (0.002)
Trade openness	-0.075 (0.221)	-0.113 (0.318)	-0.102 (0.124)	-0.107 (0.118)	-0.107 (0.21)	-0.101 (0.120)
Economic growth	-0.022 (0.103)	-0.022 (0.203)	-0.002 (0.106)	-0.012 (0.084)	-0.007 (0.004)	-0.0002 (0.005)
Private credit	0.055 (0.043)	0.005 (0.045)	0.094* (0.051)	0.004 (0.055)	-0.001 (0.055)	0.097* (0.049)
Domestic investment	1.031*** (0.115)	1.047*** (0.114)	0.451*** (0.136)	0.663*** (0.131)	0.704*** (0.133)	0.454*** (0.133)
Inflation	2.128 (1.277)	2.300 (1.211)	2.323 (1.214)	2.736 (2.175)	2.081 (1.182)	1.623 (2.154)
Instrument	36	36	36	36	36	36
Country/ Observation	36/504	36/504	36/468	36/468	36/468	36/468
AR(2) test	0.210	0.213	0.217	0.220	0.209	0.213
Sargan test	0.756	0.786	0.293	0.738	0.588	0.366
Hansen test	0.268	0.324	0.290	0.471	0.509	0.356

Note: ***, ** and *denote significance at 1 percent, 5 percent and 10 percent respectively

Table 3. FDI, governance and stock market development: S-GMM estimations, 2002 – 2017

Dependent variable: Stock Market Development (SMD) - Market capitalization of listed domestic companies (% of GDP)

Variables	**GOV1**	**GOV2**	**GOV3**	**GOV4**	**GOV5**	**GOV6**
SMD (-1)	0.674*** (0.018)	1.111*** (0.033)	0.996*** (0.050)	0.638*** (0.036)	1.174*** (0.040)	1.089*** (0.034)
FDI	0.096 (0.525)	2.119*** (0.360)	1.708*** (0.177)	1.362** (0.652)	1.516*** (0.184)	0.865*** (0.147)
Governance	5.449** (2.559)	17.239* (8.949)	8.044** (3.495)	6.856** (3.032)	13.412** (5.064)	-2.619 (2.230)
FDI*Governance	-0.576** (0.262)	-3.456*** (0.592)	-2.34*** (0.230)	-1.493** (0.613)	-2.114*** (0.228)	-1.007*** (0.138)
Money supply	-0.039 (0.049)	-0.277 (0.168)	-0.478 (0.319)	-0.134 (0.147)	-0.397 (0.204)	-0.276 (0.191)
Exchange rate	-0.002 (0.003)	0.033 (0.026)	0.035 (0.105)	-0.007** (0.003)	0.033 (0.106)	0.033*** (0.005)
Trade openness	-0.047*** (0.115)	-0.383 (0.266)	-0.396 (0.240)	-0.123 (0.132)	-0.401 (0.363)	-0.266 (0.162)
Economic growth	0.002 (0.006)	0.053*** (0.012)	0.044*** (0.011)	0.028*** (0.007)	0.055*** (0.013)	0.031*** (0.011)
Private credit	0.229** (0.094)	-0.184 (0.119)	0.135 (0.099)	0.509*** (0.070)	-0.195 (0.116)	-0.078 (0.071)
Domestic investment	0.426 (0.351)	0.625* (0.365)	0.897* (0.461)	-0.871** (0.409)	0.955** (0.426)	0.905** (0.354)
Inflation	-0.262 (0.324)	-3.974*** (0.75)	-3.179*** (0.840)	0.619 (0.394)	-4.132*** (0.62)	-4.166*** (0.736)
Instrument	36	33	33	36	34	34
Country/Observation	36/540	36/468	36/468	36/540	36/468	36/468
AR(2) test	0.418	0.686	0.943	0.530	0.747	0.814
Sargan test	0.788	0.121	0.110	0.134	0.114	0.112
Hansen test	0.804	0.215	0.313	0.507	0.280	0.211

Note: ***, ** and *denote significance at 1 percent, 5 percent and 10 percent respectively

Table 4. FDI, governance and stock market development: D-GMM estimations, 2002 – 2017
Dependent variable: Stock Market Development (SMD) - Stocks traded, total value (% of GDP)

Variables	**GOV1**	**GOV2**	**GOV3**	**GOV4**	**GOV5**	**GOV6**
SMD (-1)	-0.070***	-0.033	-0.056**	-0.047	-0.057***	-0.099**
	(0.023)	(0.023)	(0.025)	(0.103)	(0.018)	(0.039)
FDI	1.387***	1.703***	2.458***	2.027***	1.065***	2.201***
	(0.284)	(0.553)	(0.586)	(0.699)	(0.306)	(0.466)
Governance	43.669***	13.492***	71.438***	103.100**	29.646***	61.137***
	(14.389)	(4.149)	(16.752)	(43.003)	(7.420)	(21.048)
FDI*Governance	-1.892***	-1.778**	-3.097***	-2.181***	-0.964**	-2.370***
	(0.384)	(0.756)	(0.744)	(0.732)	(0.397)	(0.550)
Money supply	-0.053	-0.318	-0.030	-0.151	-0.173	0.028
	(0.097)	(0.235)	(0.100)	(0.228)	(0.103)	(0.159)
Exchange rate	-0.028	0.034	0.021	0.205	-0.007	-0.107
	(0.040)	(0.035)	(0.070)	(0.123)	(0.042)	(0.087)
Trade openness	-0.007	0.093	-0.001	-0.061	-0.022	-0.029
	(0.064)	(0.056)	(0.053)	(0.138)	(0.070)	(0.073)
Economic growth	-0.080	-0.002	0.033	-0.810***	-0.082	-0.042
	(0.051)	(0.087)	(0.106)	(0.221)	(0.056)	(0.097)
Private credit	0.363***	0.476***	0.208*	0.452**	0.374***	0.279**
	(0.097)	(0.138)	(0.110)	(0.194)	(0.086)	(0.136)
Domestic investment	0.211	0.055	-0.673**	0.279	0.209	0.001
	(0.149)	(0.196)	(0.237)	(0.308)	(0.206)	(0.240)
Inflation	-0.142	-0.267	-0.280	0.128	-0.204*	-0.258
	(0.150)	(0.162)	(0.174)	(0.453)	(0.117)	(0.418)
Instrument	23	24	23	23	25	23
Country/Observation	36/468	36/504	36/468	36/468	36/468	36/468
AR(2) test	0.201	0.147	0.143	0.173	0.190	0.171
Sargan test	0.278	0.345	0.973	0.576	0.130	0.103
Hansen test	0.168	0.107	0.640	0.123	0.181	0.307

Note: ***, ** and *denote significance at 1 percent, 5 percent and 10 percent respectively

Table 5. FDI, governance and stock market development: D-GMM estimations, 2002 – 2017
Dependent variable: Stock Market Development (SMD) - Stocks traded, turnover ratio of domestic shares (%)

Variables	**GOV1**	**GOV2**	**GOV3**	**GOV4**	**GOV5**	**GOV6**
SMD (-1)	-0.283***	-0.318***	-0.283***	-0.264***	-0.315***	-0.284***
	(0.046)	(0.017)	(0.027)	(0.059)	(0.032)	(0.032)
FDI	1.055**	0.895***	0.889**	1.533***	0.658***	0.468***
	(0.404)	(0.224)	(0.339)	(0.432)	(0.185)	(0.114)
Governance	123.722***	21.212**	47.312**	135.304***	21.470*	45.509***
	(40.609)	(8.378)	(22.317)	(34.252)	(10.889)	(8.143)
FDI*Governance	-2.251***	-0.810**	-1.404**	-1.594***	-0.738**	-0.432**
	(0.746)	(0.333)	(0.543)	(0.479)	(0.318)	(0.186)
Money supply	0.580**	0.386***	0.555***	0.478**	0.289***	0.409***
	(0.268)	(0.078)	(0.159)	(0.184)	(0.099)	(0.126)
Exchange rate	-0.150	-0.126**	-0.045	0.073	-0.021	-0.010
	(0.175)	(0.056)	(0.213)	(0.155)	(0.068)	(0.084)
Trade openness	-0.219	-0.010	0.277	-0.320**	0.114	0.072
	(0.373)	(0.052)	(0.261)	(0.145)	(0.101)	(0.101)
Economic growth	0.108	-0.127	0.245	-0.881***	0.044	0.167
	(0.172)	(0.122)	(0.195)	(0.288)	(0.113)	(0.099)
Private credit	0.026	0.117	-0.236	0.243	0.073	0.072
	(0.201)	(0.085)	(0.143)	(0.146)	(0.105)	(0.105)
Domestic investment	0.266	0.607***	0.174	-0.063	0.399	0.166
	(0.377)	(0.163)	(0.328)	(0.344)	(0.295)	(0.214)
Inflation	0.190	0.233	0.672	1.898	-0.124*	0.545
	(0.375)	(0.136)	(0.752)	(0.914)	(0.535)	(0.480)
Instrument	23	28	25	24	27	23
Country/Observation	36/468	36/504	36/468	36/468	36/468	36/468
AR(2) test	0.415	0.545	0.415	0.535	0.525	0.171
Sargan test	0.263	0.112	0.104	0.173	0.144	0.103
Hansen test	0.156	0.527	0.532	0.655	0.527	0.307

Note: ***, ** and *denote significance at 1 percent, 5 percent and 10 percent respectively

Table 6. FDI, governance and stock market development: D-GMM estimations, 2002 – 2017
Dependent variable: Stock Market Development (SMD) - Market capitalization of listed domestic companies (% of GDP)

Variables	**GOV1**	**GOV2**	**GOV3**	**GOV4**	**GOV5**	**GOV6**
SMD (-1)	-0.345***	0.138	-0.329***	0.199	0.085	-0.310***
	0(.064)	(0.109)	(0.069)	(0.117)	(0.136)	(0.057)
FDI	3.336***	8.222***	3.441***	8.033***	5.254***	3.207***
	(0.770)	(1.434)	(0.413)	(1.596)	(1.166)	(0.477)
Governance	102.774**	123.558***	50.246**	96.515**	47.775**	25.499**
	(42.631)	(29.888)	(21.953)	(38.968)	(22.066)	(9.794)
FDI* Governance	-5.659***	-13.892***	-3.679***	-8.808***	-7.064***	-3.127***
	(1.424)	(2.504)	(0.573)	(1.831)	(1.688)	(0.751)
Money supply	1.292	0.464	1.763**	0.165	0.034	1.242*
	(1.043)	(0.741)	(0.688)	(0.654)	(0.921)	(0.686)
Exchange rate	0.248	0.536**	0.518*	0.926**	0.558	0.397
	(0.375)	(0.264)	(0.282)	(0.392)	(0.371)	(0.249)
Trade openness	1.563**	1.716***	1.804***	1.427*	1.283*	1.514***
	(0.698)	(0.613)	(0.450)	(0.772)	(0.681)	(0.558)
Economic growth	-0.231	-0.356	0.019	-0.546*	-0.308	-0.360
	(0.505)	(0.313)	(0.292)	(0.281)	(0.250)	(0.243)
Private credit	-0.247	-0.346	-0.640	-0.565	-0.434	-0.728
	(0.772)	(0.509)	(0.486)	(0.534)	(0.590)	(0.390)
Domestic investment	-1.212	-0.858	-0.944	2.288	1.221	-0.005
	(1.577)	(1.703)	(0.856)	(1.799)	(1.794)	(1.575)
Inflation	-3.200***	-4.002***	-3.652***	-3.758***	-3.360***	-2.856***
	(1.164)	(0.860)	(0.822)	(1.217)	(1.242)	(0.832)
Instrument	27	28	27	28	27	28
Country/ Observation	36/468	36/504	36/468	36/468	36/468	36/468
AR(2) test	0.457	0.260	0.311	0.143	0.678	0.179
Sargan test	0.443	0.146	0.150	0.210	0.214	0.408
Hansen test	0.113	0.155	0.114	0.174	0.114	0.124

Note: ***, ** and *denote significance at 1 percent, 5 percent and 10 percent respectively

4.2 Robustness check

We check the robustness of GMM estimates through the sign and significance of coefficients in FDI, governance, and their interaction. So, we re-estimate Equation (1) using the PMG estimator. The corresponding results across all models are reported in Table 7, Table 8, and Table 9. In line with S-GMM and D-GMM estimates, we discover that FDI and governance foster stock market development but their interaction impedes it. In particular, the sign and significance of the error-correction coefficients shown at the bottom of tables suggest that PMG estimates are highly reliable.

Table 7. Governance, FDI and private investment: PMG estimations, 2002 – 2017 Long run co-integrating vectors
Dependent variable: Stock Market Development (SMD) - Stocks traded, total value (% of GDP)

Variables	GOV1	GOV2	GOV3	GOV4	GOV5	GOV6
FDI	0.094***	3.160***	0.074**	2.27***	0.164***	0.657***
	(0.035)	(0.339)	(0.031)	(0.180)	(0.038)	(0.063)
Governance	2.273***	6.679***	1.245***	39.656***	3.898***	1.699***
	(0.764)	(1.136)	(0.300)	(2.564)	(0.580)	(0.733)
FDI*Governance	-0.038	-3.240***	-0.213***	-5.223***	-0.390***	-0.392***
	(0.059)	(0.399)	(0.033)	(0.394)	(0.105)	(0.078)
Error correction	-0.710***	-0.397***	-0.511***	-0.402***	-0.654***	-0.625***
Observation	540	540	540	540	540	540
Log likelihood	-1146.86	-1164.39	-1143.64	-1168.91	-1140.34	-1132.90

Note: ***, ** and *denote significance at 1 percent, 5 percent and 10 percent respectively

Table 8. Governance, FDI and private investment: PMG estimations, 2002 – 2017
Long run co-integrating vectors
Dependent variable: Stock Market Development (SMD) - Stocks traded, turnover ratio of domestic shares (%)

Variables	GOV1	GOV2	GOV3	GOV4	GOV5	GOV6
FDI	0.529***	0.493***	1.050***	1.338***	0.665***	0.536***
	(0.050)	(0.051)	(0.111)	(0.322)	(0.070)	(0.111)
Governance	3.856***	1.386****	2.259***	46.474***	-1.775	22.221***
	(1.236)	(0.386)	(0.878)	(3.055)	(1.371)	(1.554)
FDI*Governance	-0.890***	-0.341***	-0.374***	-4.991***	-0.440***	-1.563***
	(0.161)	(0.092)	(0.091)	(0.574)	(0.124)	(0.188)
Error correction	-0.674***	-0.647***	-0.675***	-0.388***	-0.716***	-0.551***
Observation	540	540	540	540	540	540
Log likelihood	-1374.66	-1386.09	-1421.38	-1433.36	-1382.26	-1352.32

Note: ***, ** and *denote significance at 1 percent, 5 percent and 10 percent respectively

Table 9. Governance, FDI and private investment: PMG estimations, 2002 – 2017
Long run co-integrating vectors
Dependent variable: Stock Market Development (SMD) - Market capitalization of listed domestic companies (% of GDP)

Variables	GOV1	GOV2	GOV3	GOV4	GOV5	GOV6
FDI	0.314***	1.636***	0.520***	1.890***	1.426***	1.218***
	(0.142)	(0.147)	(0.146)	(0.116)	(0.128)	(0.168)
Governance	7.752**	24.820***	6.229***	14.656***	41.792***	26.469***
	(3.803)	(3.452)	(1.100)	(1.893)	(1.954)	(3.271)
FDI*Governance	-0.728***	-5.408***	-1.698***	-3.872***	-1.496***	-1.670***
	(0.266)	(0.383)	(0.168)	(0.271)	(0.141)	(0.161)
Error correction	-0.904***	-0.606***	-0.826***	-0.705***	-0.757***	-0.746***
Observation	540	540	540	540	540	540
Log likelihood	-1621.56	-1594.56	-1608.72	-1609.05	-1580.92	-1661.30

Note: ***, ** and *denote significance at 1 percent, 5 percent and 10 percent respectively

5. Conclusion and policy implications

Driven by the fact that governance environment plays an important role in the FDI – stock market development relationship, the paper attempts to empirically investigate the effects of FDI, governance, and their interaction on stock market development for a panel data of 72 developing countries with poor governance environment over the period 2002 – 2017 using two-step S-GMM and D-GMM. Then, the robustness of estimates is checked by the PMG estimator.

The estimated results indicate that FDI and governance improve stock market development, but their interaction hinders it. In particular, these results are highly consistent for all six dimensions of governance and 3 proxies of stock market development. From these findings, we emphasize that any research on the FDI – stock market development relationship should take account of the governance environment. Besides, money supply, exchange rate, trade openness, economic growth, private credit, domestic investment, and inflation are empirically demonstrated to be the determinants of stock market development.

The findings in this paper suggest some crucial implications in the design, formulation, and implementation of policies relating to the relationship between FDI and stock market development. The main implication is that the governance environment not only enhances stock market development but impedes it (under the interaction between it and FDI). Therefore, governments in developing countries should strongly implement institutional reforms to provide a conducive environment for the FDI – stock market development relationship, especially for the private sector's development. More importantly, these governments need to avoid rushing to attract more FDI inflows by lowering the related standards.

Reference

Abdul Malik, I., & Amjad, S. (2013). Foreign direct investment and stock market development in Pakistan. Journal of International Trade Law and Policy, 12(3), 226-242.

Acquah-Sam, E. (2016). Determinants of capital market development in Ghana. European Scientific Journal, 12(1), 251-270.

Asongu, S.A. (2012). Government quality determinants of stock market performance in African countries. Journal of African Business, 13(3), 183-199.

Ayaydın, H., & Baltacı, N. (2013). Corruption, banking sector, and stock market development: A panel data analysis. European Journal of Research on Education, Human Resources Management, Special Issue, 2(1), 94-99.

Ben Naceur, S., Ghazouani, S., & Omran, M. (2007). The Determinants of stock market development in the Middle-Eastern and North African region. Managerial Finance, 33(7), 477-489.

Biswas, R., & Ofori, E. (2015). Democracy and stock market development: The African experience. In Overlaps of Private Sector with Public Sector around the Globe (Research in Finance, Volume 31), (pp.65-86). Emerald Group Publishing Limited.

Blundell, R., & Bond, S. (2000). GMM estimation with persistent panel data: an application to production functions. Econometric Reviews, 19(3), 321-340.

Cherif, M., & Gazdar, K. (2010). Macroeconomic and institutional determinants of stock market development in MENA region: new results from a panel data analysis. International Journal of Banking and Finance, 7(1), 139-159.

Chenery, H.B., & Strout, A.M. (1966). Foreign Assistance and Economic Development. The American Economic Review, 56(4), 679-733.

Claessens, S., Klingebiel, D., & Schmukler, S. (2001). FDI and Stock Market Development: Complements or Substitutes?. World Bank Working Paper.

El-Nader, H. M., & Alraimony, A. D. (2013). The Macroeconomic Determinants of Stock Market Development in Jordan. International Journal of Economics and Finance, 5(6), 91-103.

Evrim-Mandaci, P., Aktan, B., Gumus, G. K., & Tvaronavičienė, M. (2013). Determinants of stock market development: evidence from advanced and emerging markets in a long span. Business: Theory and Practice/Verslas: Teorija ir Praktika, 14(1), 51-56.

Jeffus, W. (2004). FDI and stock market development in selected Latin American countries. International Finance Review, 5, 35-44.

Gani, A., & Ngassam, C.(2008). Effect of institutional factors on stock market development in Asia. American Journal of Finance and Accounting, 1(2), 103-120.

Garcia, V. F., & Liu, L. (1999). Macroeconomic determinants of stock market development. Journal of Applied Economics, 2(1), 29-59.

Hausmann, R., & Fernandez-Arias, E. (2000). Foreign Direct Investment: Good Cholesterol?. Inter American Development Bank, Research Department Working Paper No. 348.

Holtz-Eakin, D., Newey, W., & Rosen, H. S. (1988). Estimating vector autoregressions with panel data. Econometrica: Journal of the Econometric Society, 1371-1395.

Hope Sr, K. R. (2009). Capacity development for good governance in developing countries: Some lessons from the field. International Journal of Public Administration, 32 (2), 728-740.

Judson, R. A., & Owen, A. L. (1999). Estimating dynamic panel data models: a guide for Macroeconomists. Economics Letters, 65(1), 9-15.

Kaufmann, D., Kraay, A., & Mastruzzi, M. (2011). The Worldwide governance indicators: methodology and analytical issues. Hague Journal on the Rule of Law, 3(2), 220-246.

Ng, A., Ibrahim, M. H., & Mirakhor, A. (2016). Does trust contribute to stock market development? Economic Modelling, 52, 239-250.

Phan, D.N., & Vo, T.H.H. (2013). Determinants of Stock Market Development in Southeast Asian Countries. Journal of Economics and Development, 14(1), 101.

Pesaran, M. H., Shin, Y., & Smith, R. P. (1999). Pooled mean group estimation of dynamic heterogeneous panels. Journal of the American Statistical Association, 94, 621-634.

Quartey, P., & Gaddah, M. (2007). Long run determinants of stock market development in Ghana. Journal of African Business, 8(2), 105-125.

Raza, A., Iqbal, N., Ahmed, Z., Ahmed, M., & Ahmed, T. (2012). The Role of FDI on stock market development: The case of Pakistan. Journal of Economics and Behavioral Studies, 4(1), 26-33.

Raza, S. A., & Jawaid, S. T. (2014). Foreign capital inflows, economic growth and stock market capitalization in Asian countries: an ARDL bound testing approach. Quality & Quantity, 48(1), 375-385.

Raza, S. A., Jawaid, S. T., Afshan, S., & Karim, M. Z. A. (2015). Is stock market sensitive to foreign capital inflows and economic growth? Evidence from Pakistan. Journal of Chinese Economic and Foreign Trade Studies, 8(3), 142-164.

Roodman, D. (2009). How to do xtabond2: an introduction to difference and system GMM in Stata. The Stata Journal, 9(1), 86-136.

Shahbaz, M., Rehman, I. U., & Afza, T. (2015). Macroeconomic determinants of stock market capitalization in an emerging market: fresh evidence from cointegration with unknown structural breaks. Macroeconomics and Finance in Emerging Market Economies, 1-25.

Yartey, C. A. (2010). The Institutional and macroeconomic determinants of stock market development in emerging economies. Applied Financial Economics, 20(21), 1615-1625.

Appendix

App 1. Data description

Variable	Definition	Type	Source
Stock market dev. 1 (SMD1)	Stocks traded, total value	% GDP	World Development Indicators (WDI), World Bank
Stock market dev. 2 (SMD2)	Stocks traded, turnover ratio of domestic shares	% GDP	
Stock market dev. 3 (SMD3)	Market capitalization of listed domestic companies	% GDP	
Foreign direct investment (FDI)	Share of net FDI inflows in GDP	% GDP	
Money supply (M2)	Broad money	%	
Exchange rate (EXG)	Official exchange rate (LCU per US$, average)	log	
Trade openness (OPE)	Real GDP per capita (constant 2010 US$)	log	
Economic growth (GDP)	Domestic credit to private sector	% GDP	
Private credit (PRI)	Share of sum of exports and imports	% GDP	
Domestic investment (DIN)	Gross fixed capital formation	% GDP	
Inflation (INF)	Inflation, consumer prices (annual)	%	
Regulatory Quality (GOV1)	Dimensions of governance	level	Worldwide Governance Indicators (WGI), World Bank
Rule of Law (GOV2)			
Voice and Accountability (GOV3)			
Control of Corruption (GOV4)			
Government Effectiveness (GOV5)			
Political Stability (GOV6)			

App 2. Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Stock market dev. 1 (SMD1)	576	21.254	38.304	0	372.259
Stock market dev. 2 (SMD2)	576	39.287	53.210	0	480.287
Stock market dev. 3 (SMD3)	576	52.315	48.324	2.488	352.845
Foreign direct investment (FDI)	576	3.713	4.761	-15.989	54.868
Money supply (M2)	576	72.040	43.885	11.300	258.831
Exchange rate (EXG)	576	332.304	282.942	-97.816	1041.11
Trade openness (OPE)	576	79.672	42.059	20.722	210.373
Economic growth (GDP)	576	861.449	96.863	631.337	1100.79
Private credit (PRI)	576	57.079	34.186	8.084	160.124
Domestic investment (DIN)	576	23.724	5.926	11.960	45.689
Inflation (INF)	576	5.686	5.103	-3.749	44.964
Regulatory Quality (GOV1)	576	-0.206	0.591	-1.496	1.592
Rule of Law (GOV2)	576	0.058	0.529	-1.214	1.509
Voice and Accountability (GOV3)	576	-0.430	0.903	-2.810	1.261
Control of Corruption (GOV4)	576	0.053	0.617	-1.720	1.538
Government Effectiveness (GOV5)	576	-0.118	0.582	-1.427	1.433
Political Stability (GOV6)	576	-0.268	0.779	-1.907	1.292

App 3. Matrix of correlation coefficients between variables

	FDI	M2	EXG	OPE	GDP	PRI	DIN	INF
FDI	1							
M2	0.191***	1						
EXG	0.007	0.028	1					
OPE	0.318***	0.323***	-0.17***	1				
GDP	0.171***	-0.001	-0.39***	0.350***	1			
PRI	0.125***	0.700***	-0.065	0.433***	0.184***	1		
DIN	0.115***	0.320***	0.056	0.138***	-0.047	0.348***	1	
INF	-0.083	-0.29***	0.279***	-0.30***	-0.25***	-0.33***	-0.094	1

Note: ***, ** and *denote significance at 1 percent, 5 percent and 10 percent respectively

App 4. Matrix of correlation coefficients between six dimensions of governance

	GOV1	**GOV2**	**GOV3**	**GOV4**	**GOV5**	**GOV6**
GOV1	1					
GOV2	0.863***	1				
GOV3	0.704***	0.695***	1			
GOV4	0.813***	0.843***	0.607***	1		
GOV5	0.897***	0.870***	0.704***	0.838***	1	
GOV6	0.376***	0.395***	0.321***	0.499***	0.408***	1

Note: ***, ** and *denote significance at 1 percent, 5 percent and 10 percent respectively