Causality between FDI and Financial Market Development: Evidence from Emerging Markets

Soumaré, Issouf and TCHANA TCHANA, Fulbert

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Issouf Soumaré
Department of Finance, Insurance and Real Estate
Faculty of Business Administration
Laval University, Quebec, Canada
Email: issouf.soumare@fsa.ulaval.ca

Fulbert Tchana Tchana
Ministère des Finances du Québec
Quebec, Canada
Email: fulbert.tchanatchana@finances.gouv.qc.ca

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Abstract

This paper studies the causal relationship between foreign direct investment (FDI) and financial market development (FMD) using panel data from emerging markets. Most studies of the relationship between FDI and FMD have focused on the role of FMD in the link between FDI and economic growth, with no deep understanding of direct causality between FDI and FMD, especially in emerging markets, where financial markets are in the development stage. We document bidirectional causality between FDI and stock market development indicators. For banking sector development indicators, the relationship is ambiguous and inconclusive. Care is therefore needed when analysing the relationship between FMD and FDI, as results may depend on whether the FMD variables used to evaluate causality are stock market or banking sector development indicators.

JEL Code: F21, O16.

Keyword: Foreign direct investment, FDI, financial market development, stock market development, banking sector development, causality.

I. INTRODUCTION

In general, the literature on the relationship between foreign direct investment (FDI), financial market development (FMD), and economic growth falls into two categories. The first finds FDI is only efficient at spurring growth when certain conditions are met, one of which consists of a fairly developed financial sector (e.g., Alfaro et al (2004, 2010), Hermes and Lensink (2003)).[1] The second provides evidence that well-functioning financial sector or market liberalization—in other words, FMD—can help spur growth (Bekaert et al (2005), Levine et al (2000), Levine and Zervos (1998), and many others).

In this paper, we study the direct causal relationship between FDI and FMD. We perform an empirical assessment of this relationship using panel data from emerging markets. Our focus on emerging markets has at least four advantages. First, data are available for almost all the countries of our sample. Second, the quality of institutions is less diverse in these countries that it would be in a sample that included developed markets, therefore a common explanatory variable that can link economic development and other variables in given economy (such as gross domestic product (GDP) per capita) will have less effect on the results. Third, our focus on emerging economies allows us to study stock market and other financial development variables often used in the literature. And fourth, emerging markets are the most relevant sample with which to study our topic: developed markets are irrelevant, and less developed or the poorest countries may have difficulty attracting FDI even if they have a well functioning financial sector, because their smaller market power or lack of resources make them less attractive.

Should the link between FDI and FMD prove to be relevant, the best way to study that link is with a system of endogenous simultaneous equations where the key endogenous variables are FDI and FMD. We follow the methodology adopted by Levine et al (2000) to assess causality between these two main variables. This methodology consists of using cross-sectional analyses, panel procedures, and a system of simultaneous equations for the determinants of FDI and FMD.

To best of our knowledge, very little theoretical or empirical work specifically addresses the direct link between FDI and FMD. For example, Adam and Tweneboah (2009) find a long-run relationship between FDI and stock market development in Ghana. Al Nasser and Soydemir (2010) conduct Granger causality tests between FDI and financial development variables for Latin American countries. They show a unidirectional relationship from banking sector

[1] See Carkovic and Levine (2005) for a thorough review of the literature.

development to FDI and not the reverse; the relationship between FDI and stock market development is bidirectional. Their explanation is that FDI can initially promote stock market development because of the investment opportunities that FDI-related spillover effects usually generate: a more developed stock market may then attract more FDI in turn. These two studies focus on a single country or countries in the same geographical location.

Most other studies more or less related to our work address political economy (e.g., Dutta and Roy (2011), Kholdy and Sohrabian (2008), and Rajan and Zingales (2003)) or use capital market liberalisation as a proxy for FMD (e.g., Desai et al (2006) and Henry (2000)). With regard to political economy, Rajan and Zingales (2003) argue that the only force that can ultimately make financial elites adopt more market-friendly policies is the inflow of foreign goods and capital. Kholdy and Sohrabian (2008) and Dutta and Roy (2011) both show that political risk factors can affect the relationship between FDI and FMD, with Kholdy and Sohrabian positing that FDI can enhance financial development by pressuring a corrupt elite to reduce regulation on the financial system and allow more competition in the sector. For Dutta and Roy (2011), advanced financial markets must co-exist with political stability for an economy to realise the benefits of FDI. While undoubtedly interesting, these papers do not focus on emerging markets as we do here. Furthermore, they only use some financial development indicators: this could bias their findings. Indeed, as we show later, the choice of FMD indicator is crucial to the type of relationship that one finds between FDI and FMD.

As regards capital controls or market liberalisation, Desai et al (2006) argue that capital controls are accompanied by high interest rates and that firms respond to capital controls by distorting profit reports and dividend repatriation policies, incurring substantial organizational and regulatory costs in the process. Liberalising capital controls appears to initiate periods of considerably faster growth in the local activities of multinational firms. Henry (2000) shows that financial liberalisation is always followed by an increase in the growth rate of private investment and FDI. One explanation for why FDI increases is that stock market liberalisation may be positively correlated with other changes that reduce the operating risks of foreign multinationals and therefore, their cost of capital.

We document bidirectional causality between FDI and stock market development variables. Hence, studies involving both FDI and FMD, especially stock market development, must account for potential problems of endogeneity. We therefore use a system of simultaneous

equations to further explore the implications for the bidirectional link between FDI and FMD while controlling for other factors that drive inflows of FDI and the development of financial markets. For FMD variables other than variables related to the development of the stock market, such as banking sector development indicators, the relationship is ambiguous and inconclusive. For that reason, care is needed when analysing the relationship between FMD and FDI, as results may depend on whether the FMD variables used measure development of the stock market or development of the banking sector.

The rest of this paper is structured as follows. In Section II, we review the literature and the theory. In Section III, we describe the data and present descriptive statistics. We also present and discuss the results of our unit root and Granger causality tests. In Section IV, we do likewise for the empirical regression models and their results. We conclude in Section V.

II. LITERATURE REVIEW AND THEORETICAL ARGUMENTS

Theoretical background

Theoretically, the causal relationship between FDI and FMD has been explained in terms of three phenomena. First, Desai et al (2006), Henry (2000), and others argue that an increase in FDI net inflows increases the funds available in the economy and causes financial intermediation through financial markets or the banking system to boom. Companies involved in FDI are also likely to list their shares on the local stock market, as they generally originate from industrialised countries where stock market financing is a must for any company that wants to be taken seriously.

Second, Kholdy and Sohrabian (2008), Rajan and Zingales (2003), and others use political economy analysis to argue that more FDI reduces elites' relative power in the economy and can force the elite to adopt market-friendly regulations that strengthen the development of financial markets.

Third, a relatively well-functioning financial market can attract foreign investors, who perceive such a market as a sign of vitality, openness on the part of country authorities, and a market-friendly environment. A relatively well-developed stock market increases the liquidity of listed companies and may eventually reduce the cost of capital, thus rendering the country attractive to foreign investment (e.g., Desai et al (2006)).

Role of FMD in the link between FDI and economic growth

Although it is possible to test the direct relationship between FDI and economic growth, it is legitimate to assume that FDI will flow to countries with better developed financial markets or to assume that FDI flows will help develop financial markets, thus leading to increased economic growth. With this in mind, and given that empirical data seems to suggest that an advanced financial market is a good predictor of FDI inflow, some authors analyse how the development of the financial system contributes to the relationship between FDI and economic growth.

Hermes and Lensink (2003) investigate the role that the development of a financial system plays in enhancing the positive relationship between FDI and economic growth. Their dataset includes 67 countries, mostly from Latin America and Asia. They find that a certain degree of development of the financial system of a recipient country is an important precondition for FDI to positively impact economic growth. A more developed financial system contributes to the technological diffusion associated with FDI inflow. Of the 67 countries in their dataset, 37 have a financial system that is developed enough to allow FDI to contribute positively to economic growth.

Alfaro et al (2004) examine the same issue using cross-country data between 1975 and 1995 and find that FDI alone plays an ambiguous role in contributing to economic growth. However, countries with well-developed financial markets gain significantly from FDI.

Dutta and Roy (2011) empirically investigate the role of political risk in association with FDI and financial development. Using a panel of 97 countries over 20 years, they establish a non-linear association between financial development and FDI inflows. Financial development leads to greater FDI inflows up to a certain threshold of financial development, beyond which the association becomes negative. However, the authors also find that by altering this threshold, political risk factors affect the FDI-financial development relationship. With greater political stability, the negative impact of FDI inflows only occurs at a higher threshold of financial development. It thus seems that advanced financial markets must co-exist with political stability for an economy to capture and enjoy the benefits of FDI.

Kholdy and Sohrabian (2005) investigate various links between financial markets, FDI and economic growth. Using the Granger causality model and a panel of 25 countries over the 1975-2002 period, they find bidirectional causality between financial markets and FDI in countries with higher GDP per capita and more developed markets.

Market liberalisation or financial development and foreign investment

Another strand of literature close to ours consists of studies of investment and market liberalisation and studies of the alleviation of capital controls, in the sense that if capital controls are the sign of a less developed financial sector, market liberalisation can be interpreted as evidence of FMD.

In this vein, Henry (2000) shows that financial liberalisation is always followed by an increase in the growth rate of private investment and FDI. This increase can last for three years or longer before returning to the previous rate. But it is difficult to conclude that financial market liberalisation is the sole driver of this phenomenon, given that during the same period, numerous types of financial and macroeconomics reforms had taken place. More specifically, Henry finds that following stock market liberalisation, private investment increases, the ratio of FDI to private investment increases, and therefore the sum of private investment and FDI increases. One explanation for why FDI increases is that stock market liberalisation may be positively correlated with other changes that reduce the operating risks of foreign multinationals operating in the country. In this case, the cost of capital to multinationals may also fall. When we hold the cost of capital for multinationals constant, FDI may also increase if stock market liberalisation is positively correlated with other economic reforms that increase expected future cash flows from domestic investment.

Desai et al (2006) answer the following question theoretically as well as empirically: how do capital controls affect the cost of capital for foreign investors? Their theory is that because most often a considerable portion of the funding for the local affiliates of multinational investors comes from local loans, the higher interest rates that result from capital controls increase the cost of capital and can be expected to discourage FDI. Capital controls affect local investments by multinational firms because they influence local borrowing rates and increase the cost of repatriation. Furthermore, the costs associated with capital controls undoubtedly discourage many potential investors from establishing affiliates in the first place. Supporting this theory are data from United States-based multinational firms that suggests that capital controls are accompanied by high interest rates and that firms respond to capital controls by distorting profit reports and dividend repatriation policies, incurring substantial organizational and regulatory costs in the process. Liberalising capital controls appears to initiate periods of considerably faster growth in the local activities of multinational firms.

It is obvious from this discussion that the links between FDI and FMD are tied to adjustments for the cost of capital, since FMD reduces the cost of capital and therefore spurs investments in local companies or multinationals' local affiliates.

Finally, as regards the direct relationship between FDI and FMD, Adam and Tweneboah (2009) examine the impact of FDI on stock market development in Ghana. Their results indicate that a long-run relationship exists between FDI, the nominal exchange rate, and the development of Ghana's stock market, and that a shock to FDI significantly influences the development of the stock market in Ghana. Al Nasser and Soydemir (2010) analyse the relationship between FDI and financial development in 14 Latin American countries from 1978 to 2007 and find that a better functioning financial market is critical for determining the amount of FDI inflows to these countries. Their Granger causality tests between FDI and financial development show a unidirectional relationship from banking sector development to FDI and not the reverse; the relationship between FDI and stock market development is bidirectional. The authors argue that these results indicate that FDI could initially enhance stock market development because of the investment opportunities that FDI-related spillover effects usually generate, and that stock market development could attract more FDI in turn.

III. DATA AND CAUSALITY ANALYSIS

3.1. Data

Our sample is composed of the following 29 emerging markets: Argentina, Brazil, Chile, China, Colombia, Czech Republic, Egypt, Hong Kong, Hungary, India, Indonesia, Iran, Israel, Jordan, Malaysia, Mexico, Morocco, Peru, Philippines, Poland, Russia, Saudi Arabia, Singapore, South Africa, Tunisia, Turkey, Vietnam, Thailand, and South Korea. These markets are located in Africa (4 countries), Asia (15 countries), Eastern Europe (4 countries) and Latin America (6 countries).

Our data covers 1994 to 2006. We began in 1994 because some countries in our sample are former communist nations that did not have a stock market before 1994. After 2007, the data is too instable to use.[2]

[2] Because of the 2007 subprime credit crisis, there have been too much uncertainties on financial markets and on flows of FDI. For this reason, we ignore data from 2007 and afterwards.

We consider the following two commonly-used indicators of FDI: the ratio of FDI to GDP (FDIGDP) and the ratio of FDI to gross fixed capital formation (FDIGCF). We extracted the data for these variables from the World Bank's World Development Indicators database.

As for FMD, we divided five indicators into two subgroups: the stock market development (SMD) indicators subgroup and the banking sector development (BSD) indicators subgroup. The SMD indicators consist of (i) the ratio of stock market capitalization to GDP (STKMKTCAP) and (ii) the ratio of stock value traded as a percentage of GDP (STKVALTRA).[3] The BSD indicators consist of (i) the ratio of private credit by deposit money banks and other financial institutions to GDP (CREDIT), (ii) the liquid liabilities of the financial system (currency plus demand and interest-bearing liabilities of banks and non-bank financial intermediaries) divided by GDP (LLIAB), and (iii) the ratio of commercial bank assets divided by commercial bank plus central bank assets (CCB). We obtained data for these indicators from the World Bank's Global Development Finance database and from the International Monetary Fund's International Financial Statistics database.

The complete definition and the sources of these variables are provided in Table 1. The table also lists the control variables used in the regression analysis. These are discussed in Section IV, when we discuss the regression model and its results.

[Insert Table 1 Here]

3.2. Descriptive statistics and unit root tests

Figure 1 shows scatter plots of FDI and FMD variables, where we computed the average of each variable for each country. From this figure, a linear relationship between stock market development variables (STKMKTCAP and STKVALTRA) and FDIGDP seems to exist. We observe the same linear relationship between FDIGDP and banking sector development variables (CREDIT, LLIAB and CCB). Because the same relationships hold when we use FDIGCF as an FDI variable, we do not report those results.

[Insert Figure 1 Here]

Table 2 presents the correlations between FDI and FMD variables. We observe a correlation of 96% between the two FDI variables. For that reason, we omit FDIGCF and only

[3] Note that stock market turnover, another indicator of stock market development, is related to stock market liquidity and equals the total value of domestic shares traded divided by market capitalisation. As such, it is obtained by combining STKMKTCAP and STKVALTRA. For that reason, we omit stock market turnover from our analysis.

use FDIGDP. The correlations between the FMD indicators are also positive but do not exceed 67%. We also observe positive correlations between FDIGDP and the five FMD variables.

[Insert Table 2 Here]

In Table 3, we investigate the stationary properties of the FDI and FMD variables. We use the Levin, Lin and Chu (2002) and Im, Perasan and Shin (2003) tests for heterogeneous panel data. We use the well-known augmented Dikey-Fuller (ADF) and Phillips-Perron (PP) unit root tests as well.

FDIGDP is stationary according to all panel unit root tests. Also, all the reported unit root tests show that STKVALTRA and CCB are stationary. STKMKTCAP and LLIAB are I(1) according to all unit root tests. The unit root test results for CREDIT are ambiguous: while three of the four tests indicate the absence of a unit root, the PP test indicates the presence of a unit root. We therefore perform the test on the first difference of CREDIT, and this time, the PP rejects the presence of a unit root. We can argue that CREDIT is most likely to be stationary, since only one unit root test states the contrary.

[Insert Table 3 Here]

3.3. Causality analysis between FDI and FMD

Studying causal relationships when using panel data is always a challenge because one must consider dynamics. Like Arellano (2003), we consider various specifications of a bivariate VAR(2) model for the FDI and FMD variables, denoted FDI_{it} and FMD_{it} respectively. Individual and time effects are included in both equations. The form of the model is

$$FDI_{it} = \delta_{1t} + \alpha_1 FDI_{i(t-1)} + \alpha_2 FDI_{i(t-2)} + \beta_1 FMD_{i(t-1)} + \beta_2 FMD_{i(t-2)} + \eta_{1i} + \nu_{1it}, \quad (1)$$

$$FMD_{it} = \delta_{2t} + \gamma_1 FMD_{i(t-1)} + \gamma_2 FMD_{i(t-2)} + \lambda_1 FDI_{i(t-1)} + \lambda_2 FDI_{i(t-2)} + \eta_{2i} + \nu_{2it}, \quad (2)$$

where δ_{1t} and δ_{2t} capture the time effect and η_{1i} and η_{2i} capture the individual effect. The hypothesis that FDI does not Granger-cause FMD, conditional on individual and time effects imposes the restrictions $\lambda_1 = \lambda_2 = 0$. Conversely, to test whether FMD Granger-causes FDI, we examine the restrictions $\beta_1 = \beta_2 = 0$.

Practically, we first estimate the VAR system consisting of equations (1) and (2) and then use a Wald-type test to verify these two non-causality restrictions. We use Arellano's two-step generalized method of moments (GMM) estimator (2003, pp. 118). More precisely, we use two

variants of this estimator: i) the two-step GMM in differences (which we denote by GMM2—Diff.), which captures the effect of greater persistence and is consistent with the presence of unobserved heterogeneous intercepts; and ii) the two-step GMM in level and differences (denoted by GMM2—Level Diff.) proposed by Arellano and Bover (1995) and Blundell and Bond (1998). This last estimation technique is appropriate for capturing mean stationarity. Note, however, that both estimation methods are two-step GMM. The two-step estimator is useful in this context because it both solves endogeneity issues as well as observed heterogeneity.

As stated above, the five FMD indicators are grouped into two categories: stock market development (SMD) indicators (STKMKTCAP and STKVALTRA) and banking sector development (BSD) indicators (CREDIT, LLIAB and CCB). We perform a causality analysis for each variable within each category.

3.3.1. Causality test between FDI and SMD

i) Causality test between FDIGDP and STKMKTCAP

From the unit root tests, we know that STKMKTCAP is a I(1) process. Given that the Granger causality test can only be performed on stationary variables, we have performed the causality test between FDIGDP and the first difference of STKMKTCAP. For the rest of this paper, we will precede the name of the variable by "D." to denote the first difference. We wish to determine whether there is a Granger causal link between FDIGDP and D.STKMKTCAP.

Table 4A presents the results of causality tests between FDIGDP and D.STKMKTCAP. It shows that D.STKMKTCAP Granger-causes FDIGDP at least at the 6.65% confidence level, independently of the type of instrument used. In the same table, we observe that FDIGDP causes D.STKMKTCAP at the 5.14% confidence level if the method of estimation is GMM2—Diff. where the instruments are only first differences. This is not the case if we use additional instruments such as variables in levels (GMM2—Level Diff.). From Arellano (2003), we know that the relevance of the type of instrument depends on the assumption of the variables' mean stationarity. If the mean stationarity assumption holds, the accurate method is to use only first differences as instruments. A Sargan test does not reject the null hypothesis of mean stationarity for both variables. Therefore, GMM2—Diff. with first differences as instruments seems appropriate. We then conclude that at the 10% confidence level, we have bidirectional Granger-causality between FDIGDP and D.STKMKTCAP.

Intuitively, the results of these causality tests suggest that if a country experiences a large increase in its stock market capitalisation, it will tend to attract more FDI in following years. Similarly, everything else being equal, countries that have attracted large amounts of FDI in recent years will tend to increase the speed of their stock market capitalisation.

[Insert Table 4A Here]

ii) Causality test between FDIGDP and STKVALTRA

Because we know that FDIGDP and STKVALTRA are stationary processes, we can perform the Granger causality test on the two variables directly. In other words, we want to know whether there is a causal link between FDIGDP and STKVALTRA. Table 4B presents the results of causality tests between FDIGDP and STKVALTRA. From the GMM2—Diff. method with first differences as instruments, it appears that STKVALTRA Granger-causes FDI at the 10% confidence level, but that FDIGDP does not Granger-cause STKVALTRA.

[Insert Table 4B Here]

In sum, stock market development variables interact differently with FDIGDP. While there is a bidirectional causal relationship between STKMKTCAP and FDIGDP, the causality test between FDIGDP and STKVALTRA is inconclusive. Later, we analyse these relationships between FDI and SMD indicators by way of multivariate regressions.

3.3.2. Causality test between FDI and BSD

i) Causality test between FDIGDP and CREDIT

Given the uncertainty surrounding the stationary status of CREDIT, we will analyse both cases: the case where CREDIT is I(0) and the case where it is I(1). Table 4C presents the causality test results. In the first case, where we assume CREDIT to be a I(0) process, we find a unidirectional relationship. More precisely, CREDIT Granger-causes FDIGDP if the instruments used are level and first differences of the dependent variables. According to the Sargan over-identification test, the GMM2—Level Diff. method with level and first differences as instruments is the right specification.

In the second case, where we assume CREDIT to be a I(1) process, we need as before to differentiate CREDIT: the new differentiated variable is D.CREDIT. In this case, we find strong bidirectional causality between D.CREDIT and FDIGDP whatever the specification, meaning

that the growth rate of CREDIT has a bidirectional relationship with FDIGDP whatever the GMM estimation method used.

[Insert Table 4C Here]

ii) Causality test between FDIGDP and LLIAB

Again according to the unit root tests, FDIGDP is I(0) and LLIAB is I(1). We therefore test the Granger causality between FDIGDP and the first difference of LLIAB, denoted by D.LLIAB. As shown in Table 4D, FDIGDP Granger-causes D.LLIAB if the estimation method used is GMM2—Level Diff., i.e., if we use level and first differences as instruments. The Sargan over-identification test confirms this estimation method to be correct. But D.LLIAB does not Granger-cause FDIGDP.

[Insert Table 4D Here]

iii) Causality test between FDIGDP and CCB

From the unit root tests above, both FDIGDP and CCB are I(0) processes. The Granger causality test results between the two variables presented in Table 4E show that there is no causal relationship between FDIGDP and CCB, whatever the estimation method and whatever the direction. Thus, these two variables may be determined exogenously.

[Insert Table 4E Here]

In sum, the causality tests between BSD indicators and FDI are inconclusive. Below, we perform further multivariate analyses of the causal relationship between FDI and BSD indicators by way of endogenous simultaneous regressions.

IV. EMPIRICAL REGRESSION MODEL AND RESULTS

4.1. Regression model specification

For most FMD variables, our analyses of the direct causality tests between FDI and FMD are inconclusive. To achieve our objective of studying the relationship between FDI and FMD, therefore, and given the likelihood of endogeneity problems between the two set of variables, we turn to the following system of simultaneous equations:

$$FDI_{it} = a_0 + a_1\, FMD_{it} + a_2\, EDUCATION_{it} + a_3\, INFLATION_{it} + a_4\, EXHRATE_{it} +$$

$a_5\ GOVERNANCE_{it} + a_6\ LOG(GDP_{it-1}) + a_7\ OPENNESS_{it} + a_8\ NATRES_{it} + a_9\ INFRAS_{it} + \varepsilon_{it}$, (3)

$FMD_{it} = b_0 + b_1\ FDI_{it} + b_2\ EDUCATION_{it} + b_3\ INFLATION_{it} + b_4\ EXHRATE_{it} +$
$b_5\ GOVERNANCE_{it} + b_6\ Log(GDP_{it-1}) + b_7\ BALANCE_{it} + b_8\ INTRATE_{it} + \nu_{it}$. (4)

This system of endogenous simultaneous equations has been set to achieve identification that is at least theoretically sound. We chose the explanatory control variables on the basis of literature on the determinants of FDI and FMD. The control variables we used to estimate the determinants are as follows:

Economic and policy variables

- EDUCATION is the gross enrolment ratio (GER) for all levels of education. The level of a population's education indicates the quality of the country's human capital.
- INFRAS is an infrastructure measure equal to Log(Phones per 1000 habitants). The level of infrastructure development has been found to be a key determinant of the inflow of FDI into a country.
- NATRES is the natural resources variable and is measured by the share of fuel and minerals in exports. This variable has been recognized as a main determinant of FDI for countries endowed with substantial reserves of natural resources.
- EXHRATE is the exchange rate variable. The exchange rate indicates the value of the local currency and is used as a proxy for macroeconomic stability and the country's attractiveness to foreign investment.
- INFLATION is the inflation rate measured by the percentage change in the GDP deflator. It is a good proxy for macroeconomic stability. Because inflation has a negative effect on borrowing rates and the cost of capital, we expect it to have a negative impact on BSD indicators. Inflation's effect on SMD indicators can be positive, because under a high inflationary regime, it may be relatively less costly for companies to raise money through the stock market than through loans from banks and deposit institutions.
- INTRATE is the real interest rate and is measured by the lending interest rate adjusted for inflation as measured by the GDP deflator. This rate can be seen as a proxy for the intensity of banks' lending. A high real interest rate can hamper banks' lending activities, creating an imbalance between credit and deposit activities and increasing banks'

liquidity.

- BALANCE is the current account balance over total GDP. It can be seen as a rough indicator of the health of the macroeconomic environment.
- OPENNESS proxies for the degree of openness. It is equal to imports plus exports over GDP. In the literature on FDI determinants, this variable measures how friendly a country is to FDI. As such, it has been identified as a key determinant of a country's attractiveness to FDI. We expect this variable to impact FDI positively and significantly.
- LOG(GDP_{t-1}) is the logarithm of lagged real GDP. It is used as a proxy for the size of the economy.

Governance and institutional quality variables

- GOVERNANCE measures the level of governance in a country and quality of the country's institutions. It is measured by the KKM Index, a broad governance measure developed by Kaufmann, Kraay and Mastruzzi (2009). The KKM Index is the average of six indicators that measure (i) voice and accountability; (ii) political stability and the absence of violence; (iii) regulatory quality; (iv) government effectiveness; (v) the rule of law; and (vi) the control of corruption.[4]

Table 1 lists complete definitions of these control variables and states the source of data for each.

From the theoretical arguments exposed in Section II, FMD may affect FDI positively because a well-functioning financial market can help attract foreign investors to the country. Conversely, FDI inflows may increase the flow of capital in the country, thereby increasing the resources available for financial intermediation and strengthening the financial sector. However, financial development is multidimensional and covers the development of the banking sector as well as that of the stock market. As we have shown in our direct causality tests, the type of FMD variable used is crucial to determining the direction of causality between FDI and FMD. We explore these causal relationships further by means of a system of endogenous simultaneous equations by controlling for other factors pertaining to the inflows of FDI to a country and the development of a country's financial market.

[4] The Worldwide Governance Indicators (WGI) project can be found at http://info.worldbank.org/governance/wgi/index.asp.

Each equation in our system has at least one variable that is not available to the other equation of the system. Like any system of endogenous equations, we can use single equation methods, such as the two-stage least squares (2SLS) method, or full information methods, such as the three-stage least squares (3SLS) method, which requires joint estimation of the model equations. The theory of many of these estimation techniques has not yet been fully investigated in the context of panel data. For example, the 3SLS has not yet been implemented by mainstream econometric software. Our analysis uses the 2SLS method as the main estimation method for the panel data. For robustness, we use the 3SLS method with pool data.

4.2. Relationship between FDI and FMD

Tables 5A and 5B present the regression results of the 2SLS panel regressions of equations (3) and (4) for stock market development (SMD) and banking sector development (BSD) indicators, respectively. In Table 5A, we see that the FDIGDP and SMD indicators (STKMKTCAP and STKVALTRA) impact each other positively and significantly. This result confirms the bidirectional causality found between FDIGDP and STKMKTCAP.

[Insert Table 5A Here]

Table 5B presents the results for the FDI and BSD variables. In all the regressions, we see that the BSD variables do not affect FDIGDP. We also note that FDIGDP only negatively and significantly affects CREDIT at the 5% confidence level, but it does not significantly affect the other BSD variables. In other words, over the 1994-2006 period, BSD variables had no significant effect on FDI, nor did FDI significantly affect BSD indicators. For CREDIT, the impact of FDI on BSD is even negative. These results confirm the results of our direct causality tests (discussed above): namely, that there is no positive causality relationship between FDI and BSD indicators. The negative significant impact of FDI on CREDIT is less obvious, and may be explained by the fact that an increase in FDI translates into an increase in the country's GDP: since the CREDIT variable has GDP as its denominator, a marginal increase in the amount of credit to the private sector (the numerator) that is smaller than the marginal increase in GDP following an increase in FDI means that more FDI will cause the ratio of credit to the private sector over GDP (i.e., CREDIT) to fall.

[Insert Table 5B Here]

In both Tables 5A and 5B, the other determinants of the FDI and FMD indicators have the expected signs. For example, the size of the economy measured by $LOG(GDP_{t-1})$ has a positive

impact on FMD indicators. As documented in previous work (e.g., Asiedu (2002), Dutta and Roy (2011), and Faeth (2009)), OPENNESS has a positive significant impact on FDI. This implies that more open or liberalised countries are likely to attract higher levels of FDI. The impact of BALANCE, a control variable, on FMD is ambiguous: BALANCE has a significantly negative impact on SMD and an ambiguous impact on BSD. Allen et al (2010) have found similar mixed results. The control variables EDUCATION, EXHRATE and GOVERNANCE positively affect FMD indicators whenever their coefficients are significant, while INFLATION has a mixed effect with a positive sign with SMD indicators and a negative sign with BSD indicators. In countries with higher inflation, people tend to have less trust in the banking system; at the same time, high inflation boosts stock market capitalisation.

4.3. Relationship between FDI and the growth rate of FMD

In this section, we control for the fact that some FMD variables are I(1) processes. We use the 2SLS estimation method with Error Correction Model panel regressions to see if earlier results still hold. As an additional check of robustness, we keep this specification for stationary FMD indicators, to see if the growth rate of a given variable affects FDI.

Table 6A gives regression results for SMD indicators with this new specification. The results are almost the same as in the first specification but the amplitude of the effect of some variables differs. The main differences are that EDUCATION, which had not been significant, now has a positive significant sign as a determinant of D.STKMKTCAP, while INFLATION remains positive but is no longer significant. The other control variables conserve their expected signs.

[Insert Table 6A Here]

Table 6B presents the regression results for FDI and BSD indicators. We find that the impact of FDI on D.CREDIT and on D.LLIAB is not significant: FDI only impacts D.CCB positively. This contrasts slightly with our previous findings, when FDI had a negative significant impact on CREDIT and a positive but non-significant impact on CCB. We also obtain that D.CREDIT and D.CCB are non-significant determinants of FDI, while D.LLIAB only negatively impacts FDI at the 10% confidence level. These findings for the BSD indicators confirm our findings with level data for the BSD variables, i.e., the absence of causality between FDI and BSD indicators.

[Insert Table 6B Here]

In sum, the results presented in Tables 6A and 6B confirm our previous results, namely that FDIGDP and SMD variables impact each other positively and significantly. With the BSD indicators, however, the results remain ambiguous and inconclusive.

4.4. Robustness check

In this section, we use the 3SLS estimation method to estimate our system of simultaneous equations. Given that almost no software has implemented the 3SLS method for panel data, we have used the 3SLS method with pool data, having assumed that the data can be pooled. Because previous analyses have proven the relevance of FMD indicators' growth rates, we focus on the first differences of FMD indicators.

The results of the regression figure in Tables 7A and 7B for SMD and BSD indicators respectively. We can see in Table 7A that the growth rate of stock market capitalisation positively and significantly impacts the ratio of FDI over GDP. Similarly, FDIGDP positively impacts D.STKMKTCAP. The same bidirectional relationship holds between FDIGDP and D.STKVALTRA. We conclude that whatever the estimation method used, FDIGDP and the SMD indicators positively and significantly impact each other at the same time.

[Insert Table 7A Here]

From table 7B, we observe that FDIGDP negatively impacts D.CREDIT and D.LLIAB. To some extent, this negative relationship between FDIGDP and the BSD indicators was found in previous analyses. Overall, as in previous results, the causality between FDI and the BSD indicators is ambiguous and inconclusive.

[Insert Table 7B Here]

V. CONCLUSION

This paper is an empirical study of the relationship between foreign direct investment and financial market development. We considered 29 emerging market economies over the 1994-2006 period, using two indicators of stock market development and three indicators of banking sector development.

Given the endogenous nature of the linkage between FDI and FMD, we not only use a VAR system to assess the Granger-causality between FDI and FMD, but we also run a system of simultaneous equations using panel data.

We find that FDI and stock market development indicators positively impact each other at the same time. When we use banking sector development indicators to measure financial market development, however, causality is ambiguous and inconclusive. We must therefore exercise great caution when analysing the relationship between FMD and FDI, as findings may depend on whether the FMD variables used to determine causality indicate stock market development or banking sector development.

There are several ways to explain the bidirectional link between FDI and stock market development in these emerging economies. On one hand, foreign investment helps develop local stock markets by its investment spillover effects. This is because more foreign investment increases the likelihood that the affiliates of multinationals involved in FDI activities will be listed on local stock markets, since multinationals tend to hail from industrialised countries where financing through the stock market is a tradition. Furthermore, consistent with the political economy argument, one can conjecture that FDI inflows encourage the country's political elite to adopt market-friendly regulations—especially investor protection and better governance regulations: this promotes the development of the stock market. On the other hand, a relatively well-developed stock market helps attract foreign investors, as such a market is perceived as a sign of vitality, of openness on the part of country authorities, and of a market-friendly environment. This is especially true in emerging markets, whose stock markets are more developed than are the markets of other developing countries.

These findings suggest a key policy recommendation: that policies to attract more FDI be accompanied by market-friendly regulations, especially stock market regulations such as mechanisms to improve governance and protect investors. This will allow countries to maximise the benefits of the spillover effects of FDI.

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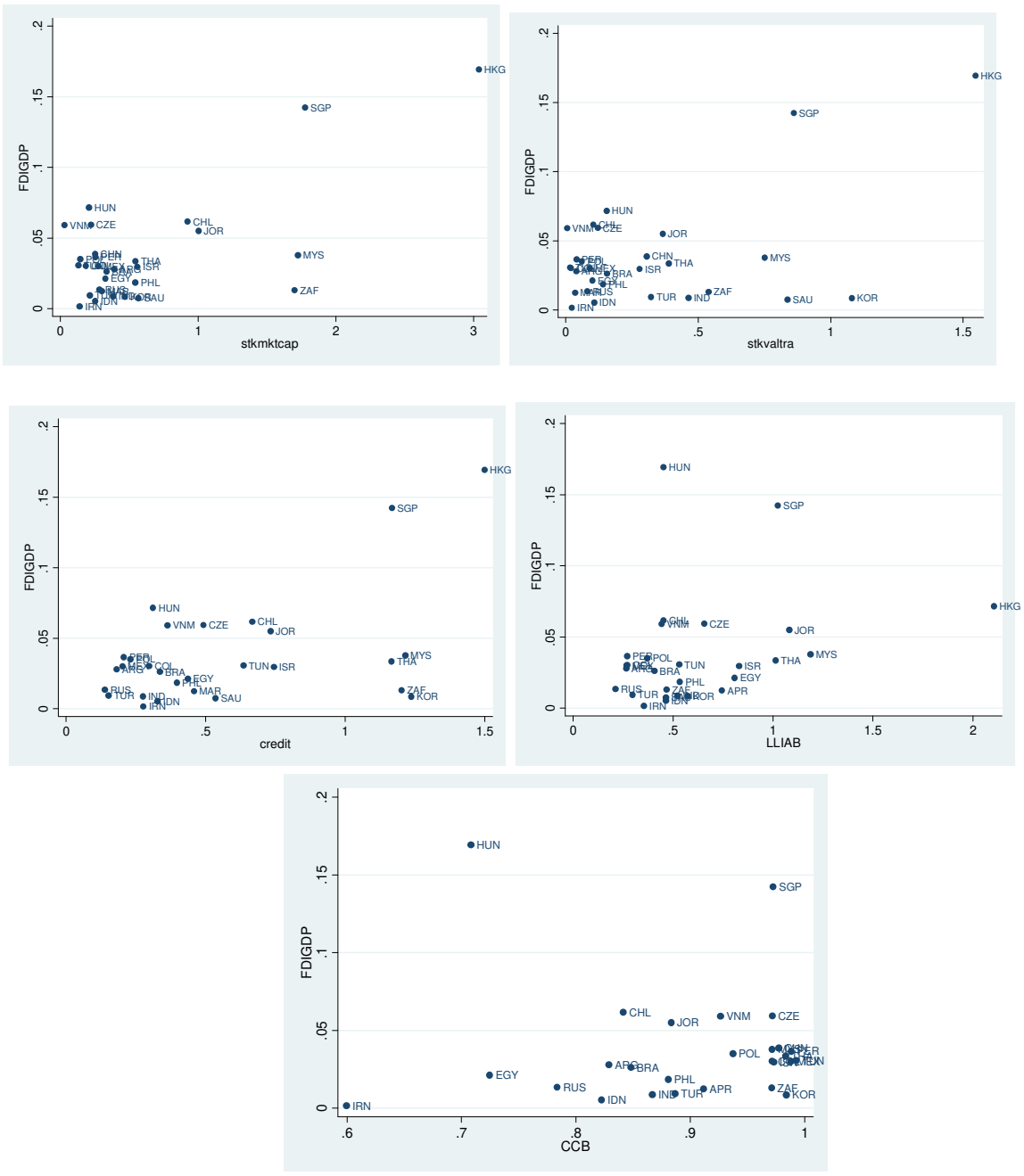
Figure 1: Scatter plots of foreign direct investment and financial market development



Notes: FDIGDP is the ratio of foreign direct investment (FDI) to gross domestic product (GDP). STKMKTCAP is the ratio of stock market capitalization to GDP. STKVALTRA is the ratio of stock value traded as a percentage of GDP. CREDIT is the ratio of private credit by deposit money banks and other financial institutions to GDP. LLIAB is the liquid liabilities of the financial system (currency plus demand and interest-bearing liabilities of banks and non-bank financial intermediaries) divided by GDP. CCB is the ratio of commercial bank assets divided by commercial bank plus central bank assets.

Table 1: Descriptions of the variables and of the sources of data

VARIABLE	DESCRIPTION	SOURCE OF DATA
	FDI variables	
FDIGDP	FDI / GDP	The World Bank's World Development Indicators and Global Development Finance databases
FDIGCF	FDI / GCF	
	FMD variables	
STKMKTCAP	Stock market capitalisation / GDP	The World Bank's Global Development Finance[6] database and the International Monetary Fund's International Financial Statistics database
STKVALTRA	Value traded as a percentage of GDP	
STKTUR	Stock market turnover	
CREDIT	Total credit by financial intermediaries to the private sector / GDP	
LLIAB	Liquid liabilities of the financial system (currency plus demand and interest-bearing liabilities of banks and non-bank financial intermediaries) / GDP	
CCB	Ratio of commercial bank assets / commercial bank plus central bank assets	
	Economic and policy variables	
INFLATION	Percentage change in GDP deflator	The World Development Indicators database of the World Bank; the UNESCO database (EDUCATION only)
INFRAS	Log(Phones per 1000 population)	
OPENNESS	(Import + Export) / GDP	
LOG(GDP_{t-1})	Logarithm of lagged real GDP	
NATRES	Share of fuel and minerals in exports	
EXHRATE	Exchange rate	
BALANCE	Current account balance / GDP	
INTRATE	Lending interest rate adjusted for inflation as measured by the GDP deflator	
EDUCATION	Gross enrolment ratio for all levels of education	
	Governance and institutional quality variables	
GOVERNANCE	The KKM index is the average of six Worldwide Governance Indicators: 1. Voice and accountability 2. Political stability and absence of violence 3. Regulatory quality 4. Government effectiveness 5. Rule of law 6. Control of corruption	The Worldwide Governance Indicators project (see http://info.worldbank.org/governance/wgi/index.asp)

Notes: FDI=foreign direct investment; GDP=gross domestic product; GCF=gross fixed capital formation.

[6] The link to the Global Development Finance data is http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/0,,contentMDK:20696167~pagePK:64214825~piPK:64214943~theSitePK:469382,00.html

Table 2: Correlation between foreign direct investment and financial market development variables

	CREDIT	LLIAB	CCB	STKMKTCAP	STKVALTRA	FDIGDP	FDIGCF
CREDIT	1						
LLIAB	0.6683	1					
CCB	0.4413	0.2395	1				
STKMKTCAP	0.6570	0.5173	0.2455	1			
STKVALTRA	0.5887	0.4171	0.2752	0.6341	1		
FDIGDP	0.2003	0.3253	0.1501	0.3830	0.2501	1	
FDIGCF	0.1686	0.2697	0.1379	0.3559	0.1855	0.9601	1

Notes: FDIGDP is the ratio of foreign direct investment (FDI) to gross domestic product (GDP). FDIGCF is the ratio of FDI to gross fixed capital formation. STKMKTCAP is the ratio of stock market capitalization to GDP. STKVALTRA is the ratio of stock value traded as a percentage of GDP. CREDIT is the ratio of private credit by deposit money banks and other financial institutions to GDP. LLIAB is the liquid liabilities of the financial system (currency plus demand and interest-bearing liabilities of banks and non-bank financial intermediaries) divided by GDP. CCB is the ratio of commercial bank assets divided by commercial bank plus central bank assets.

Table 3: Panel unit root tests

	FDIGDP			STKMKTCAP			STKVALTRA			CREDIT			CCB			LLIAB		
Method	Stat.	Prob.	Dec.	Stat	Prob.	Dec	Stat.	Prob.	Dec	Stat	Prob	Dec	Stat	Prob	Dec	Stat.	Prob.	Dec
Level																		
Levin, Lin and Chu t [(1)]	-3.91	0	AUR	6.31	1.00	PUR	-17	0	AUR	-11.13	0	AUR	-6.47	0	AUR	4.42	1	PUR
Im, Pesaran and Shin W-stat [(2)]	-2.99	0	AUR	2.77	0.99	PUR	-3.81	0	AUR	-1.42	0.08	AUR	-4.22	0	AUR	0.94	0.83	PUR
ADF – Fisher Chi-square [(2)]	111.6	0	AUR	47	0.80	PUR	111.5	0	AUR	91.81	0.00	AUR	111.6	0	AUR	66.42	0.12	PUR
PP – Fisher Chi-square [(2)]	119.7	0	AUR	29.86	0.99	PUR	61.75	0.34	AUR	43.32	0.89	PUR	87.9	0	AUR	36.67	0.98	PUR
First Difference																		
Levin, Lin and Chu t [(1)]	-7.35	0	AUR	-30.3	0	AUR	-18.4	0	AUR	7.93	1	PUR	-9.53	0	AUR	-33.82	0	AUR
Im, Pesaran and Shin W-stat [(2)]	-7.85	0	AUR	-6.94	0	AUR	-9.85	0	AUR	0.47	0.68	PUR	-8.55	0	AUR	-11.51	0	AUR
ADF – Fisher Chi-square [(2)]	171.6	0	AUR	131.2	0	AUR	125.3	0	AUR	96.93	0	AUR	163.8	0	AUR	176.4	0	AUR
PP – Fisher Chi-square [(2)]	331.5	0	AUR	86.42	0.01	AUR	212.7	0	AUR	109.9	0	AUR	201.8	0	AUR	130.2	0	AUR

Notes: FDIGDP is the ratio of FDI to GDP. STKMKTCAP is the ratio of stock market capitalization to GDP. STKVALTRA is the ratio of stock value traded as a percentage of GDP. CREDIT is the ratio of private credit by deposit money banks and other financial institutions to GDP. LLIAB is the liquid liabilities of the financial system (currency plus demand and interest-bearing liabilities of banks and non-bank financial intermediaries) divided by GDP. CCB is the ratio of commercial bank assets divided by commercial bank plus central bank assets. (1) The Levin, Lin and Chu test assumes a common unit root process. (2) The other tests (Im, Pesaran and Shin; ADF; and PP) assume an individual unit root process. ADF is the augmented Dikey-Fuller unit root test and PP is the Phillips-Perron unit root test. AUR indicates the absence of a unit root and PUR indicates the presence of a unit root.

Table 4A: Causality tests between FDIGDP and STKMKTCAP

	FDIGDP GMM2--Diff	FDIGDP GMM2--Level. Diff	D.STKMKTCAP GMM2--Diff	D.STKMKTCAP GMM2--Level. Diff
FDIGDP(t-1)	0.0833919	**0.5176485*** **	**-0.0182675** **	-0.0052687
	(0.2304652)	(0.0640622)	(0.008522)	(0.0103214)
FDIGDP(t-2)	-0.1653217	**0.2037235*** **	**-0.0195661** **	-0.0061985
	(0.2781927)	(0.0746479)	(0.0088878)	(0.0062273)
D.STKMKTCAP(t-1)	**5.230495***	**5.917832** **	0.1472544	0.1950357
	(4.092635)	(2.760846)	(0.134511)	(0.2146659)
D.STKMKTCAP(t-2)	-0.2477217	**-5.524277*** **	**-0.3398284*** **	-0.5150559
	(2.122503)	(1.056543)	(0.1013939)	(0.2074006)
Chi-square test	5.42*	53.57***	5.94*	1.9
Df	2	2	2	2
p-value	0.0665	0	0.0514	0.3865
Observations	248	276	248	276
Number of ncode	28	28	28	28

Notes: FDIGDP is the ratio of foreign direct investment (FDI) to gross domestic product (GDP). STKMKTCAP is the ratio of stock market capitalization to GDP. Standard errors are in parentheses. ***=p<0.01; **=p<0.05; *=p<0.1.

Table 4B: Causality tests between FDIGDP and STKVALTRA

VARIABLES	FDIGDP GMM2-Diff	FDIGDP GMM2-Level. Diff	STKVALTRA GMM2-Diff	STKVALTRA GMM2-Level. Diff
FDIGDP(t-1)	0.0894	**0.425*** **	-1.961	-2.367
	(0.275)	(0.0857)	(2.868)	(1.855)
FDIGDP(t-2)	-0.223	0.0379	-0.238	1.165
	(0.322)	(0.106)	(2.276)	(2.107)
STKVALTRA(t-1)	0.0357	**0.0382***	0.637	**1.068*** **
	(0.0252)	(0.0212)	(0.529)	(0.190)
STKVALTRA(t-2)	-0.0182	-0.00278	-0.0895	-0.0668
	(0.0213)	(0.0168)	(0.437)	(0.101)
Chi-square test	2.01	4.04	1.21	3.87
Df	2	2	2	2
P-value	0.3659	0.1327	0.5471	0.1448
Observations	277	306	272	301
Number of ncode	29	29	29	29

Notes: FDIGDP is the ratio of foreign direct investment (FDI) to gross domestic product (GDP). STKVALTRA is the ratio of stock value traded as a percentage of GDP. Standard errors are in parentheses. ***=p<0.01; **=p<0.05; *=p<0.1.

Table 4C: Causality tests between FDIGDP and CREDIT

FDIGDP and CREDIT are (I(0))

VARIABLES	FPIGDP GMM2-Diff	FDIGDP GMM2-Level. Diff	CREDIT GMM2-Diff	CREDIT GMM2-Level. Diff
FDIGDP(t-1)	0.196	**0.305****	0.000364	0.000866
	(0.168)	(0.123)	(0.0499)	(0.0346)
FDIGDP(t-2)	-0.261	-0.160	0.000786	0.00124
	(0.222)	(0.194)	(0.0242)	(0.0139)
CREDIT(t-1)	**2.053****	**6.057****	1.077	1.409
	(0.831)	(3.076)	(8.061)	(0.963)
CREDIT(t-2)	1.118	1.504	-0.394	-0.436
	(5.333)	(14.91)	(3.296)	(0.722)
Chi-square test	1.991	32.51	0.0159	0.0256
Df	2	2	2	2
P-value	0.3695	0	0.9921	0.9873
Observations	274	302	274	302
Number of ncode	28	28	28	28

FDIGDP (I(0)) and CREDIT (I(1))

	FDIGDP GMM2--Diff	FDIGDP GMM2--Level. Diff	D.CREDIT GMM2—Diff	D.CREDIT GMM2--Level. Diff
FDIGDP(t-1)	**0.2225253*****	**0.5973818*****	0.0000571	**-0.0022485*****
	(0.0065899)	(0.0103269)	(0.0000851)	(0.0002976)
FDIGDP(t-2)	**-0.2424165*****	**0.0776598*****	**0.0006425*****	-0.0000733
	(0.0068558)	(0.0026983)	(0.0001657)	(0.0001869)
D.CREDIT(t-1)	**-2.562363*****	**-2.467033***	**0.4371431*****	**0.4356329*****
	(0.960259)	(1.313218)	(0.0154857)	(0.0101164)
D.CREDIT(t-2)	**8.770588*****	**17.53928*****	**-0.1750518*****	**-0.1862194*****
	(0.1994549)	(0.7200644)	(0.0068078)	(0.0041465)
Chi-square test	1995.14	27769.82	27.05	208.8
Df	2	2	2	2
p-value	0	0	0	0
Obs.	247	275	247	275
Number of ncode	28	28	28	28

Notes: FDIGDP is the ratio of foreign direct investment (FDI) to gross domestic product (GDP). CREDIT is the ratio of private credit by deposit money banks and other financial institutions to GDP. Standard errors are in parentheses. ***=p<0.01; **=p<0.05; *=p<0.1.

Table 4D: Causality tests between FDIGDP and LLIAB

VARIABLES	FDIGDP GMM2-Diff	FDIGDP GMM2-Level. Diff	D.LLIAB GMM2-Diff	D.LLIAB GMM2-Level. Diff
FDIGDP(t-1)	0.212	**0.557*** **	0.0121	0.0278
	(0.249)	(0.140)	(0.0995)	(0.100)
FDIGDP(t-2)	-0.272	0.0155	0.193	**0.219** **
	(0.208)	(0.0929)	(0.207)	(0.105)
D.LLIAB(t-1)	0.0828	0.111	**0.237** **	**0.225** **
	(0.0510)	(0.0867)	(0.117)	(0.0878)
D.LLIAB(t-2)	0.0490	0.0668	0.0161	-0.00541
	(0.0834)	(0.0819)	(0.0871)	(0.0713)
Chi-square test	2.810	3.450	0.921	13.70
Df	2	2	2	2
p-value	0.2453	0.1782	0.6308	0.0011
Observations	247	275	247	275
Number of ncode	28	28	28	28

Notes: FDIGDP is the ratio of foreign direct investment (FDI) to gross domestic product (GDP). LLIAB is the liquid liabilities of the financial system (currency plus demand and interest-bearing liabilities of banks and non-bank financial intermediaries) divided by GDP. Standard errors are in parentheses. ***=p<0.01; **=p<0.05; *=p<0.1.

Table 4E: Causality tests between FDIGDP and CCB

VARIABLES	FDIGDP GMM2-Diff	FDIGDP GMM2-Level. Diff	CCB GMM2-Diff	CCB GMM2-Level. Diff
FDIGDP(t-1)	0.312	0.367	0.0253	-0.00503
	(0.557)	(0.483)	(1.002)	(1.365)
FDIGDP(t-2)	-0.00200	0.0517	-0.0769	0.0209
	(0.164)	(0.158)	(1.480)	(2.480)
CCB(t-1)	0.0288	0.0286	0.801	1.085
	(0.0383)	(0.0647)	(6.771)	(1.045)
CCB(t-2)	0.0343	0.0177	-0.0363	-0.0667
	(0.258)	(0.109)	(1.748)	(1.002)
Chi-square test	0.63	4.58	0.01	0
Df	2	2	2	2
p-value	0.7292	0.101	0.9927	0.9999
Observations	254	281	253	280
Number of ncode	27	27	26	27

Notes: FDIGDP is the ratio of foreign direct investment (FDI) to gross domestic product (GDP). CCB is the ratio of commercial bank assets divided by commercial bank plus central bank assets. Standard errors are in parentheses. ***=p<0.01; **=p<0.05; *=p<0.1.

Table 5A: Two-stage least squares panel regression results for stock market development indicators

VARIABLES	(1) FDIGDP	(2) STKMKTCAP	(1) FDIGDP	(2) STKVALTRA
STKMKTCAP	**0.0448*** **			
	(0.0154)			
STKVALTRA			**0.0463*** **	
			(0.0164)	
EDUCATION	-0.000773	0.00407	-0.000659	0.00300
	(0.000740)	(0.00781)	(0.000801)	(0.00810)
INFLATION	-0.000309	**0.00957** **	6.68e-06	0.00252
	(0.000410)	(0.00444)	(0.000415)	(0.00464)
EXHRATE	2.25e-06	-4.01e-05	-4.31e-07	4.97e-06
	(1.10e-05)	(0.000121)	(1.13e-05)	(0.000123)
NATRES	0.0288		0.0630	
	(0.0721)		(0.0775)	
GOVERNANCE	0.0146	-0.227	0.00320	0.0313
	(0.0154)	(0.173)	(0.0170)	(0.178)
$LOG(GDP_{t-1})$	-0.0116	**0.404** *	-0.00142	0.231
	(0.0250)	(0.240)	(0.0258)	(0.249)
OPENNESS	**0.000597*** **		**0.000609*** **	
	(0.000212)		(0.000218)	
INFRAS	1.28e-05		-1.82e-05	
	(0.000128)		(0.000147)	
FDIGDP		**8.350*** **		**7.578*** **
		(2.090)		(2.150)
BALANCE		**-0.0209*** **		**-0.0223*** **
		(0.00657)		(0.00676)
INTRATE		-0.00465		-0.00342
		(0.00283)		(0.00293)
Observations	167	167	165	165
R-square	0.279	0.254	0.227	0.164
Number of ncode	25	25	25	25

Notes: FDIGDP is the ratio of foreign direct investment (FDI) to gross domestic product (GDP). STKMKTCAP is the ratio of stock market capitalization to GDP. STKVALTRA is the ratio of stock value traded as a percentage of GDP. The other variables are described in Table 1. Standard errors are in parentheses. ***=p<0.01; **=p<0.05; *=p<0.1.

Table 5B: Two-stage least squares panel regression results for banking sector development indicators

VARIABLES	(1) FDIGDP	(2) CREDIT	(1) FDIGDP	(2) LLIAB	(1) FDIGDP	(2) CCB
CREDIT	-0.443					
	(0.478)					
LLIAB			1.975			
			(5.260)			
CCB					0.845	
					(0.697)	
EDUCATION	-0.00121	-0.00325	-0.0117	**0.00482****	-0.00327	**0.00277***
	(0.00172)	(0.00467)	(0.0274)	(0.00189)	(0.00209)	(0.00151)
INFLATION	0.000875	0.00267	-0.00137	0.00112	0.00408	**-0.00466*****
	(0.00130)	(0.00265)	(0.00434)	(0.00107)	(0.00341)	(0.000895)
EXHRATE	2.48e-05	3.59e-05	-8.47e-05	**4.63e-05****	-1.04e-05	-3.82e-06
	(4.63e-05)	(4.98e-05)	(0.000191)	(2.01e-05)	(1.57e-05)	(1.59e-05)
NATRES	-0.118		0.0569		0.00551	
	(0.268)		(0.358)		(0.158)	
GOVERNANCE	0.0759	0.166	0.0159	0.00106	-0.0998	**0.125*****
	(0.0742)	(0.104)	(0.0808)	(0.0419)	(0.102)	(0.0343)
LOG(GDP_{t-1})	0.156	**0.333****	-0.543	**0.192*****	-0.133	0.153***
	(0.175)	(0.159)	(1.472)	(0.0641)	(0.110)	(0.0431)
OPENNESS	-0.000391		7.38e-05		**0.000928****	
	(0.00139)		(0.00222)		(0.000412)	
INFRAS	-0.000136		0.00152		6.51e-05	
	(0.000434)		(0.00374)		(0.000270)	
FDIGDP		**-3.725*****		0.0296		0.0478
		(1.364)		(0.551)		(0.417)
BALANCE		-0.00370		-0.000123		-0.00131
		(0.00392)		(0.00158)		(0.00127)
INTRATE		-0.000611		8.19e-05		-0.000514
		(0.00169)		(0.000682)		(0.000561)
Observations	165	165	165	165	165	165
R-square	-3.415	-0.662	-18.824	0.345	-2.147	0.501
Number of ncode	24	24	24	24	24	24

Notes: FDIGDP is the ratio of foreign direct investment (FDI) to gross domestic product (GDP). CREDIT is the ratio of private credit by deposit money banks and other financial institutions to GDP. LLIAB is the liquid liabilities of the financial system (currency plus demand and interest-bearing liabilities of banks and non-bank financial intermediaries) divided by GDP. CCB is the ratio of commercial bank assets divided by commercial bank plus central bank assets. The other variables are described in Table 1. Standard errors are in parentheses. ***=p<0.01; **=p<0.05; *=p<0.1.

Table 6A: Two-stage least squares Error Correction Model panel regression results for stock market development indicators

VARIABLES	(1) FDIGDP	(2) D.STKMKTCAP	(1) FDIGDP	(2) D.STKVALTRA
D.STKMKTCAP	**0.143****			
	(0.0699)			
D.STKVALTRA			**0.120***	
			(0.0616)	
EDUCATION	-0.00136	**0.00954***	-0.000636	0.00470
	(0.000975)	(0.00503)	(0.00115)	(0.00568)
INFLATION	-0.000592	0.00543	0.000349	0.000518
	(0.000660)	(0.00340)	(0.000638)	(0.00391)
EXHRATE	5.64e-07	-8.62e-06	2.45e-06	8.52e-06
	(1.60e-05)	(9.60e-05)	(1.70e-05)	(0.000107)
NATRES	-0.000598		-0.0214	
	(0.110)		(0.129)	
GOVERNANCE	0.0106	-0.130	0.00749	0.00626
	(0.0230)	(0.136)	(0.0246)	(0.152)
LOG(GDP_{t-1})	-0.0924	0.477	-0.0237	0.320
	(0.101)	(0.544)	(0.0986)	(0.619)
OPENNESS	**0.00101*****		**0.000827*****	
	(0.000288)		(0.000300)	
INFRAS	-0.000137		4.38e-05	
	(0.000203)		(0.000175)	
FDIGDP		**5.555*****		**5.589*****
		(1.940)		(1.981)
$STKMKTCAP_{t-1}$		**-0.453*****		
		(0.106)		
$STKVALTRA_{t-1}$				**-0.582*****
				(0.107)
BALANCE		**-0.0125****		**-0.0162*****
		(0.00498)		(0.00556)
INTRATE		-0.00215		-0.00209
		(0.00229)		(0.00255)
Observations	165	165	164	164
R-square	-0.534	-0.022	-0.677	0.029
Number of ncode	24	24	25	25

Notes: FDIGDP is the ratio of foreign direct investment (FDI) to gross domestic product (GDP). STKMKTCAP is the ratio of stock market capitalization to GDP. STKVALTRA is the ratio of stock value traded as a percentage of GDP. The other variables are described in Table 1. Standard errors are in parentheses. ***=p<0.01; **=p<0.05; *=p<0.1.

Table 6B: Two-stage least squares Error Correction Model panel regression results for banking sector development indicators

VARIABLES	(1) FDIGDP	(2) D.CREDIT	(1) FDIGDP	(2) D.LLIAB	(1) FDIGDP	(2) D.CCB
D.CREDIT	1.110					
	(1.076)					
D.LLIAB			**-0.503***			
			(0.295)			
D.CCB					-0.382	
					(0.368)	
EDUCATION	0.00249	-0.00168	-0.00124	0.000437	**-0.00180****	0.000493
	(0.00420)	(0.00157)	(0.000922)	(0.000917)	(0.000785)	(0.000649)
INFLATION	0.000294	-0.000510	-0.000159	-0.000488	0.000158	-0.000971**
	(0.00113)	(0.00103)	(0.000556)	(0.000544)	(0.000449)	(0.000459)
EXHRATE	-4.81e-05	1.68e-05	-7.47e-06	**1.66e-05***	**-1.38e-05***	4.39e-06
	(3.88e-05)	(1.89e-05)	(1.07e-05)	(1.00e-05)	(7.90e-06)	(7.25e-06)
NATRES	0.264		0.0524		0.134	
	(0.259)		(0.0923)		(0.0837)	
GOVERNANCE	-0.0189	0.0260	0.0228	0.0285	0.0328	0.0574***
	(0.0554)	(0.0425)	(0.0214)	(0.0219)	(0.0226)	(0.0164)
LOG(GDP_{t-1})	-0.390	**0.343****	0.109	0.138	0.0345	0.0739
	(0.421)	(0.169)	(0.103)	(0.0895)	(0.0752)	(0.0655)
OPENNESS	0.00210		**0.000551***		0.000866***	
	(0.00135)		(0.000304)		(0.000219)	
INFRAS	-0.000494		7.83e-05		0.000175	
	(0.000693)		(0.000146)		(0.000109)	
FDIGDP		-0.681		-0.301		**0.309***
		(0.443)		(0.240)		(0.184)
$CREDIT_{t-1}$		-0.0263				
		(0.0518)				
$LLIAB_{t-1}$				**-0.173*****		
				(0.0399)		
CCB_{t-1}						**-0.210*****
						(0.0342)
BALANCE		**-0.00262***		0.00120		0.000438
		(0.00153)		(0.000808)		(0.000588)
INTRATE		-0.000226		0.000541		**-0.000667****
		(0.000690)		(0.000369)		(0.000275)
Observations	165	165	165	165	165	165
R-square	-4.650	0.025	-0.341	0.160	0.159	0.205
Number of ncode	24	24	24	24	24	24

Notes: FDIGDP is the ratio of foreign direct investment (FDI) to gross domestic product (GDP). CREDIT is the ratio of private credit by deposit money banks and other financial institutions to GDP. LLIAB is the liquid liabilities of the financial system (currency plus demand and interest-bearing liabilities of banks and non-bank financial intermediaries) divided by GDP. CCB is the ratio of commercial bank assets divided by commercial bank plus central bank assets. The other variables are described in Table 1. Standard errors are in parentheses. ***=p<0.01; **=p<0.05; *=p<0.1.

Table 7A: Three-stage least squares regression results for stock market development indicators

VARIABLES	(1) FDIGDP	(2) D.STKMKTCAP	(1) FDIGDP	(2) D.STKVALTRA
D.STKMKTCAP	**0.318****			
	(0.124)			
D.STKVALTRA			**0.283****	
			(0.118)	
EDUCATION	-0.000375	0.00141	0.000184	-0.000560
	(0.000447)	(0.00137)	(0.000491)	(0.00157)
INFLATION	-0.000216	0.00104	0.000396	-0.000873
	(0.000687)	(0.00216)	(0.000748)	(0.00244)
EXHRATE	2.32e-08	-2.28e-06	4.82e-08	-3.45e-06
	(2.19e-06)	(6.51e-06)	(2.06e-06)	(6.51e-06)
NATRES	0.00638		0.00990	
	(0.0156)		(0.0191)	
GOVERNANCE	0.0129	-0.0417	0.00792	-0.0283
	(0.00972)	(0.0325)	(0.0106)	(0.0372)
$LOG(GDP_{t-1})$	-0.193	0.684	-0.124	0.533
	(0.157)	(0.424)	(0.158)	(0.484)
OPENNESS	**0.000170****		**0.000204*****	
	(6.90e-05)		(7.00e-05)	
INFRAS	4.17e-05		8.49e-05	
	(0.000190)		(8.83e-05)	
FDIGDP		**1.759****		**1.577***
		(0.727)		(0.815)
BALANCE		-0.00281		**-0.00396***
		(0.00200)		(0.00240)
INTRATE		0.000266		0.000384
		(0.000469)		(0.000418)
CONSTANT	0.0422	-0.157	-0.00925	0.0144
	(0.0368)	(0.115)	(0.0409)	(0.131)
Observations	166	166	164	164
R-square	-1.502	0.073	-1.649	0.027

Notes: FDIGDP is the ratio of foreign direct investment (FDI) to gross domestic product (GDP). STKMKTCAP is the ratio of stock market capitalization to GDP. STKVALTRA is the ratio of stock value traded as a percentage of GDP. The other variables are described in Table 1. Standard errors are in parentheses. ***=p<0.01; **=p<0.05; *=p<0.1.

Table 7B: Three-stage least squares regression results for banking sector development indicators

VARIABLES	(1) FDIGDP	(2) D.CREDIT	(1) FDIGDP	(2) D.LLIAB	(1) FDIGDP	(2) D.CCB
D.CREDIT	**1.333****					
	(0.626)					
D.LLIAB			-0.586			
			(0.487)			
D.CCB					0.198	
					(0.348)	
EDUCATION	0.000547	-0.000133	6.78e-05	-2.65e-06	0.000150	-5.77e-05
	(0.000721)	(0.000423)	(0.000334)	(0.000268)	(0.000287)	(0.000191)
INFLATION	-0.000197	0.000501	-0.000192	-0.000555	1.15e-06	**0.00106*****
	(0.000887)	(0.000660)	(0.000563)	(0.000418)	(0.000478)	(0.000300)
EXHRATE	**-4.76e-06***	**2.56e-06***	1.01e-06	**2.12e-06****	-2.73e-07	4.59e-07
	(2.85e-06)	(1.42e-06)	(1.33e-06)	(9.06e-07)	(8.12e-07)	(6.35e-07)
NATRES	0.0251		0.00395		-0.0104	
	(0.0282)		(0.0140)		(0.0208)	
GOVERNANCE	-0.0145	0.0114	0.0122	**0.0149****	0.00299	**0.00864***
	(0.0188)	(0.0102)	(0.00788)	(0.00630)	(0.00819)	(0.00454)
LOG(GDP_{t-1})	**-0.537***	**0.427*****	0.143	**0.231*****	0.0236	**0.114***
	(0.312)	(0.134)	(0.134)	(0.0858)	(0.0894)	(0.0602)
OPENNESS	**0.000637*****		**0.000184*****		**0.000257*****	
	(0.000243)		(5.74e-05)		(4.77e-05)	
INFRAS	0.000157		0.000105		0.000106	
	(0.000163)		(0.000105)		(9.49e-05)	
FDIGDP		**-0.457****		**-0.552*****		-0.0357
		(0.216)		(0.120)		(0.101)
BALANCE		**-0.00255*****		**0.000835****		**-0.000696****
		(0.000647)		(0.000371)		(0.000300)
INTRATE		0.000243		0.000219		**-0.000575*****
		(0.000223)		(0.000205)		(0.000166)
CONSTANT	-0.0446	0.00472	0.00867	0.0171	-0.00290	0.00594
	(0.0597)	(0.0353)	(0.0272)	(0.0223)	(0.0224)	(0.0160)
Observations	165	165	165	165	166	166
R-square	-2.997	0.148	0.025	-0.255	0.375	0.174

Notes: FDIGDP is the ratio of foreign direct investment (FDI) to gross domestic product (GDP). CREDIT is the ratio of private credit by deposit money banks and other financial institutions to GDP. LLIAB is the liquid liabilities of the financial system (currency plus demand and interest-bearing liabilities of banks and non-bank financial intermediaries) divided by GDP. CCB is the ratio of commercial bank assets divided by commercial bank plus central bank assets. The other variables are described in Table 1. Standard errors are in parentheses. ***=p<0.01; **=p<0.05; *=p<0.1.