Economics Bulletin

Volume 38, Issue 4

The Determinants of Inbound FDI: Asia on a Reappraisal

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Abstract

Although FDI inflows in Asia have increased over the years, the share of FDI in GDP has remained persistently low. There has also been a lack of general consensus on the relationship between FDI inflows and its potential determinants. Results have varied considerably depending on econometric methodologies, sample periods and countries under study. Do domestic investment and government expenditure complement or crowd out foreign investment? How significant a role do trade openness and market size play in attracting foreign investment in Asia? We re-examine the short-run and the long-run determinants of FDI inflows (in proportion to GDP) for a panel of 32 Asian economies. The period of study is 1970-2013. The variables are found to be integrated of order one. Cointegration tests establish long-run relationship between the panel variables. Government expenditure is found to have a significantly negative long-run effect on FDI inflows. Trade openness and domestic investment significantly complement FDI inflows. Results also indicate that market size, when measured by per-capita real GDP, is not a significant determinant of FDI inflows in Asia.

Citation: Md. Sharif Hossain and Rajarshi Mitra and Md. Iqbal Hossain, (2018) "The Determinants of Inbound FDI: Asia on a Reappraisal", *Economics Bulletin*, Volume 38, Issue 4, pages 2500-2508 Contact: Md. Sharif Hossain - sharif_hossain0465@yahoo.com, Rajarshi Mitra - rmitra010@hotmail.com, Md. Iqbal Hossain - iqbal_hossain0721@yahoo.com. Submitted: October 03, 2018. Published: December 27, 2018.

1. Introduction

Many developing economies during the last few decades have implemented an FDI-policy framework as a means to attract more foreign investment for sustainable economic growth and development and also to enhance domestic productivity. As recent studies have shown, FDI largely has had a positive impact on economic growth. Although FDI inflows have increased in Asia over the years, according to a World Bank report published in 2013, the share of FDI in GDP, particularly for the South Asian economies, has remained persistently low when compared to other developing regions. FDI inflows have also varied considerably across countries in Asia and also across industries within each country. It is estimated that in the next 20 years or so, more than one million youth will enter the South Asian labor market. In order to be able to create new jobs and also improve the standard of living, the Asian economies may have to rely on foreign investment apart from just public investment. Despite restrictions on capital outflow arising from portfolio preferences, institutional rigidities and international differences in tax rules, countries implementing FDI-driven growth policies are taking steps to increase transparency and instil confidence in foreign investors in their overseas investment decisions.

A vast body of empirical literature already exists on the determinants of FDI but the coefficient estimates and the direction of impact of changes in the determinants on FDI inflows have varied considerably depending on the econometric methodologies used, sample periods and countries under study. For instance, the roles of domestic investment and government spending remain controversial. They have been shown to either complement FDI inflows or crowd out foreign investment. Trade openness expectedly increases FDI inflows, but the significance of its impact on FDI inflows depends largely on the measure of the index used in the study. In most cases its effect on FDI inflows has been largely positive. As discussed in subsequent sections, although market size is generally considered a major determinant of FDI inflows, some studies have shown lack of any significant impact of market size on FDI inflows.

We re-investigate the roles of domestic investment, government spending, and trade openness (measured as trade-to-GDP ratio) and market size (measured by per-capita real GDP) in FDI inflows (as a percentage of GDP) for a panel of 32 Asian economies for the period 1970-2013. A review of empirical literature is provided in Section 2. A description of the data and the methodology used is provided in Section 3. The results are presented and discussed in Section 4. The concluding remarks and the policy implications are discussed in Section 5.

2. Literature Review

Although Ndikumana and Verick (2008) and Hossain and Mitra (2013) reported a positive effect of domestic investment on FDI inflows, McMillan (1999) found a negative relationship between the two. Harrison and Revenga (1995) found no significant relation between domestic investment and FDI inflows, but Lautier and Moreaub (2012) showed that lagged domestic investment can have a positive effect on FDI inflows. Anyanwu (2011) found that government spending can have a positive effect on FDI inflows, but Mkenda and Mkenda (2004) reported a negative relationship between government spending and FDI inflows. Hossain and Mitra (2013) observed insignificant short-run and long-run relationships between government spending and FDI inflows. Studies that have reported a positive relationship between trade openness and FDI inflows include Kravis and Lipsey (1982),

Culem (1988), Lucas (1993), Chakrabarti (2001), Jensen (2003), Djokoto (2012) and Panagiotis and Skandalis (2012). But Schmitz and Bieri (1972), Globerman and Shapiro (2002) and Busse and Hefeker (2007) reported an insignificant relationship between trade openness and FDI inflows. Hossain and Mitra (2013) observed an insignificant short-run relation between trade openness and FDI inflows, but a significantly positive long-run relation between the two variables. Chakrabarti (2001) found market size to be the single most widely accepted significant determinant of foreign direct investment flows. Some studies have used overall GDP as the measure of market size. As Chakrabarti (2001) noted, "It has been pointed out that absolute GDP is a relatively poor indicator of market potential for the products of foreign investors, particularly in many developing economies, since it reflects the size of the population rather than income." In one of most recent studies, Petrović-Ranđelović et. al. (2017) studied market size as a determinant of FDI inflows in the western Balkans countries. They used per-capita GDP as a measure of market size, and found a significant positive impact of FDI inflows. Following the line of reasoning provided by Chakrabarti (2001), Petrović-Ranđelović et. al. (2017) and other authors, we used per-capita real GDP as a measure of market size in our paper. Studies that have reported a positive effect of market size on FDI inflows notably include Bandera and White (1968), Lunn (1980), Dunning (1980), Kravis and Lipsey (1982), Culem (1988), Wheeler and Mody (1992), Tsai (1994), Billington (1999) and Pistoresi (2000) and Chakrabarti (2001). On the other hand, Elbadawi and Mwega (1997) and Hossain and Mitra (2013) observed an insignificant relationship between market size and FDI inflows.

3. Data and Estimation Method

We use annual times series data on 32 countries in South Asia, South-East Asia, West Asia and Central Asia, namely, Afghanistan, Bahrain, Bangladesh, Bhutan, Brunei Darussalam, Cambodia, China, India, Iran (Islamic Rep), Iraq, Jordan, Korea Rep, Kuwait, Lao PDR, Lebanon, Malaysia, Maldives, Mongolia, Myanmar, Nepal, Oman, Pakistan, Philippines, Qatar, Saudi Arabia, Singapore, Sri Lanka, State of Palestine, Syrian Arab Republic, Thailand, Turkey and Viet Nam. The dependent variable in the model is total net FDI inflow which is measured as the difference between credits and debits in capital transactions. The four major potential determinants are domestic investment (measured as the difference between new and disposed fixed assets owned by household, business and government sectors); government expenditure (the total government expenditure on goods and services for the people in a nation); trade openness (measured as the trade-to-GDP ratio which is calculated as the sum of a nation's exports and imports divided by its GDP); and market size (measured by per-capita real GDP in 2005 constant prices and exchange rates). There have been arguments for and against the use of per-capita real GDP as a measure of market size. Some studies have used absolute GDP; however, per-capita real GDP is considered a better measure of market potential since it reflects income rather than population. Except per-capita real GDP, all other variables are included in the model as a percentage of nominal GDP and measured in current prices and current exchange rates. The data source is UNCTAD Statistics and the period of study is 1970-2013.

We estimate a model of the form:

$$FDI_{it} = \alpha_0 + \alpha_1 OPN_{it} + \alpha_2 DINV_{it} + \alpha_3 PGDP_{it} + \alpha_4 GEXP_{it} + \varepsilon_{it}$$
(1)

In equation (1), α_1 , α_2 , α_3 and α_4 are the long-run coefficients for trade openness (OPN), domestic investment (DINV), per-capita real GDP (PGDP) and government expenditure (GEXP) respectively.

The suffix *i* denotes the *i*-th country and *t* denotes the time period under consideration. The model in (1) is estimated in three steps: first, the unit root tests are performed, namely, Maddala and Wu (MW, 1999), Levin, Lin and Chu (LLC, 2002), Im, Peasaran and Shin (IPS, 2003) and Choi (2006); second, the Kao (1999) and the Johnsen Fisher Panel cointegration tests are performed to identify the long-run relationships between the panel variables; in the third and final step, an error correction model is estimated in order to examine the short-run and the long-run coefficients and also the direction of causality between the panel variables. In all the four unit root tests, both constant and trend terms are included when testing the variables in level form, while only the constant term is included when taking the first difference. The Johansen Fisher cointegration test is performed for two models separately: Model 1 that does not include intercept and trend in the cointegrating equation and VAR, and Model 2 that includes an intercept but no trend in the cointegrating equation and no intercept in VAR. For causality, the Engle and Granger (1987) test is performed. The results are discussed in subsequent sections.

4. Results

4.1 Unit Root Tests: The presence of a unit root is examined by performing the four tests as mentioned in the preceding section. Levin, Lin and Chu (LLC 2002) and Choi (2006) tests the null hypothesis of a unit root against the alternate hypothesis of no unit root. In Im, Pesaran and Shin (IPS 2003) the null hypothesis of a unit root in each series is tested against the alternate hypothesis that some of the individual series may contain a unit root but not all. Maddala and Wu (MW 1999) proposes a Fisher-type test. The test is nonparametric and follows a chi-square distribution. It does not depend on the lag length in the individual ADF regressions. The results of the LLC and IPS unit root tests are provided in Table 1. The results of the MW and Choi unit root tests are provided in Table 2. In Table 1 and Table 2, *** indicates significant at 1% significance level. The results overall indicate that all five variables are first-difference stationary.

| | Const | tant and Trend [L | Level] | | |
|----------------------------------|----------|-------------------|----------|-------|--|
| | LLC | prob. | IPS | prob. | |
| PGDP | 5.9 | 1.00 | 8.5 | 1.00 | |
| OPN | 2.9 | 0.99 | 1.5 | 0.93 | |
| DINV | 0.4 | 0.66 | -0.4 | 0.36 | |
| GEXP | 0.3 | 0.60 | 0.9 | 0.83 | |
| FDI | -0.5 | 0.32 | -3.8*** | 0.00 | |
| Constant Only [First-Difference] | | | | | |
| | LLC | prob. | IPS | prob. | |
| △PGDP | -5.1*** | 0.00 | -8.3*** | 0.00 | |
| $\triangle OPN$ | -21.2*** | 0.00 | -20.2*** | 0.00 | |
| △DINV | -23.9*** | 0.00 | -21.7*** | 0.00 | |
| $\triangle \text{GEXP}$ | -21.4*** | 0.00 | -19.4*** | 0.00 | |
| ∆FDI | -30.0*** | 0.00 | -28.9*** | 0.00 | |

Table 1. Unit Root Tests

| Constant and Trend [Level] | | | | | |
|----------------------------------|----------|-------|----------|-------|--|
| | MW | prob. | Choi | prob. | |
| PGDP | 15.4 | 1.00 | 8.4 | 1.00 | |
| OPN | 62.7 | 0.19 | 1.8 | 0.96 | |
| DINV | 65.8 | 0.13 | -0.3 | 0.38 | |
| GEXP | 49.6 | 0.65 | 1.3 | 0.89 | |
| FDI | 132.4*** | 0.00 | -3.2*** | 0.00 | |
| Constant Only [First-Difference] | | | | | |
| | MW | prob. | Choi | prob. | |
| $\triangle PGDP$ | 233.6*** | 0.00 | -7.4*** | 0.00 | |
| $\triangle OPN$ | 499.7*** | 0.00 | -15.8 | 0.00 | |
| $\triangle \text{DINV}$ | 509.8*** | 0.00 | -18.2*** | 0.00 | |
| $\triangle \text{GEXP}$ | 464.8*** | 0.00 | -16.1*** | 0.00 | |
| ∆FDI | 673.6*** | 0.00 | -21.1*** | 0.00 | |

Table 2. Unit Root Tests

4.2 Cointegration Tests: The results of both Kao (1999) and Johansen Fisher panel cointegration tests are reported in Table 3. In Table 3, *** indicates significant at 1% significance level; ** indicates significant at 5% significance level and * indicates significant at 10% significance level. In Table 3, Model 1: No intercept and trend in CE and VAR; Model 2: intercept (no trend) in CE-no intercept in VAR. The tests are performed with one lag and the results confirm a long-run relationship between the panel variables.

| Kao Test | | | prob. | | | |
|----------------------------|----------------------------------|---------|--------------------------------------|-------|--|--|
| | -6.73*** | 0.00 | | | | |
| Johansen Fisher Pan | | | anel Cointegration Test | | | |
| Model 1 | | | | | | |
| Cointegrating Equations | Fisher Statistic (Trace Test) | prob. | Fisher Statistic (Max.Eigenvalue) | prob. | | |
| none | 298.60*** | 0.00 | 205.60*** | 0.00 | | |
| maximum 1 | 146.00*** | 0.00 | 115.10*** | 0.00 | | |
| maximum 2 | 73.20** | 0.04 | 67.85* | 0.09 | | |
| maximum 3 | 41.39 | 0.89 | 37.84 | 0.95 | | |
| maximum 4 | 38.88 | 0.94 | 38.88 | 0.94 | | |
| | | Model 2 | | | | |
| Cointegrating Equations | Fisher Statistic (Trace Test) | prob. | Fisher Statistic (Max.Eigenvalue) | prob. | | |
| none | 323.80*** | 0.00 | 229.00*** | 0.00 | | |
| maximum 1 | 152.60*** | 0.00 | 117.30*** | 0.00 | | |
| maximum 2 | 75.76** | 0.03 | 58.56 | 0.31 | | |
| maximum 3 | 50.01 | 0.63 | 45.78 | 0.78 | | |
| maximum 4 | 39.02 | 0.94 | 39.02 | 0.94 | | |

4.3 Granger Causality: The Engel and Granger (1987) test is performed on the first-differenced variables to determine the existence of causal relationships. An error correction

term is included for long-run causality. The augmented form of the Granger causality test is presented below:

$$\begin{bmatrix} \Delta FDI_{it} \\ \Delta OPN_{it} \\ \Delta DINV_{it} \\ \Delta PGDP_{it} \\ \Delta GEXD_{it} \end{bmatrix} = \begin{bmatrix} C_1 \\ C_2 \\ C_3 \\ C_4 \\ C_5 \end{bmatrix} + \sum_{k=1}^{p} \begin{bmatrix} \beta_{11k} & \beta_{12k} & \beta_{13k} & \beta_{14k} & \beta_{15k} \\ \beta_{21k} & \beta_{22k} & \beta_{23k} & \beta_{24k} & \beta_{25k} \\ \beta_{31k} & \beta_{32k} & \beta_{33k} & \beta_{34k} & \beta_{35k} \\ \beta_{41k} & \beta_{42k} & \beta_{43k} & \beta_{44k} & \beta_{45k} \\ \beta_{51k} & \beta_{52k} & \beta_{53k} & \beta_{54k} & \beta_{55k} \end{bmatrix} \begin{bmatrix} \Delta FDI_{it-k} \\ \Delta OPN_{it-k} \\ \Delta DINV_{it-k} \\ \Delta GEXD_{it-k} \end{bmatrix} + \begin{bmatrix} \lambda_1 \\ \lambda_2 \\ \lambda_3 \\ \lambda_4 \\ \lambda_5 \end{bmatrix} ECM_{it-1} + \begin{bmatrix} \epsilon_{1it} \\ \epsilon_{2it} \\ \epsilon_{3it} \\ \epsilon_{4it} \\ \epsilon_{5it} \end{bmatrix} (2)$$

In equation (2), for instance, trade openness will Granger cause FDI in the short-run if and only if the coefficient β_{12k} is significantly different from zero. Likewise, FDI will Granger cause trade openness in the short-run if and only if β_{21k} is significantly different from zero. The results of the F-test are reported in Table 4. In Table 4, the figures in the parenthesis are the p-values; *** indicates significant at 1% significance level; ** indicates significant at 5% significance level and * indicates significant at 10% significance level.

| | ∆FDI | $\triangle OPN$ | $\triangle \text{DINV}$ | $\triangle PGDP$ | $\triangle \text{GEXP}$ | ECM |
|-------|--------|-----------------|-------------------------|------------------|-------------------------|----------|
| ∆FDI | | 1.97* | 3.53*** | 0.49 | 0.46 | -5.79*** |
| | | (0.08) | (0.00) | (0.79) | (0.81) | (0.00) |
| △OPN | 1.71 | | 1.73 | 2.29** | 2.15* | 1.59 |
| | (0.13) | | (0.13) | (0.04) | (0.06) | (0.11) |
| △DINV | 2.30** | 3.2*** | | 0.79 | 2.77** | -0.99 |
| | (0.04) | (0.01) | | (0.55) | (0.02) | (0.32) |
| △PGDP | 1.73 | 1.97* | 4.02*** | | 1.97* | 1.31 |
| | (0.13) | (0.08) | (0.00) | | (0.08) | (0.19) |
| △GEXP | 1.77 | 14.46*** | 3.45*** | 17.98*** | | -2.08** |
| | (0.12) | (0.00) | (0.00) | (0.00) | | (0.04) |

Table 4. Granger Causality

The results indicate short-run unidirectional causal effects from trade openness to FDI and domestic investment, from domestic investment to per-capita real GDP. Results also indicate short-run bidirectional causalities between domestic investment and foreign direct investment, between per-capita real GDP and trade openness, between trade openness and government spending, between government spending and domestic investment, and between government spending and per-capita real GDP. Long-run causal link is observed from foreign direct investment to trade openness, domestic investment, per-capita real GDP and government spending and from government spending to foreign direct investment, trade openness, domestic investment and per-capita real GDP.

4.4 Short-Run and Long-Run Dynamics: The short-run and long-run coefficients are obtained by estimating the models in (3) and (4) respectively

$$\Delta FDI_{it} = \beta_1 \Delta OPN_{it} + \beta_2 \Delta DINV_{it} + \beta_3 \Delta PGDP_{it} + \beta_4 \Delta GEXP_{it} + \lambda ECM_{it-1} + \varepsilon_{it}$$
(3)

$$FDI_{it} = \mu_i + \alpha_1 OPN_{it} + \alpha_2 DINV_{it} + \alpha_3 PGDP_{it} + \alpha_4 GEXP_{it} + \sum_{j=1}^{p} \gamma_{ij} \Delta OPN_{it-j} + \sum_{j=1}^{p} \lambda_{ij} \Delta DINV_{it-j} - \sum_{j=1}^{p} \gamma_{jj} \Delta OPN_{jt-j} + \sum_{j=1}^{p} \gamma_{jj} \Delta OPN_$$

$$\sum_{j=1}^{p} \delta_{ij} \Delta PGDP_{it-j} + \sum_{j=1}^{p} \varphi_{ij} \Delta GEXP_{it-j} + \mu_{it}$$
(4)

In equation (3), β_1 , β_2 , β_3 and β_4 are the short-run coefficients for trade openness, domestic investment, per-capita real GDP and government expenditure respectively. In equation (4), α_1 , α_2 , α_3 and α_4 are the corresponding long-run coefficients. Since the variables are all integrated of order one and included in the model in first-differenced form, no lags are imposed in (3). The ECM term measures the speed of adjustment toward long-run equilibrium. Both AIC and SBIC are used to select the optimum lag-length. The GMM technique is then applied to estimate the short-run and the long-run coefficients. The results are reported in Table 5.

| Short-Run Coefficients | | | | | |
|-------------------------|-------------|--------|-------|--|--|
| | coefficient | t-test | prob. | | |
| $\triangle OPN$ | 0.01*** | 3.38 | 0.00 | | |
| $\triangle \text{DINV}$ | 0.02** | 2.44 | 0.02 | | |
| $\triangle PGDP$ | 0.00003 | 1.41 | 0.16 | | |
| $\triangle \text{GEXP}$ | 0.01 | 0.92 | 0.36 | | |
| ECM | -0.28*** | -13.73 | 0.00 | | |
| Long-Run Coefficients | | | | | |
| | coefficient | t-test | prob. | | |
| constant | -0.96*** | -3.17 | 0.00 | | |
| OPN | 0.03*** | 9.13 | 0.00 | | |
| DINV | 0.06*** | 4.87 | 0.00 | | |
| PGDP | -0.00001 | -0.99 | 0.32 | | |
| GEXP | -0.08*** | -4.89 | 0.00 | | |

Table 5. Short-Run and Long-Run Coefficients

In Table 5, *** indicates significant at 1% significance level; ** indicates significant at 5% significance level. Both the short-run and the long-run effects of domestic investment on FDI inflows are significantly positive. Although we observe insignificant short-run effect of government expenditure, its long-run effect on FDI inflows is significantly negative. Since the measure of DINV includes the government sector, we may consider GEXP as current government spending; therefore, the government may be having a short-run impact through DINV. When trade-to-GDP ratio is used as a measure of trade openness, then both the short-run and the long-run effects of trade openness on FDI inflows are significantly positive. The effect of per-capita real GDP on FDI inflows, in both short-run and long-run, is insignificant. The ECM coefficient is significantly negative, indicating adjustment toward long-run equilibrium.

As Lautier and Moreau (2012) explained, domestic investment can have a significantly positive effect on FDI inflows because of agglomeration effects and interfirm externalities. An increase in domestic investment on infrastructure and domestic labor productivity may attract FDI. Domestic investment may help reduce transaction costs and that may result in an increase in FDI inflows. As McMillan (1998) and Ndikumana and Verick (2008) explained, domestic investors often possess accurate information about local market conditions, and in such cases, FDI may "follow" domestic investment. This is because the foreign investors may use domestic investment as an indicator of both local market conditions and economic performance. The long-run effect of government expenditure on FDI inflows is significantly negative. This may happen if the market share of foreign investors diminishes with an increase in government expenditure. Increased participation in international trade will expectedly increase FDI inflows, as implied by the significantly positive effect of trade openness on FDI inflows. The lack of a significant relation between market size and FDI

inflows is similar to the findings of Elbadawi and Mwega (1997) and Hossain and Mitra (2013). But this does not, in any way, rule out the possibility that GDP growth-rate could be a key determinant of inbound FDI and might be worth examining in a separate study.

5. Conclusion

Due to the persistently low FDI-to-GDP ratio for many developing economies, we have reexamined the roles of domestic investment, government expenditure, trade openness and market size in FDI inflows for a panel of 32 Asian economies. Although government expenditure is found to have a significantly negative effect on FDI inflows, domestic investment and trade openness significantly complement FDI inflows (in proportion to GDP). A key finding is that market size, when measured by per-capita real GDP, is not a significant determinant of FDI inflows in Asia. Short-run unidirectional causality is observed from trade openness to FDI, and short-run bidirectional causality between domestic investment and FDI. Long-run causality is observed from government spending to FDI. Thus an increase in public investment and greater participation in international trade will expectedly increase FDI inflows in Asia. From a policy standpoint, it might be interesting to extend this panel cointegration analysis to a country case study and examine the determinants of FDI inflows for each of the 32 Asian countries covered in this study.

Over the period 1970 to 2013, some political factors influencing FDI, such as competition, institutional freedom, property rights and banking & financial sectors have changed due to political reforms, wars, etc. These political factors are also important determinants of FDI inflows. The 32 countries included in the panel differ not just in terms of political variables but they have different levels of corruption, risk, macroeconomic stability and infrastructure. Subject to the availability of time series data, it might be interesting to consider those political and macroeconomic factors and re-examine the sensitivity of FDI in Asia to changes in its potential determinants for the panel of Asian countries as an extension of this study.

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