

FDI and Economic Growth in South and East Asia & Pacific Region: Evidence from Meta-Analysis

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Abstract

Economic growth is considered to be a function of investment and other factors. While there is a theoretical consensus on this aspect, empirically the role of inward FDI on economic growth has been and still is a subject of long and intense debate. The objective of this study is to address the impact of inward FDI on economic growth empirically with a view to providing a meta-synthesis of the empirical evidence on the direct effects of inward FDI on economic growth in South and East Asia & Pacific countries. Based on 633 estimates from 37 empirical studies, the results of this study indicate that FDI has a positive and significant effect on growth. Our results have important policy implications.

Keywords: FDI; economic growth; meta-regression analysis; systematic literature review; South and East Asia & Pacific countries **JEL codes:** F21, O1, O2, O4.

Introduction

Economic growth is considered to be a function of investment and other factors. While investment can be both domestic and foreign, foreign direct investment in particular is considered to add new investible funds to a host country leading to enhanced economic growth. While there is a theoretical consensus on this aspect, empirically the role of inward FDI on economic growth has been and still is a subject of long and intense debate (Kottaridi and Stengos (2010), Le and Suruga (2005)). Although this continuous debate has provided some insights into the relationship between inward FDI and economic growth, the precise effect of inward FDI on economic growth is still not known either to researchers or to policy makers.

The objective of this study is to address the impact of inward FDI on economic growth empirically with a view to providing a meta-synthesis of the empirical evidence on the direct effects of inward FDI on economic growth in South and East Asia & Pacific countries¹. In particular this study raises the following questions: What do existing empirical studies tell us about the effect of inward FDI on economic growth? Is there any genuine effect of FDI on economic growth? What is the overall effect of inward FDI on economic growth? What factors cause the differences in the empirical evidence reported in these studies.

In order to address the above set of questions, this study is outlined as follows. Section 1 gives a brief introduction to the study which is followed by review of literature in section 2. Section 3 and 4 present methodology and results of meta-analysis respectively followed by a

¹ As defined by World Bank and including South Korea

discussion of results in section 5. The final section of this study has concluding remarks and some implications for policy and future research.

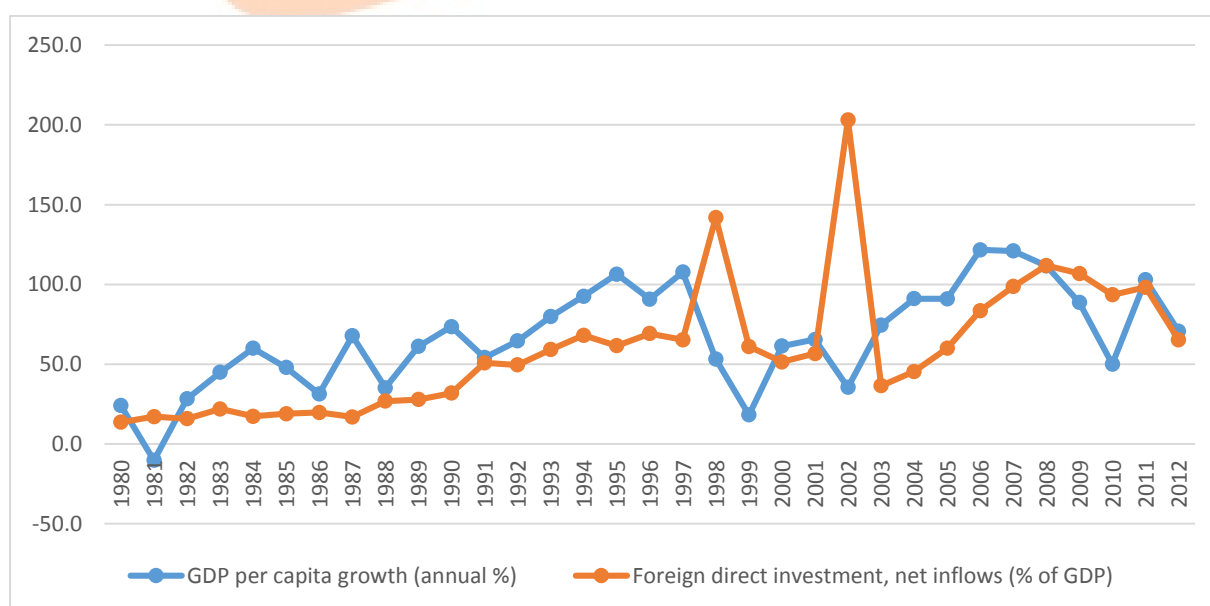
Foreign direct investment is an investment by the resident of one country in another with long lasting interest. Long lasting interest is seen when the investor owns a minimum of 10% of the voting power of the direct investment enterprise (OECD, 2008). The main objective of direct investment varies from portfolio investment whereby in the earlier case an investor would expect to influence the management of the direct investment enterprise. Foreign direct investments are made by investors, multinational corporations and other organisations from outside the country in which investment is made (Adeoye, 2009).

South and East Asia & Pacific countries have long pursued the traditional strategy of self-reliance. Foreign direct investments have become topical in South and East Asia region since the late 1980's when most of the countries in the region adopted an open door policy to welcome FDI (for example, India in 1981, China's open door policy in 1978) (Wang, 1995). This change is seen as a result of major political decision and economic development strategy so as to uplift the economies from their economic backwardness and reach their long term goals of development.

In recent times inward FDI into developing Asia has surged tremendously mainly with the liberalisation of investment policies and lowering of capital controls (ABD, 2007). Inward FDI has played a very important role in many regions of South and East Asia & Pacific countries development. While these countries have welcomed varying degrees of inward FDI into these regions, their effect on economic growth has been different based on the investment policies they have adopted. Some light is shed on economic growth and FDI trends in this region from 1980 to 2012.

Appendix 1 shows inward FDI and economic growth into these countries from 1980 – 2012. Needless to say, while macro environment in these countries has played a very important role in attracting inward FDI, an equally important role was played by FDI policies. As can be viewed from the graph, there is a clear positive pattern in inward FDI and economic growth in this region. Both FDI and economic growth were lowest in this region in the year 1980 and 1981 respectively and FDI peaked in the year 2002, while showing some steep falls between the periods 1998 and 1999, and 2002 and 2003.

Figure 1 Foreign Direct Investment and Growth in South and East Asia & Pacific Region



Fluctuating trends in FDI into South and East Asia & Pacific countries can broadly be seen as a result of investment policies in these countries and also as a result of external factors such as currency appreciation (Figure 1). On the one hand, looking at the history of investment policies of East Asian countries from 1980, governments initially restricted FDI into these countries in order to promote and protect domestic companies. Countries such as Malaysia, Thailand and Indonesia had different policies for different industries. While investment was completely restricted in certain strategic industries, it was limited in others (Thomson, 1999).

Moreover, countries that have initially allowed FDI as a part of import substitution policy have later moved to export promotion strategies. In terms of external factors, currency appreciation of Yen around the 1980's has made it expensive to manufacture labour intensive goods. As a result, Japan started looking for other countries in Asia where labour costs were cheap. Yen appreciation has also created a wealth effect which led to an increase in outward investments to East Asian countries such as South Korea and Taiwan and later to China (Willem and Salike, 2013)

On the other hand, investment policies have been restrictive in South Asia until the 1990's when most of the countries in this region has opened up their doors and made it conducive for foreign investors (Sahoo, 2006). Most of the countries have also used tax incentive policies in order to attract FDI to promote employment opportunities, develop rural areas and the development of specific industries. Overall, inward FDI was regulated differently with differing degrees of efficiency by countries in this region.

Systematic Review of Literature

This section briefly reviews the literature on inward FDI and economic growth highlighting the inconsistencies between the empirical studies in order to shed some light on the reasons for the different findings and also to draw hypothesis to test using meta-regression analysis. The study aims to answer these questions specifically: 1. what is the effect of inward FDI on economic growth of the host country and how big is that effect? 2. What factors cause differences in empirical results within this field?

Theoretical views on FDI growth nexus

Under the neoclassical growth model, FDI is considered to be a pure factor input and the long term effects of FDI are neutral. Studies based on neoclassical growth theory argue that the effects of FDI on the host country's economic growth are only in short term and it leaves long run growth unchanged. These scholars are of the view that long run growth can occur only when the quantity (for example population growth) and quality of resources (for example technological progress) in an economy are enhanced, both of which are considered to be exogenous. In contrast to this, under the endogenous growth model, FDI is considered to be a delivery vehicle to transfer technological, knowledge and know-how from the investing country to host country (Li and Liu (2005), Borensztein, Gregorio and Lee (1998), Balasubramanyam et al., (1996)). As a result, FDI will be able to have positive effects on the host country's economic growth in the long term (Makki and Somwaru (2004)).

Empirical view on FDI growth literature

From among these studies, positive and statistically significant results are reported by Alguacil et al., (2011), Anwar and Cooray (2012), Ahmad and Hamdani (2003), Balasubramanyam et al., (1996), Basu and Guariglia (2003), Busse and Groizard (2008), Freckleton et al., (2012), Hsiao and Shen (2003), Kotrajaras (2010), Kottaridi and Stengos (2010), Le and Suruga (2005), Lee et al., (2011), Lensick and Morrissey (2006), Li and Liu (2005), Makki and Somwaru (2004), Sylwester (2005), Thangavelu et al., (2009), Vita and Kyaw (2009) and Wang and Wong (2010). Positive and statistically insignificant results are reported by Alfaro (2003),

Alfaro et al., (2004), Balasubramanyam et al., (1996), Carkovic and Levine (2002), Economidou et al., (2006), Kottaridi and Stengos (2010), Makki and Somwaru (2004).

Negative effects of FDI can be attributed to Alfaro et al., (2009), Borensztein et al., (1998), Durham (2004), Fry (1996), Hermes and Lensink (2003), Herzer (2012), Le and Suruga (2005), Vita and Kyaw (2009), Wang and Wong (2011). From these studies, significant results are reported by Borensztein et al., (1998), Hermes and Lensink (2003), Le and Suruga (2005), Vita and Kyaw (2009), Wang and Wong (2011). In contrast to these studies, insignificant results are reported by Alfaro et al., (2009), Durham (2004) and Fry (1996).

In the case of single country studies, positive and statistically significant effects of FDI can be attributed to Baharumshah and Almansaied (2009) for Malaysia from 1974 – 2004, Acharyya (2009) for India from 1980 – 2003, Ahmed (2012) for Malaysia from 1999 – 2008, Ang (2009) for Thailand from 1970 – 2004, Chen et al., (1995) for China from 1968 – 1990, Hoang et al., (2010) for Vietnam from 1995 – 2006, Quader (2009) for Bangladesh from 1990 – 2006, Yu and JingMei (2009) for China from 1991 – 2007. Choong et al., (2005) study on Malaysia from 1970 – 2001 finds negative and statistically significant results.

Empirical evidence reviewed so far on the growth effects of FDI are inconclusive or at least inconsistent. As noted above, the effect of FDI on economic growth can be positive and statistically significant, positive and statistically insignificant, no effect, negative and statistically insignificant and negative and statistically significant. While the differences in data, time period of study, methodology are generating these conflicts among empirical findings (appendix 6) the role and impact of FDI seems to be more country specific and can differ based on the host country's economic, institutional, technological and other factors (Li and Liu (2005)). Conflicting research results overwhelm any clear understanding on the effect of FDI on economic growth. This restricts the ability of researchers in suggesting and policy makers in implementing appropriate policies to promote economic growth.

As a remedy for inconclusive empirical results, various scholars have tried different methodologies by differentiating developed and developing countries, export promoting countries and import substitution countries (Balasubramanyam et al., 1996) and by using advanced econometric techniques such as instrumental variable techniques in order to control for endogeneity problem (Alguacil et al., 2011, Alfaro et al., 2003, 2004), Anwar and Cooray 2012, Azman-Saini et al., 2010). While these new techniques have created additional insights into this topic, empirical results still remain inconclusive. Hence, an intelligent summary of these findings is likely to lead to informed policy decisions (Stanley and Doucouliagos, 2012). Despite differences in reported results, one common point among these studies is that they suggest that the growth enhancing effect of FDI is not automatic but is likely to depend on various country specific factors such as economic, technological and institutional. For instance, while on one hand Alfaro et al., (2003) shows that FDI effects are conditional upon sufficiently developed financial markets, on the other hand Balasubramanyam et al., (1996) suggest that the effect depend on trade policy. Despite this fact, it is important to remember that there are no widely accepted country specific factors that are identified by the literature. Hence, if the growth effects of FDI are positive or negative in some economies under some conditions, they may not be valid for all countries.

One problem in assessing the effects of FDI on economic growth is endogeneity, which arises due to interdependence of FDI and economic growth. FDI might have a positive impact on the host economy leading to market expansion. An expanded market in turn can attract further FDI. Hence, ignoring this problem might lead to reverse causality or simultaneity (Alguacil et al., 2011). Studies by Alguacil, et al., 2011, Alfaro et al., 2003, Alfaro et al., 2004), Anwar and Cooray 2012, Azman-Saini et al., 2010, Basu and Guariglia, 2003, Beugelsdijk et al., 2008, Borensztein et al., 1998, Busse and Groizard 2008, Durham 2004, Fry 1996, Kottaridi and Stengos 2010, Lensick and Morrissey 2006, Makki and Somwaru 2004, Thangavelu et al.,

2009, Vita and Kyaw 2009 and Wang and Wong 2010 have used instrumental techniques in order to understand the true effect of inward FDI on economic growth.

Methodology

The review methodology used in this study i.e the methods used for searching studies, study selection, critical evaluation and data extraction is informed by three sources. Firstly, Cambell and Cochrane Collaboration guidelines on systematic reviews in healthcare and social policy; secondly, Centre for Reviews and Dissemination (CRD, 2009) of the University of York; thirdly, Evidence for Policy and Practice Information and Co-ordinating Centre (EPPI-Centre) of the Institute of Education. Data analysis is informed by Doucouliagos et al., (2010), Doucouliagos and Ulubasoglu (2008) and Stanley and Doucouliagos (2012). We started by establishing a pre-established search criteria to identify all studies in the English language on measures of dependent variable (FDI) and independent variable (governance). This was done in two stages: the first stage involved identifying databases for published and unpublished studies. The second stage involved specifying key words, searching databases and storing results.

First stage

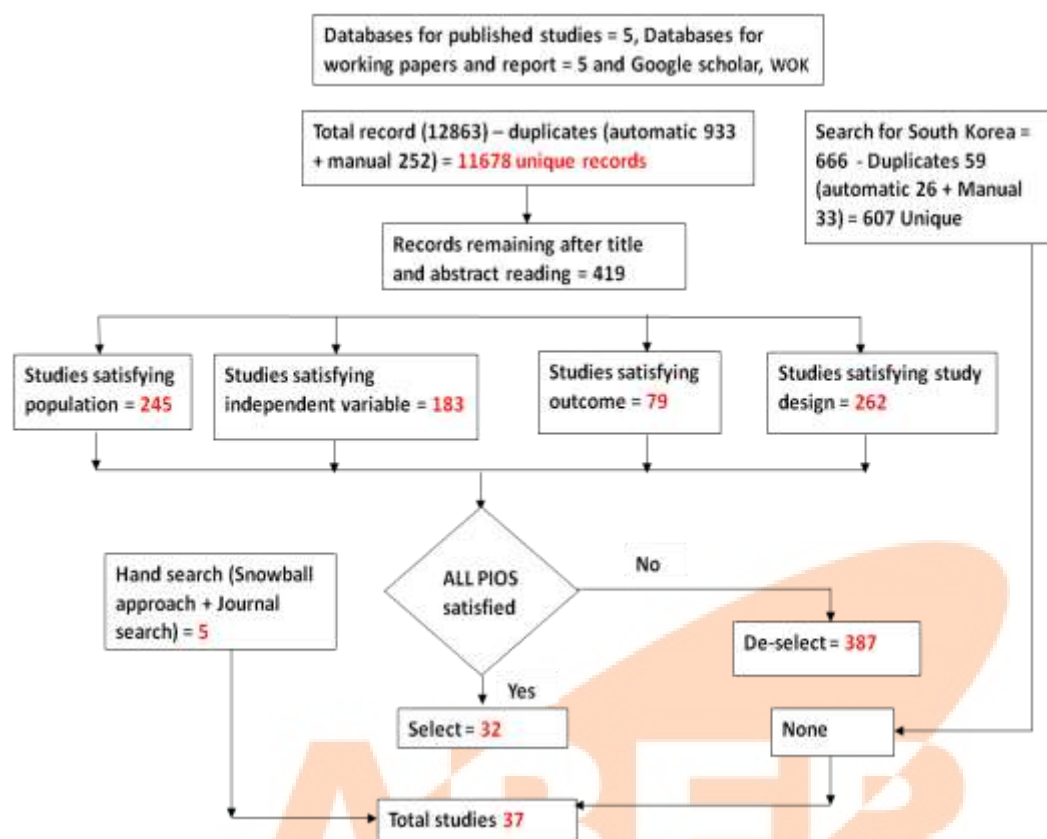
For published studies, databases such as EBSCO host (Business and economics database), Web of Knowledge (social sciences), International Bibliography of the Social Sciences (Economics, Politics, Sociology, Anthropology and Economics), Science Direct (Science and Humanities), Swetswise and JSTOR (Social Sciences) were used. For unpublished studies, databases such as World Bank e-library, Harvard Kennedy e-library, Asian Development Bank e-library, National Bureau of Economic Research and IMF e-library were used. In addition to these databases, two search engines namely Google Scholar and Web of Knowledge provided by University of Greenwich were utilised. In addition to the above, manual search was performed in order to identify grey literature using two approaches – snowball approach and random search of studies in 5 journals. Under the snowball approach we have started with the reference list of studies identified through systematic review and proceeded to find new studies. These exhaustive searches were carried out to identify all possible studies on measures of governance and inward FDI.

Second stage

Search keywords were used for FDI and growth to search ‘title’, ‘abstract’, ‘text’ and ‘keyword’ in databases listed above with the time period as January 1980 – December 2012 are listed in appendix 2. Only studies published in the English language were used in this present study. Stages involved in the search process are detailed in the following diagram.

My initial search has retrieved 12863 studies that have looked at the effect of FDI on economic growth. From these studies 933 and 252 duplicate records were identified and removed by using duplicate search option in endnote and by hand search respectively leaving 11678 unique studies for the next stage. First stage screening of these unique studies was done by reading title and abstract only which resulted in 419 suitable for this study. The relevance of each study was ascertained by interrogating it with one question: Does the study estimate the relationship between inward FDI and economic growth? If a study does not, they are deselected and are not included in meta-analysis.

Figure2: Summary of methodology used in measures of FDI and growth metaregression analysis



The critical evaluation of full text of these studies was achieved based on PIOS (population - independent variable - outcome variable - study design) criteria as suggested by the University of York (CRD, 2009) (appendix 3). 32 empirical studies were found to satisfy all four criteria (appendix 4) to which a further 5 studies were added by hand search making a total of 37 empirical studies.

The following data were obtained from above retrieved 37 empirical studies:

- Bibliographical information – name of the author, year of publication, type of paper (published paper, working paper or conference paper)
- Study characteristics – Study type, study design, nature of data used, information on dependent and independent variables (functional form, data source)
- Estimation methods used – ordinary least squares techniques, panel data techniques, time series techniques and instrumental variable techniques.
- Outcome reported – estimated parameters for all independent variables, standard errors or t – statistics of the estimates. Effect sizes² associated with linear, interaction and non-linear terms are all included in this study.

² "Effect size is a measure of the strength (magnitude) and direct of a relationship between variables" (Littell, Corcoran and Pillai, 2008, p.80)

Two forms of econometric models were used in primary studies. First, models with only linear terms (equation 1) and second, models with linear, non-linear and interaction terms (equation 2). The econometric model with only linear terms can be expressed as follows:

$$Y_{it} = \alpha_0 + \alpha_1 F_{it} + \gamma X_{it} + \varepsilon_{it} \quad \text{equation (1)}$$

The econometric model with linear, non-linear and interaction terms is expressed as follows:

$$Y_{it} = \alpha_0 + \alpha_1 F_{it} + \alpha_2 F_{it} \cdot K_{it} + \alpha_3 F_{it}^2 + \gamma X_{it} + \varepsilon_{it} \quad \text{equation (2)}$$

In equations 1 and 2, α_0 is the constant term and α_1 measures the marginal effect of F on Y; F stands for variable of interest i.e. inward FDI; F_{it} measures the linear effect of inward FDI on economic growth; $F_{it} \cdot K_{it}$ is the interaction term which measures the effect of F on economic growth conditional on the value of K; F^2 is non-linear term and α_3 measures the effect of F^2 on economic growth conditional on its own value. X_{it} is the vector of other variables that might affect the dependent variable; γ measures the marginal effect of X_{it} on Y; i and t are country and time indices respectively. E is the random error term. Interaction terms and non-linear terms are useful in identifying the marginal effect of inward FDI on economic growth.

Partial correlation is used as a standardised measure of the effect of FDI on economic growth. The beauty of partial correlation is that it allows for meaningful comparison across models. All values of $\alpha_1, \alpha_2, \alpha_3$ were transformed into partial r using the formula: $r = [t/\sqrt{t^2 + \text{dof}}]$. Where, t stands for t –statistics of the multiple regression coefficient and dof stands for the degrees of freedom of the respective t –statistic.

Modelling simple and meta-regression analysis

The following equation is used for simple meta-regression analysis for estimating the overall effect after correcting for publication bias³:

$$r_{ij} = \beta_0 + \beta_1 SE_{ij}^2 + \varepsilon_{ij} \quad \text{equation (3)}$$

The following equation is used for multiple meta-regression analysis for estimating the overall effect after correcting for publication bias:

$$r_{ij} = \beta_0 + \beta_1 SE_{ij}^2 + \beta_2 X_{ij} + \varepsilon_{ij} \quad \text{equation (4)}$$

The following equation is used for multiple meta-regression analysis with study and journal specific moderator variables.

$$r_{ij} = \beta_0 + \beta_1 SE_{ij}^2 + \beta_2 X_{ij} + \beta_3 Z_j + \varepsilon_{ij} \quad \text{equation (5)}$$

i = estimate

j = journal

r = partial correlation coefficient

SE = standard error

SE^2 = squared standard error

³ Publication bias is tested using Funnel Asymmetric Test (FAT) and Precision Effect Test (PET). FAT-PET is estimated using equation $t_i = \beta_1 + \beta_0 (1/SE_i) + v_i$ (where FAT is $H_0: \beta_1 = 0$ and PET is $H_0: \beta_0 = 0$). Results of PET suggest that except for the estimates of South Asia, there exists genuine effect of FDI on growth.

β_0 = shows the effect of FDI on growth after correcting for publication bias

β_1 = coefficient of SE^2

β_2 = coefficient of other factors such as real world

β_3 = coefficient of study and author related factors

ε_i = error term

X = estimate specific covariates

Z = journal specific covariates

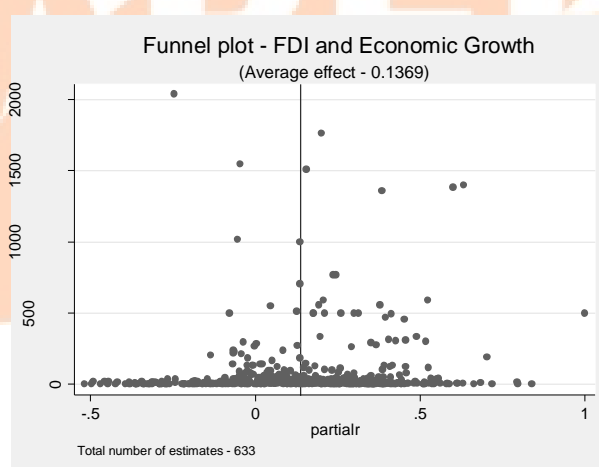
It is worth highlighting at this point that while some studies have defined r on a scale of 0-1 from low to high governance, others have used it as 0-1 high to low governance. In order to aggregate estimates, we have rescaled all estimates as 0-1 low to high governance⁴. This was done by inverting and multiplying both coefficients and standard errors of estimates defined on the opposite scale (i.e. 0-1 high - low governance) by -1.

Results

We present and analyse empirical results in this section. Funnel plot and chronological order of estimates are used to illustrate the distribution of empirical findings in FDI growth studies. Thereafter, simple and multiple meta-regression results are presented and analysed. An overview of meta-regression analysis is shown in appendix 7.

Funnel plot

Figure 3: Funnel plot for FDI growth estimates



633 estimates of FDI-growth nexus are plotted on funnel plot as shown in figure 3. Funnel plot shows association between the effect size and its precision. Effect size (partial r) is shown on X axis and weight of effect i.e. precision (calculated as inverse of standard error of each partial r) on Y axis.

Three observations can be inferred from the funnel plot. First, the average effect of FDI-growth is about 0.1369. This is the reliable summary estimate of all estimates included in this study (the mean effect of the top 3% of estimates is about 0.2140). Secondly, there is a wide variation in the empirical estimates which are both large and small, and positive and negative. There are about 586 positive and 165 negative estimates. Thirdly, estimates with large precision

⁴ Low governance means less democracy, low political stability, less regulation, low levels of government effectiveness, less of rule of law, high corruption and low overall governance.

(estimates with precision more than 500 are 18) are few and are compactly distributed on the top of the funnel while estimates with low precision are many and are widely distributed at the base of the funnel and form tails on both sides. Relatively there is more agreement among high precision estimates on FDI-growth effect as opposed to low precision estimates.

Chronological order of estimates

Figure 4: Chronological order of estimates based on average year of sample period

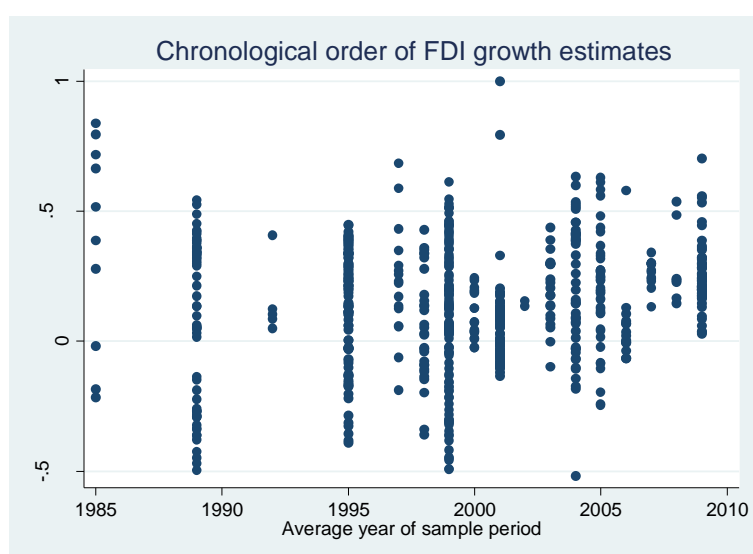


Figure 4 shows chronological order of FDI-growth estimates arranged in the order of average year of sample period. An upward trend can be seen in the results reported on the effects of FDI on economic growth. It can be noted that there is an increase in the number of positive estimates reported after 1995. This confirms the view that FDI takes time to show its positive effects on economic growth.

Simple meta-regression analysis

Table 1: Simple meta-regression results

	Statistic	All estimates (Col. 1)	Estimates controlling for endogeneity (Col. 2)	Estimates for East Asia (Col. 3)	Estimates for South East Asia (Col. 4)
Row1	Un weighted, β_0	0.07 (5.16) $R^2=0.04$	0.09 (4.52) $R^2=0.04$	-0.01 (-0.76) $R^2=0.62$	0.15 (5.10) $R^2=0.27$
Row2	Weighted by precision, β_0	0.01 (0.71) $R^2=0.26$	0.25 (12.97) $R^2=0.44$	-0.03 (-0.75) $R^2=0.20$	0.13 (2.71) $R^2=0.37$
	Number of estimates	633	232	17*	77

Note: Values in parenthesis right below the estimate represent t-values.

Simple unweighted and weighted meta-regression results are presented in table 3.5.3. I have used four different models as follows: for all estimates, estimates controlling for endogeneity, for East Asia and for South East Asia in columns 1 to 4 respectively. Row 1 displays unweighted least square results and row 2 displays weighted least square estimates. Except for East Asia, unweighted estimates of FDI show positive effect on growth which indicates that FDI has a growth enhancing effect in all cases. However, these effects are unreliable for two reasons.

Firstly, because unweighted method treats all estimates with equal weight. This means if there are more estimates coming from one study, then they will have an undue influence on the overall effect. Secondly, R^2 value of each of these models is low (ranging from 0.04 for all estimates to 0.62 for East Asia). These low values suggest that the models do not explain the complete effect of FDI on growth.

Hence, following Stanley and Doucouliagos (2012), I run weighted least squares model, where weight is defined as inverse of standard deviation. Once the estimates are weighed, size and the significance of the effects have changed. An interesting point here is that while column 1 for all estimates shows positive effect of FDI on growth, column 2 for estimates controlling for endogeneity also shows positive effect. These results tell us that after controlling for endogeneity, the true effect of FDI still remains to be positive. Hence, I infer that FDI has growth enhancing effects. Nevertheless, R^2 values have only improved a little which tells us that these models are still showing unreliable effects of FDI on growth. Due to the presence of potential heterogeneity, simple unweighted and weighted measures may not capture the real effects of FDI on growth. I address this potential heterogeneity by using all coded moderator variables in multiple meta-regression analysis.

Multiple meta-regression analysis

The following moderator variables are included in the multiple meta-regression analysis. Most of these moderator variables are included as they are proven to be significant in other meta-analysis studies dealing with economic growth (Doucouliagos and Ulubasoglu, 2008; Doucouliagos and Paldam, 2007, 2009; Abreu et al., 2005).

In case of study characteristics, difference in study based on whether or not it is published in a journal is controlled. As authors use different functional forms and data sources for FDI and growth, this is controlled for. Estimation techniques have proven to be an important source of heterogeneity. Hence, we differentiate them into OLS, panel, time series, instrumental variable and other techniques. Studies using cross sectional data have been proven to report higher effects. Therefore we differentiate data used in these studies into panel, time series and cross sectional data. Researchers have also proved that average data removes any fluctuations in the growth, hence we control for this difference using yearly and average data variables.

We have differentiated FDI based on its purpose as Greenfield or Mergers and Acquisition. We control to see if observations reported in a study make any variation to the reported results as compared to studies not reporting observations. Omission of relevant explanatory variables such as education, population and domestic investment can have an impact on the estimated coefficient (Barro, 1991).

Under real world factors we control for country composition of sample countries by grouping them into South Asia, East Asia, South East Asia and other countries. We also control for China and South Korea effect by using dummy variables. With regard to author characteristics we merely wish to test if author origin makes any difference to FDI growth estimates. Hence, we differentiate authors based on the university of the first author as American, European, South and East Asian and others. We would also like to test if authors

coming from prestigious universities like IVY league and Oxford/Cambridge report any different effects. Hence this difference is also controlled.

Journal characteristics such as differences in journals are controlled based on their discipline i.e. Economics and Finance, Science, Law, Development, Geography, Management and Policy. To see the impact of journal ranking and citations we use ABS 2010 rankings.

Table 2: Multiple meta-regression analysis results

Statistic	All-estimates (Col.1)	Estimates controlling for endogeneity (Col.2)	Estimates for East Asia (Col.3)	Estimates for South East Asia (Col.4)
Weighted by precision, β_0 (Row1)	0.28 (6.06)	0.24 (6.15)	-0.07 (-4.53)	0.76 (30.15)
	Adj.R ² =0.98	Adj.R ² =0.98	Adj.R ² =0.88	Adj.R ² =0.98
Cluster, β_0 (Row2)	0.28 (2.97)	0.24 (18.78)	-0.07 (-658.85)	0.76 (21.02)
	R ² =0.98	R ² =0.98	R ² =0.90	R ² =0.98
Number of estimates	571	232	17*	77

Note: Values in parenthesis right below the estimate represent t-values.

Table 2 above shows multiple meta-regression analysis results. I have run four models, all estimates, estimates controlling for endogeneity, East Asia and South East Asia. Row 1 shows the results of weighted least squares and row 2 shows cluster regression analysis results which I use for robustness check. Due to limited number of estimates i.e. observations fewer than 30, results are less reliable for East Asia.

As expected, all estimates model shows a positive effect of FDI on growth. As this positive effect is also confirmed by estimates controlling for endogeneity, with an R² value of 0.98 and 571 observations, my results are in strong favour of the view that FDI has a growth enhancing effect in this region. I see four possible reasons for such positive effect. Firstly, this could be due to low reverse flows to home countries in the form of profits, dividends. Secondly, multinational companies in these countries have obtained limited concessions from the host country governments (Sahoo, 2006). Either of these two possibilities can result in the possible positive effect of FDI on growth. Thirdly, policy regime in these countries might have created a favourable climate to reap the benefits of FDI. In the fourth instance, positive effect of FDI on growth can arise when FDI does not crowd out domestic investment. As this study does not address the reasons behind such a positive effect, it is worthy of future studies to look into this.

Similar to all estimates model, in the case of South East Asia, FDI has a positive effect on economic growth. However, the effect is bigger compared to all estimates and estimates controlling for endogeneity. A positive sign indicates that FDI has growth enhancing effects in the case of South East Asia. By having an open policy regime, allowing foreign investments and increasing economic activity, it is not surprising to see such results (Sahoo, 2006). It is important to note here that I only examine direct effects of FDI on economic growth. It is also possible that FDI has an indirect positive effect on economic growth in these two cases through its interaction with factors such as technology, human capital and financial markets among many others. However, I could not test this due to the very diverse nature and few interaction terms reported in primary studies.

In the case of East Asia, an unforeseen negative sign is shown. Negative effect here indicates that FDI has a growth retarding effect for East Asia. While this result is surprising, it is also in contrast with those reported by Zhang (2001a, 2001b). Many factors can be identified from FDI growth literature that could have resulted in positive effects of FDI on growth. For instance, Balasubramanyam et al., (1996) and Mencinger (2003) show that growth enhancing effects of FDI are high in countries that follow export promotion policies as compared to import substitution policy. Borensztein et al., (1998) show that the growth promoting effects of FDI depend on the existing capital stock of the host countries. Alfaro et al., (2004) show that well developed financial markets aid in realising positive effects of FDI on growth. Despite, most of the East Asian countries following these policies, it is surprising to these results.

While the presence of the above noted conditions would have created an ideal climate for exploiting the potential of FDI in promoting economic growth in East Asia, my study does not explore the reasons behind such effect. Despite high R^2 value, results for East Asia must be interpreted carefully as the number of observations is fewer than 30. Precision Effect Test (PET) results suggest that there is non-robust significant effect of FDI on growth beyond publication bias. However, the R^2 value is zero suggesting that the model is poorly fit. While this can be due to fewer number of observations i.e. 23 or due to inappropriate heterogeneity factors included in the model. Further empirical research is advised before any firm conclusions are made in case of South Asia. Overall, the results presented above suggests that FDI does not have a uniform direct effect on economic growth in all regions and that the effect is region specific. Future studies might want to study the causes behind region specific effects of FDI on growth.

Heterogeneity

We have identified several variables that have significantly influenced the reported effect of FDI on growth. We only discuss some interesting and unexpected results here.

Table 3: Moderator variable analysis

Moderator variable	All Estimates		Endogeneity		East Asia		South East Asia	
	WLS	Cluster	WLS	Cluster	WLS	Cluster	WLS	Cluster
Study related factors								
Reference category: if the model uses natural logarithm of FDI								
If the model uses relative figures of FDI	0.22 (9.16)	0.22 (2.45)			0.14 (6.48)	0.14 (7.6)		
If the model that uses levels of FDI	-0.30 (-2.03)	-0.30 (-3.36)						
Reference category: if the model is estimated using other techniques								
If the estimate belongs to a model that is	1.10 (16.24)	1.10 (6.08)					-0.07 (-4.99)	-0.07 (-2.56)

estimated using OLS techniques								
If the estimate belongs to a model that is estimated using panel data techniques	1.01 (10.44)	1.00 (3.30)						
If the estimate belongs to a model that is estimated using instrumental variable techniques	0.71 (8.45)	0.71 (3.57)						
If the estimate belongs to a model that is estimated using time series techniques	1.19 (18.11)	1.19 (6.80)						
Reference category: if the estimate is from an unpublished study								
If the estimate is from a study published in a journal			-0.85 (-4.20)	-0.85 (-12.86)				
Reference category: if the model uses regional level FDI								
If the model uses economy level fdi	2.70 (11.78)	2.70 (8.49)						
Reference category: if the estimate is taken from a model that includes education related variable								
If the estimate is taken from a model that includes population	0.40 (2.55)	0.40 (2.73)						

related variable								
If the estimate is taken from a model that includes domestic investment related variable	0.14 (4.15)	0.14 (0.72)						
Reference category: if the model uses FDI and growth data on multiple countries								
If the model uses FDI and growth data on single country	-0.45 (-2.63)	-0.45 (-2.40)						
Reference category: if the model is estimated using cross sectional data								
If the estimate belongs to a model that is estimated from panel data								
If the estimate belongs to a model that is estimated from time series data	1.16 (4.51)	1.16 (2.72)					0.76 (16.82)	0.76 (9.54)
Reference category: if the model has used aggregate FDI								
If the estimate belongs to a model that has used Greenfield form of FDI	-0.22 (-2.96)	-0.22 (-2.65)	-0.28 (-1.83)	-0.28 (-155.54)				
If the estimate belongs to a model that has used Merger and	-0.23 (-2.41)	-0.23 (-2.74)	-0.27 (-1.83)	-0.27 (-150.14)				

Acquisition form of FDI								
Author related factors								
Reference category: if the first author of the study comes from other universities								
If the first author of the study comes from an American University	-1.94 (-5.69)	-1.94 (-3.83)						
If the first author of the study comes from an European University	-2.52 (-6.76)	-2.52 (-3.75)	-0.14 (-24.05)	-0.14 (-54.36)				
If the first author of the study comes from an South or East Asian University	-0.34 (-2.03)	-0.34 (-1.35)					-0.42 (-16.28)	-0.42 (-35.41)
Journal related factors								
Reference category: estimate is taken from a journal that belongs to Policy discipline								
If the estimate is taken from a journal that belongs to Economic and Finance discipline	0.29 (8.26)	0.29 (1.51)						
If the estimate is taken from a journal that belongs to Business Management and Accounting discipline	-0.57 (-3.32)	-0.57 (-1.63)						
If the estimate is taken from a	-0.15 (-3.96)	-0.15 (-0.75)						

journal that belongs to Development discipline								
Real world factors								
Reference category: if the estimate belongs to a model that has not included China in its list of sample countries								
If the estimate belongs to a model which includes China in the list of sample countries	0.05 (4.85)	0.05 (0.92)					-0.20 (-3.37)	-0.20 (-4.70)
Reference category: if the estimate belongs to a model that has not included South Korea in its list of sample countries								
If the estimate belongs to a model which includes South Korea in the list of sample countries	-0.18 (-11.79)	-0.18 (-3.99)			0.14 (8.68)	0.14 (3495.42)	-0.24 (-12.41)	-0.24 (-15.75)
Reference category: if the estimate belongs to mixed countries								
If the estimate belongs to East Asia	-2.04 (-12.92)	-2.04 (-6.97)						
If the estimate belongs to South East Asia	-2.20 (-10.35)	-2.20 (-4.55)	-0.27 (-16.76)	-0.27 (-75.14)				
If the estimate belongs to South Asia	-1.93 (-7.45)	-1.93 (-3.20)	0.09 (11.91)	0.09 (50.37)				
No. of observations	571	571	17	17	77	77	23	23
Adjusted R2	0.98	0.98	0.88	0.9	0.98	0.98	0.46	0.51

Note: Only statistically significant variables are shown here. Values in parenthesis show t-values. See appendix 5 for full descriptive statistics of moderator variables included in multiple meta-regression.

In terms of study related factors, published studies, type of FDI, data types, estimation techniques matter for the reported results. As shown by other meta-regression studies, estimation techniques matter. Models estimated using OLS, panel data, time series and instrumental variable techniques reported higher effects in case of model with all estimates compared to those estimated using other techniques. In case of South East Asia, models estimated by OLS have reported lower effects of FDI on growth. As expected, I find that reported results differ among studies based on how researchers measure FDI and growth. For instance, relative figures of FDI and growth report higher effects in models with all estimates and East Asia estimates compared to these variables expressed in terms of natural logarithms. Those using relative figures of growth reported lower effects in all estimates model and higher effects in case of endogeneity model. Studies using levels of FDI have reported lower effects on growth.

As identified by earlier literature, growth effects of FDI vary based on the purpose of FDI. For instance, FDI for Greenfield and Mergers and Acquisitions report lower effects compared to studies using aggregate FDI. One possible reason for this could be because Greenfield and Merger and Acquisition form of FDI do not capture the complete effect on growth. The magnitude of effect also differed among studies based on real world factors. In case of all estimates model, while studies including South Korea have reported lower effects, those including China have reported higher effects. These results suggest that, in spite of an increase in FDI flows into these regions, FDI in general has mixed effects on growth.

Author and journal related factors have shown noticeable effects on reported results. First, my intuition that the variation in the empirical estimates can partially be explained by the first author from different regions or universities is correct. American and European authors have reported lower effects as compared to other authors. Possibly these authors value FDI to be less important for growth. Journals from Business Management and Development discipline report lower effects of FDI on economic growth. Those from Economics and Finance disciplines report higher effects. This could be because Economics and Finance disciplines capture the actual affect due to differences in the econometric techniques they use. The notion that estimated effects vary based on journal ranking and citations did not prove to be right in this study.

Concluding Remarks

Using Meta-regression analysis, this study provided an average effect of inward FDI on economic growth obtained from weighted least squares for 633 estimates from 37 empirical studies for South and East Asia & Pacific countries. Meta-regression analysis is used to summarise and distil lessons from a body of econometric evidence in FDI-growth field. This study started by reviewing literature on FDI-growth systematically and identified possible reasons for variation in the empirical studies.

In case of model with all estimates, contrast to earlier studies on FDI growth (Borensztein, Gregorio and Lee (1998), Hermes and Lensink (2003), Le and Suruga (2005), Vita and Kyaw (2009), Wang and Wong (2011)), the results of this study indicate that FDI has a positive and significant effect. The same positive effect does hold true for estimates controlling for endogeneity and this could mean that FDI does have a genuine positive effect on FDI. FDI has shown a negative effect in the case of East Asia and a positive effect in the case of South East Asia. It is worth noting that the results in the case of East Asia are less reliable as the number of observations are fewer than 30. In case of estimates of South Asia, the research literature has failed to provide evidence of a genuine effect of FDI on growth. In terms of variations in studies, this study has identified many related, real life and journal related aspects that have caused a significant difference to the reported estimates.

Similar to any other meta-analysis studies, the present study has the following four caveats. Firstly, as the present study describes the research record in inward FDI and growth at a point in time, the results obtained cannot be used as a forecasting tool. Future research might consider updating this dataset and comparing the predictions made in this study with the subsequent ones to see if the findings of this study hold over time. Secondly, as the study has no control over primary econometric studies, any possible measurement or reporting error in primary studies is carried over to this study.

Thirdly, since there are a range of studies included in the present study, the issue of study quality and its effect on statistical inference can arise. This study has assigned more weight (based on precision) to estimates with higher quality and vice versa to address this issue (Doucouliagos, et al., 2010; Stanley and Doucouliagos, 2012). At last, data dependency can be seen as one problem in meta-analysis especially when there are multiple estimates reported in each study. This can violate assumptions of equation 1 and 2 which assume that estimates are statistically independent. In order to overcome this problem, clustered data analysis was used for robustness check that reduced the level of standard errors by clustering observations within a study (Doucouliagos et al., 2010).

In terms of research implications, the following three suggestions are made. Firstly, future research can focus more on country specific studies as the effect of FDI on economic growth varies from country to country based on its absorptive capacity. Currently there are very few studies examining FDI-growth relationship at country level (Acharyya (2009), Ahmed (2012), Ang (2009), Baharumshah and Almasaied (2009), Hoang et al., (2010), Quader (2009)). Secondly, it might also be interesting to analyse the reasons for the negative effect of FDI on growth.

Thirdly, Literature so far with the exception of Wang and Wong⁵ (2010) and (Beugelsdijk, et al⁶ (2008) has focused on understanding the effects of aggregate FDI on economic growth. Aggregate FDI does not always help in understanding the heterogeneous growth effects of different modes of FDI. Because cross border mergers and acquisitions involve buying existing entities and Greenfield investments involve starting up a new entity, these two forms of FDI are likely to have different effects on economic growth (Wang and Wong, 2010). Hence, future researchers can study this relationship by differentiating FDI into Greenfield and Brownfield.

Based on the results of this study, the following policy implications are suggested. South East Asian countries should continue to attract FDI as it has proved to have growth enhancing effects. A favourable economic environment that helps to reap the benefits of FDI for growth is suggested for East Asian countries. As these countries already have FDI policies in place, it is worth focusing on appropriate policy enforcement so as to realise the positive effect of FDI on economic growth.

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⁵ Wang and Wong (2010) differentiate inward FDI as Greenfield and mergers and acquisitions

⁶ Beugelsdijk, Smeets and Zwinkels (2008) differentiate US FDI as vertical and horizontal FDI

Appendix

1. Foreign direct investment, net inflows (% of GDP) and GDP per capita growth (annual %) for South and East Asia & Pacific countries from 1980 – 2012

S No	Country Name	Foreign direct investment, net inflows (% of GDP) Total 1980 - 2012	GDP per capita growth (annual %) Total 1980 - 2012
1	Afghanistan	19.44419326	51.79618818
2	Bangladesh	10.73793938	83.64950207
3	Bhutan	11.77360721	185.8861903
4	India	23.14934215	137.0493466
5	Maldives	104.9397353	92.64983969
6	Nepal	3.437867088	63.44560173
7	Pakistan	31.76716453	76.13858073
8	Srilanka	35.35383478	122.0381579
9	Cambodia	102.8831484	100.3651837
10	China	88.37563769	290.4240831
11	Fiji	124.1558657	29.31332501
12	Indonesia	23.54549626	123.9951353
13	Kiribati	26.53998207	-60.62413252
14	North Korea	0	0
15	Lao PDR	71.44000787	105.59484
16	Malaysia	129.8912812	118.9182412
17	Palau	103.4352979	-13.346027
18	Papua New Guinea	92.75981917	18.48078628
19	Phillippines	39.63774466	32.57815305
20	Samoa	53.13671039	47.67167517
21	Solomon Islands	121.6002	17.4355877
22	Thailand	76.62320399	139.3261377
23	Timor Leste	25.15579257	36.32144373
24	Tuvalu	207.2438055	37.871193
25	Tonga	34.03938971	52.64713537
26	Vanuatu	251.6043381	24.27734224
27	Vietnam	136.4825187	137.8556875
28	South Korea	16.37862953	164.9093698

Source: World Bank (2013) [The above figures are calculated based on the available data on World Bank website. There are data gaps for most of the countries [for few years from 1980 – 2012. In case of North Korea, figures are unavailable on World Bank Database]

2. Search keywords used in FDI and growth meta-regression analysis

Keywords for inward FDI: FDI or Foreign direct investment or offshore investment or cross boarder investment or investment abroad or overseas investment or foreign assets or Greenfield investment or foreign investment or foreign ventures or foreign reinvestment or foreign assets or non-local investments or international investment or outside investment or non-native investment or remote investment or non-domestic investment or non-resident investment or distant investment or investment or invest or inflows or direct investment or investment in other countries.

Keywords for economic growth: Economic growth or development or economic performance or investment or labour productivity or capital or innovation or labour market participation or progress or expansion or increase or improvement or advance.

Keywords for South and East Asia & Pacific countries: Emerging economies or East Asian economies or South east Asian economies or East Asia or South Asia or South east Asia or Afghanistan or Bangladesh or Bhutan or India or Maldives or Nepal or Pakistan or Sri Lanka or American Samoa or Cambodia or China or Fiji or Indonesia or Kiribati or Korea, Dem. Rep. or Lao PDR or Malaysia or Marshall Islands or Micronesia, Fed. Sts or Mongolia or Myanmar or Palau or Papua New Guinea or Philippines or Samoa or Solomon Islands or Thailand or Timor-Leste or Tuvalu or Tonga or Vanuatu or Vietnam or Asian or Developing economies or Developing countries.

3. PIOS framework used in FDI and growth meta-regression analysis

Population – The study should focus on South and East Asia Pacific economies or equivalent as specified in the search criteria.

Independent variable - The study should be examining the impact of inward FDI or its equivalent as specified in the search criteria.

Outcome variable - The study should be examining economic growth or as defined in the search criteria.

Study design - Study design can be either theoretical or empirical. A study is considered to be theoretical if it is based on some theoretical model drawing verbal or mathematical conclusions analysing impact of economic governance on inward FDI. A study is considered to be empirical if it is based on regression model and draws an estimation model to estimate inward FDI on economic growth.

4. Number of studies satisfying PIOS criteria in FDI and growth meta-regression analysis

Criteria	Number of studies satisfying the criteria
Population (South and East Asia & Pacific countries)	245
Independent variable (Inward foreign direct investments)	183
Outcome variable (Economic growth)	79
Study design – Empirical	262
Decision Select if all 4 criteria match - PIOS	
Select for next stage	32
Deselect studies	387

5. Descriptive statistics of moderator variables included in FDI and growth meta-regression analysis

Moderator variable	Definition	Mean	Standard deviation
Paper 1	=1 if the estimate is from a study published in a journal; = 0 otherwise	0.678	0.47
Paper 2	=1 if the estimate is from a working paper; = 0 otherwise	0.317	0.47
Paper 3	=1 if the estimate is from a discussion paper; = 0 otherwise	0.007	0.08
Single	=1 if the model uses FDI and growth data on single country; = 0 otherwise	0.060	0.24
Multi	=1 if the estimate uses FDI and growth data from multiple countries; = 0 otherwise	0.940	0.24
Year1	=1 if the estimate belongs to a model that uses yearly data on FDI; = 0 otherwise	0.415	0.49
Year2	=1 if the estimate belongs to a model that uses non-yearly data on FDI; = 0 otherwise	0.585	0.49
Obs1	=1 if the estimate belongs to a model where observations are reported; = 0 otherwise	0.921	0.27
Obs2	=1 if the estimate belongs to a model where observations are not reported; = 0 otherwise	0.079	0.27
Fdi1	=1 if the estimate belongs to a model that uses relative figures of FDI; = 0 otherwise	0.170	0.38
Fdi2	=1 if the estimate belongs to a model that uses levels of FDI; = 0 otherwise	0.129	0.34
Fdi3	=1 if the estimate belongs to a model that uses natural logarithm of FDI; = 0 otherwise	0.356	0.48
Method1	=1 if the estimate belongs to a model that is estimated using OLS techniques; = 0 otherwise	0.377	0.48
Method2	=1 if the estimate belongs to a model that is estimated using panel data techniques; = 0 otherwise	0.188	0.39
Method3	=1 if the estimate belongs to a model that is estimated using instrumental variable techniques; = 0 otherwise	0.309	0.46
Method4	=1 if the estimate belongs to a model that is estimated using time series techniques; = 0 otherwise	0.048	0.21
Method5	=1 if the estimate belongs to a model that is estimated using other techniques; = 0 otherwise	0.079	0.27
Growth1	=1 if the estimate belongs to a model that uses relative figures of growth; = 0 otherwise	0.212	0.41
Growth2	=1 if the estimate belongs to a model that uses levels of growth; = 0 otherwise	0.004	0.06
Growth3	=1 if the estimate belongs to a model that uses natural logarithm of growth; = 0 otherwise	0.804	0.50
Data1	=1 if the estimate belongs to a model that is estimated from panel data; = 0 otherwise	0.491	0.50
Data2	=1 if the estimate belongs to a model that is estimated from time series data; = 0 otherwise	0.039	0.19

Data3	=1 if the estimate belongs to a model that is estimated from cross section data; = 0 otherwise	0.470	0.50
Country1	=1 if the estimate belongs to East Asia; = 0 otherwise	0.023	0.15
Country2	=1 if the estimate belongs to South East Asia; = 0 otherwise	0.113	0.32
Country3	=1 if the estimate belongs to South Asia; = 0 otherwise	0.031	0.17
Country4	=1 if the estimate belongs to Mixed countries; = 0 otherwise	0.834	0.37
China1	=1 if the estimate belongs to a model which includes China in the list of sample countries; = 0 otherwise	0.492	0.50
China2	=1 if the estimate belongs to a model which excludes China from the list of sample countries; = 0 otherwise	0.580	0.50
Skorea1	=1 if the estimate belongs to a model which includes South Korea in the list of sample countries; = 0 otherwise	0.594	0.49
Skorea2	=1 if the estimate belongs to a model which excludes South Korea from the list of sample countries; = 0 otherwise	0.406	0.49
Fdtype1	=1 if the estimate belongs to a model that has used Greenfield form of FDI; = 0 otherwise	0.036	0.19
Fdtype2	=1 if the estimate belongs to a model that has used Merger and Acquisition form of FDI; = 0 otherwise	0.036	0.19
Fdtype3	=1 if the estimate belongs to a model that has used aggregate FDI; = 0 otherwise	0.928	0.26
Lauthor1	=1 if the estimate belongs to a study where the first author comes from American University; = 0 otherwise	0.578	0.50
Lauthor2	=1 if the estimate belongs to a study where the first author comes from European University; = 0 otherwise	0.244	0.43
Lauthor3	=1 if the estimate belongs to a study where the first author comes from South East Asian University; = 0 otherwise	0.067	0.25
Lauthor4	=1 if the estimate belongs to a study where the first author comes from other University; = 0 otherwise	0.112	0.32
Journal1	=1 if the estimate is taken from a journal that belongs to Economic and Finance discipline; = 0 otherwise	0.891	0.31
Journal2	=1 if the estimate is taken from a journal that belongs to Business Management and Accounting discipline; = 0 otherwise	0.019	0.14
Journal3	=1 if the estimate is taken from a journal that belongs to Policy discipline; = 0 otherwise	0.057	0.23
Journal5	=1 if the estimate is taken from a journal that belongs to Development discipline; = 0 otherwise	0.033	0.18
Omitted1	= 1 if the estimate is taken from a model that includes population related variable; = 0 otherwise	0.365	0.48
Omitted2	= 1 if the estimate is taken from a model that includes domestic investment related variable; = 0 otherwise	0.605	0.49

Omitted3	= 1 if the estimate is taken from a model that includes education related variable; = 0 otherwise	0.860	0.35
Uni1	=1 if the estimate belongs to a study where the first author of the study belongs to IVY universities; = 0 otherwise	0.205	0.40
Uni3	=1 if the first author of the study belongs to other universities; = 0 otherwise	0.795	0.40
Abs10a1	=1 if the ABS 2010 ranking of the journal is 1*; = 0 otherwise	0.020	0.14
Abs10a2	=1 if the ABS 2010 ranking of the journal is 2*; = 0 otherwise	0.372	0.48
Abs10a3	=1 if the ABS 2010 ranking of the journal is 3*; = 0 otherwise	0.584	0.49
Abs10a4	=1 if the ABS 2010 ranking of the journal is 4*; = 0 otherwise	0.025	0.16

6. Summaries of empirical studies included in FDI and growth meta-regression analysis

Study and year	Time period	Countries	Dependent variable	Independent variable	Findings	Techniques
Alguacil, Cuadros and Orts (2011)	1976 - 2005	26 developing countries	Real GDP per capita growth	Gross fixed capital as a ratio of FDI	Statistically significant and positive	
Anwar and Cooray (2012)	1970 - 2009	8 South Asian countries			Statistically significant and positive	GMM and fixed effects
Ahmad and Hamdani (2003)	1965 - 1992	32 developing countries	Real GDP in constant US \$ prices (Penworld (1995))	FDI (International Monetary Fund (1994))	Positive and statistically significant effect	Common intercept, random effects and fixed effects
Alfaro (2003)	1981 - 1999	47 countries	Average real annual per capita growth rate (World development indicators (2001))	Sectoral FDI as a percentage of GDP (OECD's International Direct Investment Statistics Yearbook (2001)) and UNCTAD's	Positive but insignificant effect	OLS

				World Investment Directory (7 – Volume series 1992 – 2000)		
Alfaro, Chanda, Kalemli-Ozcan and Sayek (2004)	1975 - 1995	71 countries	Growth rate of real per capita GDP in constant dollars (World Development Indicators (World Bank, 2000))	FDI inflows (IMF International Financial Statistics)	FDI has positive and statistically insignificant effect on growth.	OLS
Alfaro, Kalemli-Ozcan and Sayek (2009)	1975 - 1995	72 countries	Average growth rate of real GDP per capita (World Development Indicators (World Bank, 2000))	Net FDI inflows (IMF International Statistics)	Negative and statistically insignificant effect	OLS
Azman-Saini, Baharumshah and Law (2010)	1976 - 2004	85 countries	Per capita real GDP (chain weighted) (Penn World Table (PWT))	FDI inflows as percentage of GDP (World Bank)	FDI has no effect on growth	Generalised method of moments
Baharumshah and Thanoo n (2006)	1982 - 2001	8 Asian countries	Gross domestic product (Developing Asian and Pacific countries, 2003, Vol. XXXI, Oxford University	Foreign direct investment (Developing Asian and Pacific countries, 2003, Vol. XXXI, Oxford University	Positive and statistically significant effect	Dynamic generalised least squares

			Press, New York)	Press, New York)		
Balasubramanyam, Salisu and Sapsford (1996)	1970 - 1985	46 developing countries	Gross domestic product in real terms (Summers and Heston (1988))	Stock of foreign capital (Various editions of Transnational Corporations in World Development)	Positive and statistically significant effect in case of EP countries. Insignificant effect in case of IS countries (both positive and negative).	OLS, generalised instrumental variable estimator
Basu and Guariglia (2003)	119 developing countries	1970 - 1999	Growth of real per capita GDP (World Development Indicators (2000))	Net inflows of FDI as a percentage of GDP (World Development Indicators (2000))	Positive and highly significant	Fixed effects and system GMM
Beugelsdijk, Smeets and Zwinkels (2008)	44 countries	1983 - 2003	GDP per capita growth (%) (World Development Indicators)	Total US FDI stock as a % of GDP (UNCTAD); Horizontal and Vertical FDI	Mixed effects with respect to developed and developing countries	Two stage least squares model
Borensztein, Gregorio and Lee (1998)	69 developing countries	1970 - 1989	Average annual rate of per capita real GDP growth over each decade (Summers and Heston (release 5.5 of June 1993))	Net inflows of FDI (OECD)	Negative and statistically significant effect	Three stage least squares

Busse and Groizard (2008)	84 developing countries	1984 - 2003	Real growth of GDP per capita in per cent (World Bank (2006b)); GDP per capita in international US\$ (PPP) (World Bank (2006b))	FDI, net inflows in per cent of GDP (UNCTAD (2007))	Positive and statistically significant effect	System GMM
Carkovic and Levine (2002)	72 countries	1960 - 1995	Real per capita gross domestic product growth	Gross FDI inflows as a share of GDP. Average seven year period FDI (world Bank dataset (Kreey et al. 1999) and IMF)	Positive but insignificant effect	OLS, GMM
Durham (2004)	80 countries	1979 - 1998	Real per capita GDP (World Development Indicators 2000, The World Bank (2000))	FDI (OECD) and (IFS)	Negative and statistically insignificant result with OECD data, Positive and statically significant results with IFS data	OLS
Economidou, Lei and Netz (2006)	47 developing countries	1970 - 1989	Rate of GDP per capita growth	FDI (International Monetary Fund (2002) International	Positive and statistically significant effect	Fixed effects

			(Penn World Table 5.6 dataset)	Financial Statistics	insignificant effect	
Freckleton, Wright and Craigwell (2012)	42 developing and 28 developed countries	1998 - 2008	Per capita GDP	FDI as a percentage of GDP	Positive and statistically significant effect	Dynamic OLS
Fry (1996)	1972 - 1992	Six Pacific basin countries	Rate of growth in GNP (constant prices, continuously compounded)	Inflow of foreign direct investment/GNP (dollar values converted to domestic currency, current prices)	Negative and statistically insignificant effect	Three stage least squares
Hermes and Lensink (2003)	1970 - 1995	67 less developed countries	Per capita growth rate (World Bank 1997 data available on CD ROM)	Gross FDI inflows as a percentage of GDP (World Bank 1997 data available on CD ROM)	Negative and significant effect	Fixed effects and random effects
Herzer (2012)	1970 - 2005	44 developing countries	Real GDP (World Development Indicators (2007))	FDI as a percentage of GDP (UNCTAD)	Negative effect on growth	Dynamic OLS
Hsiao and Shen (2003)	1976 - 1997	23 developing countries	Real GDP (World Development Indicator CD ROM (2000))	Real FDI (World Development Indicator CD ROM (2000))	Positive and statistically significant	Vector auto regression
Kotrajas (2010)	1990 - 2009	15 East Asian countries	GDP in million USD (UNCTAD and IMF)	FDI in million USD (UNCTAD and IMF)	Positive and statistically significant effect in	Polled regression analysis, Fixed effects model

					case of high income and middle income countries only	
Kottaridi and Stengos (2010)	1970 - 2004	25 OECD countries and 20 non-OECD countries	Growth rate of income per capita (World Bank)	FDI inflows (UNCTAD)	Positive and insignificant for entire sample. Positive and significant for non OECD countries and middle income countries.	System GMM
Le and Suruga (2005)	1970 - 2001	105 developed and developing countries	Five year moving average of per capita GDP growth (World development indicators, 2003 CD ROM)	FDI inflows (World development indicators, 2003 CD ROM)	Developing countries – positive and significant Developed countries – negative and significant	OLS
Lee, Lee and Kim (2011)	1989 - 2008	122 countries (22 developed)	Gross domestic product and per capita GDP (World Bank dataset)	Stock of FDI inflows (OECD and UNCATD)	Positive and significant in case of all sample and less developed countries only.	IV technique
Lensick and Morriss	1975 - 1997	87 countries (20 are developed)	Average real per capita growth rate	Average gross foreign direct investment	Positive and statistically	OLS

ey (2006)			(Easterly and Yu (1999))	over GDP ratio (World Bank (1999))	y significant	
Li and Liu (2005)	1970 - 1999	84 countries (21 developed and 63 developing countries)	Real GDP per capita growth (World Bank)	Ratio of FDI inflows to GDP (World Investment Directory published by United Nations and missing data from World Investment Report)	Positive and statistically significant effect	Single equation and simultaneous equation model
Makki and Somwaru (2004)	1971 - 2000	66 countries	Mean values of per capita growth rate in each decade (World development Indicators published by World Bank and International Monetary Fund)	FDI (World development Indicators published by World Bank and International Monetary Fund)	Positive and significant under one model and insignificant under other models	Seemingly unrelated regression (SUR) and three stage least squares
Sylwester (2005)	1970 - 1989	29 less developed countries	Growth rate of income per capita (Barro and Lee (1994))	Average Net inflows of FDI as a percentage of GDP (World Bank)	Positive and statistically significant effect	OLS and SUR
Thangavelu, Yong and Chongvilaivan (2009)	1988 - 2007	10 South – East Asian and East Asian countries	Real GDP growth rate (Asian development bank database)	FDI inflows (UNCTAD)	Positive and statistically significant effect	OLS, Fixed effects and Random effects

Vita and Kyaw (2009)	1985 - 2002	126 developing countries	Growth rate of real per capita GDP based on purchasing power parity (World Bank's World development indicators (2004))	Net inflows of FDI as a percentage of GDP (World Bank's World development indicators (2004))	Negative and significant effect in case of low income countries; positive and significant effect in case of lower middle and upper middle income countries	System GMM
Wang and Wong (2010)	84 countries	1987 - 2001	Log difference of per capita real GDP (World Bank's World Development Indicators)	Gross FDI inflows as a share of host country's GDP (World Bank's World Development Indicators)	Greenfield has positive and significant ; Merger and acquisition has negative and significant	Fixed effects, random effects, instrumental variable techniques
Wang and Wong (2011)	69 countries	1970 – 1989	Per capita real GDP growth (Borensztein, E., De Gregorio, J., & Lee, J. W. (1998))	FDI inflows as a share of GDP (Borensztein, E., De Gregorio, J., & Lee, J. W. (1998))	Negative and statistically significant . Effect is positive and statistically significant when interacted with schooling.	SUR
Baharumshah and Almans	1 country (Malaysia)	1974 - 2004	Real GDP per capita growth rate	FDI inflows as a ratio of GDP	Positive and statistically significant	OLS

aided (2009)			(International Financial Statistics database for International Monetary Fund)	(International Financial Statistics database for International Monetary Fund)	significant effect	
Acharya (2009)	1 country (India)	1980 - 2003	GDP growth in Millions US \$ (World development indicator (2007))	Total FDI in Million US \$ (World development indicator (2007))	Positive and statistically significant	
Ahmed (2012)	1 country (Malaysia)	1999 – 2008 Quarterly	Quarterly real GDP (Department of Statistics of Malaysia)	Real FDI inflows (Department of Statistics of Malaysia)	Positive and statistically significant	OLS
Ang (2009)	1 country (Thailand)	1970 – 2004 annual	Per capita real GDP (World Bank's World Development Statistics)	FDI inflows	Positive and statistically significant effect	IV method
Chen, Chang and Zhang (1995)	1 country (China)	1968 - 1990	GNP	Lagged FDI (China Statistical Yearbook, 1991)	Positive and significant	Multiple regression model
Choong, Yusop and Soo (2005)	1 country (Malaysia)	1970 - 2001	Growth rate of real GDP (World Bank's World Development Indicator 2003 CD ROM)	FDI to GDP ratio (World Bank's World Development Indicator 2003 CD ROM)	Negative and statistically significant effect	Unrestricted error correction model

Hoang, Wiboonchutikula and Tubtintong (2010)	1 country (Vietnam)	1995 - 2006	Growth rate of GDP (Statistical Yearbook of Vietnam)	FDI to GDP ratio (Statistical Yearbook of Vietnam)	Positive and statistically significant	Panel least squares
Quader (2009)	1 country (Bangladesh)	1990 - 2006	GDP (Statistics department of the central bank of Bangladesh, World Bank and UNCTAD)	FDI as percentage of GDP – 2 year lagged (Statistics department of the central bank of Bangladesh, World Bank and UNCTAD)	Positive and significant	OLS
Yu and JingMei (2009)	1 country (China)	1991 - 2007	Annual growth rate of regional GDP of Chinese provinces (Annual China Statistical Yearbook from 1992 – 2008)	(provincial FDI/Total FDI) as a ratio of (Provincial GDP/Total GDP) (Annual China Statistical Yearbook from 1992 – 2008)	Positive and statistically significant	OLS

7. Overview of FDI and growth meta-regression analysis

Field	Search engines used	Types of studies included	Effect size	Number of studies (estimates)	Countries	Aim of the study
Inward FDI and economic growth	Google, Web of Knowledge	English language studies – published and unpublished	Partial correlation	37 (633)	South and East Asia & Pacific countries as defined by world bank + South Korea	Parameter estimate and heterogeneity

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