Institute for International Integration Studies

IIIS Discussion Paper

No.179/September 2006

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Xuan-Vinh Vo
School of Economics
Faculty of Commerce and Economics
University of New South Wales,
Sydney NSW Australia

Jonathan A. Batten,
Graduate School of Management,
Macquarie University, Sydney,
Hong Kong University of Science & Technology
Clear Water Bay, Kowloon, Hong Kong

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Xuan-Vinh Vo (a) and Jonathan A. Batten (b), (c)

(a) School of Economics
Faculty of Commerce and Economics
University of New South Wales,
Sydney NSW Australia
x.vo@fce.unsw.edu.au

(b) Graduate School of Management
Macquarie University
CBD Campus Level 6, 51-57 Pitt St
Sydney, NSW 2000, Australia
Fax: ++61-2-8274-8370

(c) Department of Finance
Hong Kong University of Science & Technology
Clear Water Bay, Kowloon, Hong Kong
Tel: ++852-2358 8202
Fax: ++852- 2358 1749
Email: jabatten@gmail.com

JEL Classification: F3, F4, F16
Keywords: foreign direct investment, economic growth, panel data, social policy

Abstract
Employing a panel data modelling technique, we provide the answers to two critical research questions: what is the linkage between FDI and economic growth and does this relationship change under different legal, institutional, educational and economic conditions? Overall the analysis supports the view that FDI has a stronger positive impact on economic growth in countries with a higher level of education attainment, openness to international trade and stock market development, and a lower rate of population growth and lower level of risk. Thus countries undertaking reform of cross-border capital restrictions and controls and other policy aimed at encouraging domestic and foreign investment need to incorporate broader social policy objectives –such as education, legal and institutional reform- to maximise the benefits from FDI.

Acknowledgements
This paper was presented at the 2006 Academy of International Business Conference, Beijing, China and the 2006 Asian Finance Conference, Auckland NZ. The authors wish to thank the four anonymous referees and conference participants, which have helped improve the clarity and brevity of the paper.

1. Introduction

Worldwide, the development of financial markets, improvements in technology and information transmission has ensured an increased degree of international financial integration. To capture many of the economic benefits arising from these processes, many countries - especially developing countries – are undertaking reform agendas designed to improve the efficiency and scope of their domestic financial systems and remove structural impediments that may impede cross-border capital flows. As the reform agenda has progressed there has been a surge in the flows of both foreign direct investment (FDI) and portfolio investment, with FDI now accounting for more than 60 percent of private capital flows in recent years (Alfaro et al. 2004; Carkovic and Levine 2002).

While some policy makers remain circumspect about the long term benefits arising from inward (or inbound) portfolio investment, often citing the dangers to domestic financial system stability arising from its speculative component, there is a general consensus that FDI, by virtue of its longer term nature, has a more favourable economic impact. Academic investigation of the economic impacts from FDI flows, which have arisen from the higher levels of economic integration achieved in recent times, generally supports the view of positive economic benefits, usually in the form of higher levels of growth. Nonetheless, Gao (2005) notes that while increased economic integration has given rise to FDI with host countries benefiting from increases in living standards, one should still remain cautious of the often-observed positive correlation between inward FDI and subsequent increases in economic

growth since this does not necessarily imply a causal relationship. However, if this relation is not so clear then policy in support of FDI strategies may not necessarily achieve desired social and economic outcomes. Mullen and Martin (2005) also make this point when questioning the efficacy of regional development strategies focused on attracting foreign investment, although their analysis of U.S. state-led FDI does highlight its importance in stimulating regions within well-integrated, developed economies.

The objective of this study is to once again revisit the link between growth and FDI, but to do so using a panel data set of 79 countries over a longer period than many studies in this area (1980 to 2003). Overall, this study makes three main contributions: Firstly, this approach and data set enables the extension of recent published studies in FDI that also employ panel techniques, such as Schneider (2005) and Li and Liu (2005), through the examination of an extensive array of FDI indicators. Specially, the gross stock of FDI assets and liabilities, stock of FDI liabilities, gross flows of FDI assets and liabilities and inflows of FDI (as a share of GDP) is examined. The need for adopting both stock and flow measures is that stock measures do not fluctuate over the short-run and they accommodate variation in flows over the long run.

Secondly, while economic theories and some previous empirical evidence suggest that FDI will only have a positive growth effect under particular institutional and policy regimes, we examine an extensive array of interaction terms to determine those key economic, financial, institutional, and policy conditions under which FDI boosts growth. Specifically, we examine whether FDI has stronger (and positive) impacts on

economic growth when countries have: higher levels of real per capita GDP; higher levels of educational attainment; lower population growth rates; larger government size; higher levels of international trade; lower inflation; higher levels of bank and stock market development and lower country risk.

Thirdly, the use of newly developed panel techniques controls for simultaneity bias. This is induced by the standard practice of including lagged dependent variables in growth regressions and the omission of country-specific factors. Since each of these econometric biases is a serious concern in the assessment of the FDI – economic growth nexus, applying panel techniques enhances the level of statistical confidence possible with the empirical results. Furthermore, the panel approach allows the exploitation of the time-series dimension of the data instead of utilizing purely cross-sectional estimators.

The remainder of the paper is organized as follows. Section two reviews the literature on the impact of FDI on economic growth and introduces the theoretical framework. Section three develops the model assessing the impacts of FDI on economic growth, describes the econometric methodology and the data. Section four reports the empirical results. The final section, five, allows for some concluding comments.

2. Linking FDI and Economic Growth

2.1 Background

Theoretically, FDI has been shown to boost economic growth through technology transfer and diffusion (Dimelis, 2005; Schneider, 2005), spillover effects, productivity gains, and the introduction of new processes, managerial skills and know-how in the host countries (Girma, 2005; Li and Liu, 2005). In addition, FDI can create an

international network that can help domestic products move across borders. Also, a number of studies including those by Barro and Sala-i-Martin (1995), Grossman and Helpman (1991), Hermes and Lensink (2003), suggest that FDI plays an important role in modernizing the economy and promoting economic growth in host countries, especially developing countries.

Nonetheless the available empirical evidence suggests a more complex set of interactions between FDI and observable economic factors. Many country studies, which deal with the productivity effects of FDI spillovers on firms, or plants using micro level data, provide positive results on the role of FDI with respect to stimulating economic growth. Positive effects from FDI spillovers have been found for example, in Mexico (Blomstrom and Persson 1983; Blomstrom and Wolff 1994; Kokko 1994) and Uruguay (Kokko et al. 1996). Other research by Hejazi and Safarian (1999), for a number of countries, demonstrates that spillover effects increase significantly with the inclusion of FDI in the standard model, thereby explaining the link to total factor productivity and hence, economic growth. While Dollar and Kraay (2004) are aware of the shortcomings of the cross-sectional approach, they still find evidence to support a positive relationship between an increase in trade flows and FDI and higher growth rates. Others, such as Lübker, Smith and Weeks (2002) remain unconvinced about the validity of many of these results due to the construction of data as well as their theoretical basis.

On the other hand, some authors find that there is no trace of spillover effects in some country studies, or if effects are present the economic effect is minimal. For example, while Blomstrom (1986) finds that Mexican sectors with a higher degree of foreign

ownership exhibit faster productivity growth, their study - and similar studies - suffer from a critical identification problem: if foreign investment gravitates toward more productive industries, the observed positive correlation will overstate the positive impact of FDI on growth. Aitken and Harrison's (1999) study of plant level data for Venezuela solves this problem and consequently finds no evidence of a positive technology spillover. This result was consistent with Haddad and Harrison's (1993) study utilising panel data for Morocco, which also concludes that the net effect of FDI on productivity is small. In the case of Aitken and Harrison's (1999) study they find that FDI raises productivity within plants that receive the investment, but lowers that of domestically owned plants; a finding that contradicts spillover theory.

Several empirical studies indicate that the growth effect of FDI is strongly dependent on the institutional circumstances of the host or receiving countries (Hermes and Lensink 2003). While others find that FDI inflow is positively associated with economic growth only when countries have previously achieved a certain level of wealth (Blomstrom et al., 1994), education (Borenzstein et al. 1998), or financial development (Alfaro et al. 2004; Hermes and Lensink 2003). On the other hand, Carkovic and Levine (2002) find that these results are not robust when controlling for simultaneity bias, while Townsend (2003) confirms this result using data for less developed countries. Overall, the diversity of these findings highlights the difficulty in making generalised comments on the FDI-growth nexus based on simple correlation based analysis.

2.2 A Simple Theoretical Framework

Begin by considering the relationship between FDI and economic performance through interactions with domestic investment and wider spillover effects, and where

the domestic economy has technical progress as a result of 'capital deepening' in the form of an increase in the number of varieties of capital goods available, as suggested by Romer (1990), Grossman and Helpman (1991), Barro and Sala-i-Martin (1995) Borenzstein *et al* (1998), Berthelemy and Demurger (2000) and Agenor (2003).

Thus, in the spirit of these studies suppose that the economy produces a single consumption good according to the following technology relation:

$$Y_t = AH_t^{\alpha} K_t^{1-\alpha} \qquad \mathbf{1}$$

where A represents the exogenous state of the 'environment', H represents human capital, and K represents physical capital. The state of the environment in A comprises various control and policy variables influencing the level of productivity in the economy. Assume that human capital H is a given endowment, while physical capital consists of an aggregate of different varieties of capital goods. Hence, allow capital accumulation to take place through the expansion of a number of different varieties of capital goods, each one denoted by *x(j)* as in Ethier (1982) , such that at each instant in time, the stock of domestic capital is given by:

$$K = \left\{ \int_0^N x(j)^{1-\alpha} dj \right\}^{\frac{1}{1-\alpha}} \qquad \mathbf{2}$$

that is, total capital is a composite of a continuum of varieties of capital goods, each one being denoted by *x(j)*, while N is the total number of varieties of capital goods. Assume that there are two types of firms that produce capital goods: domestic and foreign firms that have undertaken a direct investment in the economy. The domestic firms produce n varieties out of the total number N, and the foreign firms produce n^* = N - n varieties, that is:

$$N = n + n^* \qquad \mathbf{3}$$

Also, assume that specialized firms produce each variety of capital good, and rent it out to final goods producers at a rental rate $m(j)$. The optimal demand for each variety of capital good, $x(j)$, is determined by equating the rental rate $m(j)$ and the marginal productivity of the capital good in the production of the final good. This condition is:

$$m(j) = A(1-\alpha)H^{\alpha}x(j)^{-\alpha} \qquad 4$$

Consequently, an increase in the variety of capital requires the adaptation of technology available in more advanced countries to permit the introduction of new types of capital goods. This process of technology adaptation to local needs requires a fixed setup cost, F, before production of the new type of capital can take place and this cost depends negatively on the ratio of the number of foreign firms operating in the host economy to the total number of firms (n^*/N). This assumption is made to capture the idea that foreign firms bring to the developing economy an advance in 'knowledge' applicable to the production of new capital goods that may be already available in other countries. Consequently, FDI is the main channel of technological progress in this framework by making it easier to adopt the technology necessary to provide new types of capital.

In addition, we assume the existence of a 'catch-up' effect in technological progress to reflect the fact that it is cheaper to imitate products already in existence than to create new products at the frontier of innovation. This is implemented by assuming that the setup cost depends positively on the variety of capital produced domestically compared to that produced in the more advanced countries (which we denote by N*). That is, in the countries with lower N/N*, imitation possibilities are larger and thus

the costs of adopting new technology is lower. Thus, we postulate the following functional form for the setup cost:

$$F=F(n^*/N, N/N^*), \text{ where } \frac{\partial F}{\partial (n^*/N)} < 0 \text{ and } \frac{\partial F}{\partial (N/N^*)} > 0 \qquad \mathbf{5}$$

An alternative interpretation of Eq. (5) can be given in terms of 'quality ladders' as in Grossman and Helpman (1991). The increase in the number of varieties could be interpreted as an improvement in the quality of existing goods. If the presence of foreign firms reduces the cost of improving the quality of existing capital goods, it will generate the same negative relationship between FDI and setup costs. Moreover, the catch-up assumption could be reinterpreted as meaning that the cost of improving an existing capital-good is smaller the lower its quality.

In addition to the fixed setup cost, once a capital good is introduced, its owner must spend a constant maintenance cost per period of time. This is similar to the assumption of there being a constant marginal cost of production of $x(j)$ equal to unity, and that capital goods are fully depreciable. Assuming that the interest rate (r) facing the firm is constant[1], then profits for the producer of a new variety of capital j, denoted by $\prod(j)$ are given by:

$$\prod(j)_t = -F(n^*_t / N_t, N_t / N^*) + \int_t^{\infty} [m(j)x(j) - x(j)] e^{-r(s-t)} ds \qquad \mathbf{6}$$

Maximization of (6) subject to (4) produces the following equilibrium level for the production of each capital good $x(j)$:

[1] Campbell and Harvey (2001) show that firms typically apply a constant cost of capital when evaluating capital budgeting decisions

$$x(j) = HA^{1/\alpha}(1-\alpha)^{2/\alpha} \qquad \textbf{7}$$

Note that $x(j)$ is independent of time, that is, at every instant the level of production of each new good is the same. Moreover, the level of production of the different varieties is also the same due to symmetry among producers. Substituting Eq. (7) into the demand function Eq. (4), gives the following expression for the rental rate:

$$m(j) = 1/(1-\alpha) \qquad 8$$

which gives the rental rate as a markup over maintenance costs.

Finally, we assume that there is free entry, and hence, the rate of return r will be such that profits are equal to zero. Solving for the zero profits condition allows:

$$r = A^{1/\alpha}\phi F(n^*/N, N/N^*)^{-1}H \qquad 9$$

where

$$\phi = \alpha(1-\alpha)^{(2-\alpha)/\alpha} > 0$$

To close the model, we need to describe the process of capital accumulation, which is driven by saving decisions. Although, for simplicity, we do not introduce international trade in this model, this is not a closed economy due to the presence of foreign firms. However, with the proportion of foreign firms remaining constant in a steady-state situation, equilibrium conditions are analogous to those prevailing in a closed economy. Thus, suppose that individuals maximize the following standard intertemporal utility function:

$$U_t = \int_t^{\infty} \frac{C_s^{1-\sigma}}{1-\sigma} e^{-\rho(s-t)} ds \qquad \textbf{10}$$

where C denotes units of consumption of the final good Y. Given a rate of return equal to r, the optimal consumption path is given by the standard condition:

$$\frac{\dot{C}_t}{C_t} = \frac{1}{\sigma}(r - \rho) \qquad \textbf{11}$$

It is easy to verify that the rate of growth of consumption must, in steady state equilibrium, be equal to the rate of growth of output, which we denote by g.

Finally, substituting Eq. (9) into Eq. (11), we obtain the following expression for the rate of growth of the economy:

$$g = \frac{1}{\sigma}[A^{1/\alpha}\phi F(n^*/N, N/N^*)^{-1} H^{-\rho}] \qquad \textbf{12}$$

Equation (12) shows that FDI, which is measured by the fraction of products produced by foreign firms in the total number of products (n^*/N), reduces the cost of introducing new varieties of capital goods, thus increasing the rate at which new capital goods are introduced. The cost of introducing new capital goods is also smaller for more backward countries; that is, countries that produce fewer varieties of capital goods than the leading countries - countries with lower N/N^* -enjoy lower costs of adoption of technology, and will tend to grow faster. Furthermore, the effect of FDI on the growth rate of the economy is positively associated with the level of human capital, that is, the higher the level of human capital in the host country, the higher the effect of FDI on the growth rate of the economy.

3 The Estimation Procedure

3.1 Background

In the literature explaining economic growth (for example, see Barro (1991) it is common to model growth within a regression framework. However, theory does not provide a clear guide as to the appropriate set of variables that should be included in

the growth regression equation. Depending on the aim of the study and the insight and belief of the author(s), different explanatory variables have been included in an ad hoc manner and then subsequently found –or not as the case may be- to be statistically significant (Hermes and Lensink 2003). Nonetheless the empirical evidence suggests that few variables have a robust effect on economic growth (King and Levine 1993; Levine and Renelt 1992). The statistical implication of this finding is that it is important to introduce satiability tests for the explanatory variables to ensure robustness of any latter findings (Sala-I-Martin, 1997).

From the above information it is possible to formulate a model that incorporates the following characteristics. Firstly, as the purpose of this paper is to investigate the effects of FDI on economic performance, indicators which proxy for FDI must be defined. The indicator should be conceptually analogous to the fraction of goods produced by foreign firms in the model, (n^* /N). The model must also incorporate variables familiar to those modelling economic growth. A group of control and policy variables are frequently included as determinants of growth in the literature. Other indicators capturing the 'catch-up' effect (N/N^*) should also be included in the model.

Consequently we employ four indicators to proxy for FDI including the gross stock of FDI (inflows + outflows) as a share of GDP (FDI01), stock of FDI inflows as a share of GDP (FDI02), gross FDI flows (inflows + outflows) as a share of GDP (FDI03) and FDI inflows as a share of GDP (FDI04).

Formulation 1

To satisfy the conditions mentioned previously, we follow Kormendi and Meguire (1985), where the explanatory variables are entered independently and linearly, and formulate a growth model that is represented as follows:

$$g = \alpha + \beta_1 I + \beta_2 FDI + \beta_3 X + \epsilon \quad \textbf{(13)}$$

and

$$g = \alpha + \beta_4 I + \beta_5 FDI*X + \beta_6 X + \epsilon \quad \textbf{(14)}$$

where g is per capita GDP growth, I is a set of variables always included in the regression, FDI is one of the four FDI variables of interest and X is a subset of variables chosen from a pool of variables identified by past studies as potentially important explanatory variables for economic growth. Note that a positive coefficient for $\boldsymbol{\beta_5}$ means that FDI has a stronger effect on economic growth with a greater X.[2]

In this paper, the *I*-variables include the investment share of GDP (INV), the previous lagged level of real GDP per capita (in the form of natural logarithm) [GDP(-1)] which is the conditional convergence effect, the annual secondary-school enrolment rate (EDU) and the annual rate of population growth (POPU) (both of the latter variables are measures of the stock of human capital). The pool of X-variables in this equation includes:[3] the government size indicator, which is the ratio of government consumption expenditures to GDP (GOVCON), the openness to international trade as a share of GDP (TRADE), the annual inflation rate (INFLATION), the ratio of domestic credit provided by banks to GDP (DCBANK), the size of stock markets

[2] This can be mathematically proved as follows. Differentiate Y with respect to FDI to obtain:

$$\delta_Y/\delta_{FDI} = \beta_5 * X$$

If $\beta_5 > 0$ then FDI would have a stronger effect on Y in a country with a higher level of X.

[3] These X-variables form the basis of the conditioning information set because other studies have employed these variables (or close-related variables) to stand for fiscal, trade, monetary, uncertainty, and political-instability indicators. This pool is kept small to make the results more tangible and digestible. The results do not depend importantly on choosing these variables.

(STOCAP), the international country risk guide risk index from PRS Group (in natural logarithm form) (ICRG)[4].

Formulation 2

In addition, as in Carkovic and Levine (2002) and Edison et al. (2002), we employ the following dynamic formulation:

$$y_{i,t} - y_{i,t-1} = (\alpha - 1) y_{i,t-1} + \beta' X_{i,t} + \eta_i + \varepsilon_{i,t} \quad \textbf{15}$$

which can be simplified to

$$y_{i,t} = \alpha y_{i,t-1} + \beta' X_{i,t} + \eta_i + \varepsilon_{i,t} \quad \textbf{15}$$

To eliminate any country-specific effects, take the first-differences of equation (16) giving

$$y_{i,t} - y_{i,t-1} = \alpha (y_{i,t-1} - y_{i,t-2}) + \beta' (X_{i,t} - X_{i,t-1}) + (\varepsilon_{i,t} - \varepsilon_{i,t-1})$$

where y is the logarithm of real per capita GDP, X is the set of explanatory variables as discussed above and the investment share of GDP, stock of human capital but lagged per capita GDP, η is an unobserved country-specific effect, and ε is the error term. The subscripts *i* and *t* denote the country and time period.

The main difference between the first and the latter formulation is that the latter model allows for the inclusion of a country-specific effect. If the country-specific parameter was not included, random country-specific fluctuations would be grouped into and would bias the common error term. Although few empirical studies include all of these variables, most studies control for some subsets. Of the 41 growth studies surveyed by Levine and Renelt (1991), 33 include the investment share of GDP, 29 include population growth and 13 include a measure of initial income. In addition, the

[4] www.icrgonline.com

I-variables are consistent with a variety of "new" growth models that rely on constant returns to reproducible inputs or endogenous technological change (Barro 1990; Romer 1990). Furthermore, with these *I*-variables, we can confirm the findings of a large assortment of empirical studies. In recognition of the issues raised by Mc Aleer et al. (1985), importantly changes in the *I*-variables do not significantly alter the estimation results (Levine and Renelt, 1992).

As identified by Caselli et al. (1996), most empirical studies investigating causes of growth suffer from at least one of the following two estimation problems: omitted variable bias and endogeneity. The former problem could be serious because the growth model includes a lagged dependent variable (the variable standing for catch-up effect). In a dynamic specification, serial correlation in the error term - which may be due to the omission of a relevant explanatory variable – could lead to unreliable coefficient estimates. The latter is a general problem in analysis of growth since many of the determinants of growth are, in turn, arguably affected by the rate of growth (eg. investment is often thought to be related to expected growth). However, there is always a trade-off in seeking to minimize these potential sources of bias in the estimates.

To get an unbiased empirical result, two econometric estimation techniques are employed in this paper to estimate the models, both of which have their advantages and disadvantages. We first use the fixed effect panel estimation to estimate the relationship between FDI and economic growth in formulation (1). Fixed effect estimation computes estimates from differences in variables within country across time, on the assumption that individual effects are correlated over time, but are

unrelated to other regressors. This approach accommodates endogeneity problems, although it does not attend to the problem of omitted variables.

In addition, the Generalized Method of Moments (GMM) panel estimation designed by Arellano and Bover (1995) and Blundell and Bond (1997) is used. This estimation extracts consistent and efficient estimates of the impact of FDI on economic growth in formulation (2). The advantage of this GMM panel estimation method[5] is that it exploits time-series variation in the data, accounts for unobserved country-specific effects, allow for the inclusion of lagged dependent variables as regressors, and controls for endogeneity of all the explanatory variables. This ensures the method is attractive for estimation of the many causes of growth (Carkovic and Levine 2002; Caselli et al. 1996; Edison et al. 2002; Forbes 2002; Tempe 1999). Following the suggestion from Widmalm (2001) to reduce multicollinearity, no pair of variables in I, X or FDI, which measure the same underlying phenomenon is used.

3.2 Data

Heterogeneity of data is a major issue in empirical work employing cross-sectional country analysis. To improve the quality of the estimation, we first employ a dataset with a long enough period of time to control for business-cycle fluctuations and short-run effects of political and financial shocks. Delays in the retrieval of consistent macroeconomic and social data, limits analysis to the period from 1980 to 2003. Secondly, using annual data, we estimate a static equation with no lags in the dependent variable. Fixed effect panel data estimation allows for the influence of country specific characteristics. While instrumental variable estimation reduces the

[5] See Edison et al. (2002) for a detailed discussion on the advantages of GMM estimator for dynamic panel data.

reverse causality concern, the coefficients could be biased due to the presence of serial correlation in the data.

Data was collected from a number of available commercial databases including the World Bank's World Development Indicators 2004 CDRom, the International Financial Statistics (IFS) of the International Monetary Fund (IMF), the PRS International Country Risk Guide and the DATASTREAM. However, the IMF and the World Bank collect data from the national reporting bureau of statistics and may use a different methodology to construct the published data. In addition, it is noted that some countries report data on FDI in book value and some report in market value. Generally, book value estimates understate the market value of the underlying assets and liabilities. Similar to other empirical studies employing the data on external holding, we strive to use a dataset as homogeneous as possible, taking into account both structural breaks and methodological differences in the calculation of assets and liabilities. Nevertheless, as stated by many financial economists, heterogeneities in the data unavoidably remain in empirical studies using cross-country data (Engel 2003).

In keeping with the paper's focus on assessing the statistical sensitivity of past findings, the statistical and conceptual problems in entering *I*-variables in the model are now briefly discussed. Measurement problem with real GDP per capita and the secondary-schooling enrolment rate may induce biased results. In the case of the annual rate of population growth, census data may be very poor, and the causal links with the annual growth rate of GDP per capita may be ambiguous (see, for instance, Becker et al (1990)). Furthermore, the stock of human capital represents more than formal schooling, and enrolment rates do not control for quality. There are also

problems when including the ratio of physical-capital investment to GDP. The causal relationship between the investment share of GDP and the annual growth rate of GDP per capita is ambiguous, and the justification for including many variables in growth regressions is that they may explain the investment share of GDP. If the investment share of GDP is included the only channel through which other explanatory variables can explain growth differentials is the efficiency of resource allocation.

(Insert Table 1 about here)

4. Determinates of FDI and Growth

4.1 Discussion

Table 1 reports the pair-wise correlation matrix between the variables employed in the analysis. A first glance at this table reveals that these variables may be characterized by a very small correlation coefficient. A number of important points can be noted here which indicate that the correlation is broadly consistent with theory. Firstly, economic growth is negatively correlated with the size of government (-0.07), inflation (-0.10), and the stock measures of FDI (both at -0.04), even though the correlations themselves are low. Secondly, the international risk index, ICRG and domestic investment, is positively correlated with economic growth (0.28 and 0.24 respectively), though in this case the correlation is larger. Other factors are also positively correlated with economic growth with smaller coefficients including stock market development, trade openness and education attainment. Note, that as would be expected, different measures of FDI (1-4) are highly positively correlated, while the various measures of financial market development (domestic credit and stock capitalisation) are also positively correlated.

(Insert Tables 2, 3, 4 and 5 about here)

Table 2, 3, 4 and 5 report the panel regression results for each of the four FDI indicators of interest where the dependent variable is the annual growth rate of GDP per capita using either fixed effects or the GMM estimation: Table 2 reports Gross FDI as a share of GDP; Table 3 reports FDI inflows as a share of GDP; Table 4 reports Gross Stock FDI inflows as a share of GDP; and finally Table 5 reports stock FDI inflows as a share of GDP. The panel regressions begin with the four variables; lagged GDP, investment (INV), education (EDU) and population. FDI is highlighted. Then government consumption (GOVCON), trade, inflation, domestic bank credit (DCBANK), stock market capitalisation (STOCAP) and international risk (ICRG). Overall, FDI exerts a significant positive impact on economic growth in all benchmark regressions (including only *I*-variables and FDI variable) where estimated coefficients of FDI variables are mostly significant at the 5% level. However, when other extra explanatory variables of X are systematically included in the growth regressions, the coefficients of FDI become smaller and less statistically significant. In the tables (from 2 to 5), in the first nine regressions, the FDI coefficients are positively significant but from regressions 10 to 14, they become less statistically significant. This indicates that the regression results are not robust.

However, these results can confirm a number of existing theories. First of all, poor countries tend to grow faster, which is shown by the negative coefficients of lagged GDP per capita (most of the estimated coefficients are significant at the 5% level). Second, domestic investment and education attainment in the host countries plays a

very important role in explaining economic growth. For example, most coefficients are positive and statistically significant at least at the 10% level. Note the positive estimated coefficients of investment and education attainment. Third, countries with lower risk seem to enjoy a higher economic growth rate. Fourth, even though the estimated coefficients of population growth rate are not significant in all regressions, negative coefficients indicate that higher population growth rates tend to hinder economic growth.

Interestingly, the variable for banking development (the amount of domestic credit provided by the banking system) is small (very close to zero) and not statistically significant. This may be consistent with corporations' ability to access credit outside of the banking system. Moreover, there are very few regressions that are sufficiently significant to establish a direct causal growth explanation of banking development using domestic credit provided by the banking system. Consequently, the results do not lend much credence to the view that banking development directly helps to accelerate economic growth. This finding is consistent with the previous finding of Demetriades and Hussein (1996) and Shan and Morris (2002). On the other hand, stock market development is important in explaining economic growth where its estimated coefficients are mostly significant in all regressions. This supports the view that stock market development plays a crucial role in accelerating economic growth, which is reported in a number of studies (Beck and Levine 2004; Levine and Zervos 1998), although it is also of importance to recognise that the riskiness of the investment itself (represented by ICRG) must also be considered. The remaining coefficients highlight the positive effects of trade, while government consumption has negative consequences.

(Insert Table 6 about here)

Table 6 reports the impact of FDI inflows on economic growth under different economic and institutional conditions. It is clear that FDI inflows has a significantly stronger impact on economic growth in countries with a higher level of openness to international trade and well developed stock markets (at the 5% level of significance each is positively associated with growth).

(Insert Table 7 about here)

These earlier results are largely confirmed with other specifications of FDI. Table 7 shows the impact of gross FDI flows (inflows + outflows) on economic growth under different conditions. These results confirm earlier findings indicating that gross FDI flows has a stronger impact on economic growth in countries with a higher level of education attainment and is more open to international trade and stock market development (the estimated coefficients are significant at the 5% level).

(Insert Tables 8 and 9 about here)

Tables 8 and 9 depict the growth impact of stock of FDI inflows and stock of gross FDI flows respectively. Again the stock of FDI inflows and stock of gross FDI flows have a stronger effect on growth in countries which have a higher level of education attainment, are more open to international trade and have lower rates of inflation (at the 5% level of significance). Of particular note here is that the stock of FDI inflows

has a stronger impact on economic growth in countries with a larger government size (significant at the 10% level).

Overall the results of the regressions in Table 6, 7, 8 and 9 do not support the view that FDI inflows have a stronger growth effect if countries are sufficiently rich. An interesting interpretation is that negative estimated coefficients (even though not significant) tend to support the view that poor countries benefit more from FDI rather than rich countries. This is inconsistent with the previous studies of Blomstrom et al. (1994).

4.2 Sensitivity Analysis

To examine the contribution of FDI to economic growth in more detail sensitivity analysis is now employed to test whether the results are robust, or fragile, to small changes in the conditioning information set. We use a variant of the method of Edward E. Leamer's (1985) extreme-bounds analysis to test the robustness of coefficient estimate to alterations in the conditioning set of information. This original method was further developed by Levine and Renelt (1992) and recently used by Chowdhury (2001). To provide a brief explanation of this technique, consider the regression equation (13) where the benchmark regression was undertaken including only *I*- variables (lagged value of GDP per capita, domestic investment, education attainment and population growth rate) and each of the FDI variables of interest. Then the regression results for all possible linear combinations of up to three X variables is computed with the lowest and highest values for the coefficient (β_2) of the FDI that cannot be rejected at the 5 percent level of significance, identified. If the estimated coefficient of FDI remains significant over this procedure, the correlation is

considered to be "robust". The "extreme bounds" are the highest estimated correlation plus two standard errors and the lowest minus two standard errors. If the coefficient fails to be significant in some regressions, the correlation is termed "fragile". Following this procedure to test for the robustness of the FDI variable, the results indicate that the FDI coefficients are not robust (for the sake of brevity the results are not to be reported here). This is consistent with the earlier finding of Levine and Renelt (1992). However, this robustness test is probably too strong for the correlation to pass as indicated by Sala-I-Martin (1997a; 1997b).

5. Conclusions

The encouragement of FDI remains at the forefront of policy outcomes for both developed and developing countries largely because of the economic benefits perceived from this form of investment. It has been extensively argued that government policy should be directed to the removal of capital barriers and other regulatory restrictions that may impede FDI to ensure that benefits to economic growth are maximised. In particular in the recent empirical literature, greater attention has been paid to the legal and institutional as well as economic settings that may facilitate FDI in promoting growth outcomes.

The current paper provides a new insight into these issues by investigating the impact of FDI using a wide assortment of variables to proxy for FDI including both flow measures (FDI inflows as a share of GDP, gross FDI flows as a share of GDP) and stock measures (stock of FDI inflows as a share of GDP and gross stock of FDI as a share of GDP). In addition a larger number of indicators are employed to provide a better picture of the FDI-economic growth nexus. Importantly, the paper employs fixed and dynamic estimation analysis thereby avoiding many of the shortcomings of

other studies. Specifically, we control for endogeneity, country specific effects and include lagged GDP per capita as an explanatory variable. The dynamic instrument variable analysis also has the benefit of accommodating the causal relationship between growth and FDI.

Overall, this analysis supports the view that FDI helps to promote economic growth, although the picture that emerges is of a more complex relationship between FDI flows and key societal variables: particular attention is drawn to the importance of the level of education and the quality of the institutional environment in maximising benefits. Specifically, FDI has a stronger positive impact on economic growth in countries with higher levels of education attainment, those that are more open to international trade, have better stock market development and lower rates of population growth and levels of risk. Also, the estimation results seem to be susceptible to the addition of extra variables in the growth regression, which is confirmed by a sensitivity analysis.

The paper also confirms a number of existing theories. Firstly, poorer countries tend to enjoy a higher growth rate. Secondly, we find that domestic investment and education attainment exert a positive and strong impact on economic growth. Thirdly, a higher growth rate of population will likely hinder the rate of economic growth, while countries with higher degrees of openness to international trade and stock market development and lower levels of risk tend to grow faster. Overall, the results highlight the importance for those countries undertaking reform of cross-border capital restrictions and controls and other policy aimed at encouraging domestic and foreign investment of the need to incorporate and consider broader social policy

objectives –such as education, legal and institutional reform- to maximise benefits from FDI.

Table 1 Correlation Matrix of Key Variables

	g	INV	GDP(-1)	EDU	POPU	FDI01	FDI02	FDI03	FDI04	GOVCON	TRADE	INFLATION	DCBANK	STOCAP	STOACT	STOTO	ICRG
g	1.00																
INV	0.24	1.00															
GDP(-1)	0.05	0.09	1.00														
EDU	0.10	-0.04	0.84	1.00													
POPU	0.06	0.04	-0.07	0.00	1.00												
FDI01	0.09	0.11	0.22	0.31	-0.06	1.00											
FDI02	0.11	0.18	0.08	0.09	0.03	0.91	1.00										
FDI03	-0.04	-0.18	0.17	0.30	0.02	0.67	0.54	1.00									
FDI04	-0.04	-0.14	-0.11	-0.01	0.24	0.56	0.60	0.88	1.00								
GOVCON	-0.07	-0.01	0.35	0.35	-0.01	0.09	0.13	0.24	0.13	1.00							
TRADE	0.09	0.27	0.15	0.00	0.03	0.34	0.41	0.37	0.49	0.21	1.00						
INFLATION	-0.10	-0.05	-0.04	-0.07	0.01	-0.07	-0.05	-0.04	-0.04	-0.06	-0.08	1.00					
DCBANK	0.07	0.10	0.55	0.48	-0.39	0.07	-0.01	0.11	-0.09	0.14	0.00	-0.04	1.00				
STOCAP	0.12	0.16	0.39	0.33	-0.07	0.49	0.33	0.47	0.21	0.06	0.17	-0.09	0.45	1.00			
STOACT	0.12	0.12	0.37	0.30	-0.16	0.43	0.26	0.45	0.17	-0.03	0.15	-0.06	0.41	0.71	1.00		
STOTO	0.19	0.12	0.19	0.33	-0.23	0.09	-0.01	0.13	-0.09	-0.05	-0.14	-0.03	0.26	0.20	0.58	1.00	
ICRG	0.28	0.22	0.75	0.66	-0.40	0.31	0.24	0.25	0.09	0.31	0.15	-0.19	0.44	0.40	0.34	0.19	1.00

Table 2 Panel Regression (Gross FDI as a Share of GDP)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	Fixed Effects	GMM	Fixed Effects	GMM	Fixed Effects	GMM	Fixed Effects	GMM	Fixed Effects	GMM	Fixed Effects	GMM	Fixed Effects	GMM
GDP(-1)	-0.0635** (-4.57)	-0.1544** (-3.82)	-0.0680** (-4.95)	-0.1471** (-3.74)	-0.0832** (-6.06)	-0.1905** (-4.73)	-0.0824** (-5.99)	-0.1901** (-4.71)	-0.0820** (-5.70	-0.1509** (-3.19)	-0.1459** -7.11	-0.2118** (-4.06)	-0.1854** -8.62	-0.2377** (-4.96)
INV	0.1413** (3.35)	0.0850 (0.62)	0.1625** (3.88)	0.2005 (1.42)	0.1782** (4.34)	0.1675 (1.18)	0.1771** (4.31)	0.1676 (1.18)	0.1774** (4.25	0.1680 (1.17)	0.2015** 3.75	0.2673* (1.81)	0.2114** 3.83	0.2509** (2.21)
EDU	0.0203* (1.68)	0.1022** (2.95)	0.0276** (2.30)	0.1022** (3.16)	0.0295** (2.51)	0.1019** (3.07)	0.0274** (2.29)	0.1020** (3.07)	0.0277** (2.28	0.1038** (2.94)	0.0328** 2.45	0.0798** (2.53)	0.0298** 2.29	0.0657** (2.60)
POPULATION	-0.0118** (-6.19)	-0.0024 (-0.68)	-0.0136** (-7.06)	-0.0055 (-1.51)	-0.0137** (-7.30)	-0.0066** (-2.25)	-0.0137** (-7.27)	-0.0065** (-2.21)	-0.0136** (-7.15	-0.0050* (-1.70)	-0.0151** -7.87	-0.0093** (-4.02)	-0.0154** -8.20	-0.0090** (-3.25)
FDI01	0.1212** (3.72)	0.1020* (1.77)	0.1085** (3.37)	0.0939* (1.93)	0.0677** (2.07)	0.0277 (0.56)	0.0674** (2.06)	0.0278 (0.56)	0.0655** (1.97	0.0155 (0.29)	0.0044 0.11	0.0277 (0.56)	0.0455 1.07	0.0638 (1.46)
GOVCON			-0.2958** (-4.15)	-0.5933** (-2.49)	-0.2645** (-3.79)	-0.5875** (-2.18)	-0.2614** (-3.74)	-0.5801** (-2.09)	-0.2597** -3.64	-0.5140* (-1.95)	-0.2955** -3.41	-0.6558** (-2.56)	-0.2353** -2.49	-0.5185** (-2.01)
TRADE					0.0650** (4.68)	0.1372** (3.88)	0.0651** (4.69)	0.1371** (3.88)	0.0652** 4.63	0.1476** (4.19)	0.0717** 3.93	0.1627** (3.89)	0.0942** 5.04	0.1472** (3.92)
INFLATION							-0.0007 (-0.86)	0.0003 (0.26)	-0.0007 -0.79	0.0017 (1.19)	-0.0003 -0.37	0.0005 (0.37)	-0.0005 -0.62	0.0011 (1.20)
DCBANK									0.0000 -0.14	-0.0005 (-1.48)	-0.0001 -0.57	-0.0005* (-1.67)	0.0000 0.06	-0.0003 (-1.15)
STOCAP											0.0224** 4.32	0.0227** (2.60)	0.0173** 3.35	0.0151* (1.93)
LOG(ICRG)													0.1036** 4.96	0.1595** (3.61)

Notes:
The dependent variable is annual rate of GDP per capita growth
The FDI indicator of interest is FDI01: Gross FDI as a share of GDP
The t-statistics is in parentheses
*indicates significance at the 10% level
** indicates significance at the 5% level

Table 3 Panel Regression (FDI Inflows as a Share of GDP)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	Fixed Effects	GMM	Fixed Effects	GMM	Fixed Effects	GMM	Fixed Effects	GMM	Fixed Effects	GMM	Fixed Effects	GMM	Fixed Effects	GMM
GDP(-1)	-0.0634** (-5.02)	-0.1308** (-3.39)	-0.0677** (-5.41)	-0.1326** (-3.39)	-0.0871** (-6.75)	-0.1889** (-4.42)	-0.0837** (-6.52)	-0.1889** (-4.58)	-0.0816** (-6.00)	-0.1500** (-3.19)	-0.1522** (-8.08)	-0.1968** (-4.22)	-0.1770** (-9.16)	-0.2151** (-5.01)
INV	0.1826** (4.77)	0.1235 (1.01)	0.2080** (5.45)	0.1620 (1.34)	0.2123** (5.62)	0.2259* (1.65)	0.1961** (5.24)	0.2227 (1.62)	0.1913** (5.00)	0.2139 (1.48)	0.2393** (4.95)	0.3439** (2.48)	0.2368** (4.80)	0.2851** (2.99)
EDU	0.0185 (1.47)	0.0912** (2.51)	0.0263** (2.10)	0.0980** (2.78)	0.0277** (2.24)	0.1051** (2.86)	0.0239* (1.95)	0.1060** (2.87)	0.0254** (2.04)	0.1264** (2.93)	0.0304** (2.33)	0.0938** (2.42)	0.0267** (2.08)	0.0767** (2.45)
POPULATION	-0.0114** (-5.56)	-0.0034 (-1.04)	-0.0133** (-6.43)	-0.0063* (-1.91)	-0.0133** (-6.52)	-0.0066** (-2.26)	-0.0133** (-6.63)	-0.0065** (-2.23)	-0.0133** (-6.54)	-0.0057** (-2.04)	-0.0147** (-7.67)	-0.0090** (-3.88)	-0.0149** (-7.94)	-0.0089** (-3.63)
FDI02	0.2096** (4.12)	0.1222 (1.51)	0.2008** (4.01)	0.1206 (1.63)	0.1715** (3.41)	0.0469 (0.55)	0.1571** (3.15)	0.0463 (0.55)	0.1594** (3.14)	0.0328 (0.36)	0.0344 (0.55)	0.0791 (0.93)	0.0748 (1.20)	0.1193* (1.75)
GOVCON			-0.3263** -4.52	-0.5699** (-2.44)	-0.2859** -4.00	-0.5760** (-2.18)	-0.2969** (-4.21)	-0.5659** (-2.03)	-0.2904** (-4.02)	-0.4191 (-1.60)	-0.2411** (-2.89)	-0.6136** (-2.48)	-0.2356** (-2.670	-0.5543** (-2.46)
TRADE					0.0499** 4.19	0.1415** (3.12)	0.0502** (4.25)	0.1410** (3.13)	0.0513** (4.26)	0.1624** (3.42)	0.0566** (3.81)	0.1500** (4.21)	0.0703** (4.67)	0.1386** (4.61)
INFLATION							-0.0005** (-2.49)	0.0006 (0.33)	-0.0006** (-2.48)	0.0023 (1.29)	-0.0009** (-2.57)	0.0004 (0.24)	-0.0007** (-2.16)	0.0013 (1.30)
DCBANK									-0.0001 (-0.64)	-0.0008** (-2.31)	-0.0001 (-1.12)	-0.0006** (-1.97)	-0.0001 (-0.97)	-0.0005** (-2.10)
STOCAP											0.0230** (5.28)	0.0224** (2.83)	0.0191** (4.39)	0.0148** (2.16)
LOG(ICRG)													0.0796** (4.86)	0.1468** (3.65)

Notes:
The dependent variable is annual rate of GDP per capita growth
The FDI indicator of interest is FDI02: FDI inflows as a share of GDP
The t-statistics is in parentheses
*indicates significance at the 10% level
** indicates significance at the 5% level

Table 4 Panel Regression (Gross FDI Inflows as a Share of GDP)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	Fixed Effects	GMM	Fixed Effects	GMM	Fixed Effects	GMM	Fixed Effects	GMM	Fixed Effects	GMM	Fixed Effects	GMM	Fixed Effects	GMM
GDP(-1)	-0.1071** (-4.82)	-0.3307** (-5.03)	-0.1067** (-4.88)	-0.3362** (-5.00)	-0.1181** (-5.81)	-0.3391** (-5.62)	-0.1134** (-5.67)	-0.3327** (-5.51)	-0.1111** (-5.07)	-0.3301** (-5.26)	-0.2015** (-6.65)	-0.3116** (-4.44)	-0.2192** (-7.78)	-0.3163** (-4.99)
INV	0.3721** (6.25)	0.3879** (2.27)	0.3603** 6.15	0.4030** (2.30)	0.3123** (5.70)	0.3440** (2.27)	0.2871** (5.30)	0.3367** (2.23)	0.2862** (5.20)	0.3494** (2.37)	0.2852** (4.89)	0.3057* (1.83)	0.3056** (5.27)	0.3131** (2.80)
EDU	0.0373** (2.71)	0.1476** (2.98)	0.0410** 3.02	0.1450** (2.97)	0.0355** (2.81)	0.1357** (3.12)	0.0340** (2.75)	0.1287** (2.99)	0.0345** (2.71)	0.1339** (2.88)	0.0425** (3.22)	0.0831** (2.80)	0.0389** (3.18)	0.0756** (3.20)
POPULATION	-0.0063 (-1.04)	-0.0108 (-1.22)	-0.0032 -0.53	-0.0093 (-1.06)	0.0005 0.09	-0.0109 (-1.27)	0.0022 (0.41)	-0.0094 (-1.11)	0.0027 (0.48)	-0.0133 (-1.48)	0.0085 (1.31)	-0.0153 (-1.62)	-0.0059 (-0.89)	-0.0239** (-2.29)
FDI03	0.0472** (4.49)	0.1063** (4.27)	0.0432** 4.15	0.1075** (4.33)	0.0308** (3.14)	0.0609** (2.63)	0.0291** (3.02)	0.0603** (2.61)	0.0285** (2.87)	0.0556** (2.43)	0.0096 (0.75)	0.0225 (1.04)	0.0153 (1.28)	0.0294 (1.19)
GOVCON			-0.3095** -3.43	-0.2430 (-0.89)	-0.2966** (-3.54)	-0.2392 (-1.08)	-0.3146** (-3.82)	-0.2615 (-1.20)	-0.3152** (-3.76)	-0.2889 (-1.38)	-0.3186** (-3.64)	-0.2307 (-1.02)	-0.1699** (-2.00)	-0.2300 (-0.90)
TRADE					0.1031** (7.24)	0.1608** (3.66)	0.1042** (7.45)	0.1622** (3.72)	0.1036** (7.17)	0.1712** (3.73)	0.1314** (6.62)	0.1583** (3.35)	0.1400** (7.40)	0.1511** (3.47)
INFLATION							-0.0011** (-3.59)	-0.0081* (-1.79)	-0.0011** (-3.54)	-0.0087* (-1.94)	-0.0011** (-3.82)	-0.0119* (-1.84)	-0.0006** (-2.34)	-0.0047 (-1.29)
DCBANK									0.0000 (-0.22)	0.0000 (-0.12)	0.0000 (-0.25)	-0.0001 (-0.65)	0.0000 (0.06)	0.0001 (0.32)
STOCAP											0.0166** (3.32)	0.0152** (2.09)	0.0121** (2.61)	0.0106* (1.87)
LOG(ICRG)													0.1532** (5.49)	0.2068** (5.05)

Notes:
The dependent variable is annual rate of GDP per capita growth
The FDI indicator of interest is FDI03: Gross stock FDI as a share of GDP
The t-statistics is in parentheses
*indicates significance at the 10% level
** indicates significance at the 5% level

Table 5 Panel Regression (Stock FDI Inflows as a Share of GDP)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	Fixed Effects	GMM	Fixed Effects	GMM	Fixed Effects	GMM	Fixed Effects	GMM	Fixed Effects	GMM	Fixed Effects	GMM	Fixed Effects	GMM
GDP(-1)	-0.0888** (-4.05)	-0.2688** (-4.80)	-0.0906** (-4.21)	-0.2719** (-4.83)	-0.1112** (-5.59)	-0.3054** (-5.36)	-0.1064** (-5.43)	-0.2990** (-5.27)	-0.1054** (-4.93)	-0.2964** (-4.86)	-0.1869** (-6.49)	-0.2932** (-4.35)	-0.2191** (-8.08)	-0.3071** (-5.06)
INV	0.3452** (5.66)	0.4133** (2.21)	0.3350** (5.59)	0.4268** (2.27)	0.3043** (5.53)	0.3511** (2.05)	0.2784** (5.11)	0.3435** (2.01)	0.2782** (5.02)	0.3585** (2.18)	0.2792** (4.80)	0.3158* (1.81)	0.3100** (5.34)	0.3376** (2.77)
EDU	0.0403** (2.90)	0.1512** (2.85)	0.0438** (3.21)	0.1489** (2.86)	0.0365** (2.91)	0.1350** (3.01)	0.0350** (2.83)	0.1281** (2.89)	0.0356** (2.82)	0.1333** (2.82)	0.0385** (2.94)	0.0805** (2.71)	0.0379** (3.11)	0.0760** (3.22)
POPULATION	-0.0078 (-1.35)	-0.0115 (-1.28)	-0.0048 (-0.84)	-0.0118 (-1.35)	-0.0009 (-0.17)	-0.0132* (-1.70)	0.0006 (0.12)	-0.0120 (-1.56)	0.0011 (0.20)	-0.0147* (-1.83)	0.0035 (0.59)	-0.0184** (-2.39)	-0.0115* (-1.90)	-0.0299** (-3.29)
FDI04	0.0482** (2.83)	0.1211** (3.23)	0.0438** (2.61)	0.1202** (3.18)	0.0397** (2.58)	0.0644* (1.73)	0.0364** (2.41)	0.0629* (1.71)	0.0355** (2.30)	0.0636* (1.76)	0.0148 (0.76)	0.0111 (0.30)	0.0192 (1.05)	0.0232 (0.57)
GOVCON			-0.3359** (-3.71)	-0.2051 (-0.73)	-0.3077** (-3.71)	-0.1987 (-0.91)	-0.3247** (-3.98)	-0.2170 (-1.01)	-0.3252** (-3.92)	-0.2451 (-1.17)	-0.3189** (-3.65)	-0.1669 (-0.78)	-0.1764** (-2.06)	-0.1655 (-0.71)
TRADE					0.1096** (7.86)	0.1815** (3.99)	0.1102** (8.05)	0.1829** (4.06)	0.1098** (7.80)	0.1882** (4.06)	0.1246** (6.48)	0.1637** (3.54)	0.1412** (7.68)	0.1591** (3.71)
INFLATION							-0.0011** (-3.59)	-0.0081* (-1.70)	-0.0011** (-3.54)	-0.0085* (-1.82)	-0.0011** (-3.76)	-0.0118* (-1.77)	-0.0007** (-2.44)	-0.0044 (-1.23)
DCBANK									0.0000 (-0.11)	-0.0001 (-0.36)	-0.0001 (-0.61)	-0.0002 (-0.87)	0.0000 (0.02)	0.0000 (0.10)
STOCAP											0.0166** (3.78)	0.0172** (2.57)	0.0130** (3.19)	0.0134** (2.51)
LOG(ICRG)													0.1317** (5.09)	0.1936** (4.78)

Notes:
The dependent variable is annual rate of GDP per capita growth
The FDI indicator of interest is FDI04: Stock FDI inflows as a share of GDP
The t-statistics is in parentheses
*indicates significance at the 10% level
** indicates significance at the 5% level

Table 6 Impact of FDI Inflows on Economic Growth under Different Conditions

	GDP(-1)	EDU	POPULATION	GOVERNMENT SIZE	TRADE OPENNESS	INFLATION	BANK	STOCK	RISK
GDP(-1)		-0.1691** (-4.27)	-0.1490** (-3.97)	-0.1861** (-4.20)	-0.1637** (-3.71)	-0.1798** (-4.09)	-0.1812** (-4.28)	-0.1726** (-4.01)	-0.1625** (-3.60)
INV	0.1862** (2.62)	0.1814** (2.80)	0.1832** (2.28)	0.2094** (2.84)	0.1797** (2.07)	0.2168** (2.87)	0.2149** (2.87)	0.2170** (2.67)	0.2266** (2.64)
EDU	-0.0104 (-0.73)		0.0201 (1.58)	0.0250 (1.43)	0.0283 (1.48)	0.0308* (1.81)	0.0305* (1.82)	0.0365** (2.15)	0.0338* (1.84)
POPULATION	-0.0132** (-7.13)	-0.0147** (-17.46)		-0.0140** (-12.02)	-0.0156** (-9.37)	-0.0155** (-12.41)	-0.0155** (-12.80)	-0.0158** (-12.76)	-0.0161** (-12.40)
FDI01 * interaction	-0.0037 (-1.08)	0.0495* (1.76)	-0.1030 (-1.60)	0.2601* (1.70)	0.0931** (2.17)	-0.0683 (-0.58)	0.0001 (0.30)	0.0460** (2.29)	0.0056 (0.75)
GOVCON	-0.2547** (-2.14)	-0.2039* (-1.65)	-0.0302 (-0.12)		-0.2683** (-2.06)	-0.2414** (-1.98)	-0.2397** (-1.93)	-0.2880** (-2.16)	-0.3483** (-2.89)
TRADE	0.0640** (2.75)	0.0902** (3.72)	0.1034** (3.52)	0.0968** (3.79)		0.0989** (3.82)	0.0972** (3.64)	0.1020** (3.63)	0.0831** (3.04)
INFLATION	-0.0003 (-1.13)	-0.0009** (-2.68)	-0.0007** (-2.11)	-0.0004 (-1.44)	-0.0007 (-1.76)		-0.0005** (-2.17)	-0.0006 (-1.59)	-0.0003 (-0.92)
DCBANK	-0.0003** (-2.16)	0.0000 (-0.02)	-0.0001 (-0.48)	0.0000 (-0.13)	0.0000 (0.28)	0.0000 (-0.09)		0.0000 (0.25)	-0.0001 (-0.53)
STOCAP	0.0160** (3.60)	0.0180** (3.20)	0.0242** (4.07)	0.0194** (3.49)	0.0194** (3.65)	0.0201** (3.79)	0.0194** (4.30)		0.0196** (3.36)
LOG(ICRG)	0.0646* (1.92)	0.1066** (3.27)	0.1110** (3.11)	0.1161** (3.78)	0.0908** (3.02)	0.1007** (3.13)	0.1017** (3.26)	0.1070** (3.25)	

Notes:
The dependent variable is annual rate of GDP per capita growth
The FDI indicator of interest is FDI01: Gross FDI as a share of GDP
The t-statistics is in parentheses
*indicates significance at the 10% level
** indicates significance at the 5% level

Table 7 Impact of Gross FDI Flows (Inflows + Outflows) on Economic Growth under Different Conditions

	GDP(-1)	EDU	POPULATION	GOVERNMENT SIZE	TRADE OPENNESS	INFLATION	BANK	STOCK	RISK
GDP(-1)		-0.1631** (-4.85)	-0.1506** (-5.03)	-0.1738** (-4.63)	-0.1523** (-4.62)	-0.1747** (-4.61)	-0.1826** (-5.01)	-0.1702** (-4.62)	-0.1654** (-4.42)
INV	0.2213** (3.68)	0.2118** (3.95)	0.1733** (2.95)	0.2261** (3.72)	0.1987** (2.74)	0.2439** (3.88)	0.2429** (3.95)	0.2561** (3.89)	0.2669** (3.76)
EDU	-0.0165 (-1.07)		0.0131 (0.75)	0.0212 (1.22)	0.0253 (1.42)	0.0281* (1.71)	0.0299* (1.91)	0.0336** (2.02)	0.0305* (1.71)
POPULATION	-0.0125** (-6.04)	-0.0143** (-12.40)		-0.0135** (-9.13)	-0.0151** (-7.74)	-0.0151** (-9.88)	-0.0152** (-9.59)	-0.0152** (-9.64)	-0.0156** (-10.99)
FDI02 * interaction	-0.0005 (-0.07)	0.0879** (2.12)	0.0269 (0.37)	0.3256 (1.48)	0.1024** (2.42)	-0.2710 (-1.29)	0.0006 (1.49)	0.1486** (3.49)	0.0137 (1.06)
GOVCON	-0.2028* (-1.87)	-0.2032* (-1.93)	-0.0423 (-0.18)		-0.2764** (-2.59)	-0.2404** (-2.26)	-0.2445** (-2.23)	-0.2751** (-2.43)	-0.2787** (-2.65)
TRADE	0.0330* (1.93)	0.0675** (3.64)	0.0754** (3.46)	0.0744** (3.86)		0.0727** (3.71)	0.0672** (3.37)	0.0744** (3.54)	0.0662** (3.39)
INFLATION	-0.0008** (-4.90)	-0.0008** (-9.33)	-0.0008** (-6.31)	-0.0007** (-5.39)	-0.0008** (-8.52)		-0.0008** (-7.48)	-0.0008** (-6.09)	-0.0009** (-5.43)
DCBANK	-0.0004** (-2.64)	-0.0001 (-0.91)	-0.0002 (-1.52)	-0.0001 (-1.01)	0.0000 (-0.15)	-0.0001 (-0.78)		-0.0001 (-0.38)	-0.0001 (-0.93)
STOCAP	0.0161** (5.46)	0.0199** (4.70)	0.0236** (5.95)	0.0214** (5.06)	0.0205** (4.71)	0.0209** (5.23)	0.0188** (4.72)		0.0212** (4.60)
LOG(ICRG)	0.0607** (2.63)	0.0820** (3.27)	0.0872** (3.28)	0.0840** (3.21)	0.0756** (3.69)	0.0799** (3.13)	0.0810** (3.15)	0.0863** (3.48)	

Notes:
The dependent variable is annual rate of GDP per capita growth
The FDI indicator of interest is FDI02: FDI inflows a share of GDP
The t-statistics is in parentheses
*indicates significance at the 10% level
** indicates significance at the 5% level

Table 8 Growth Impact of FDI Stock Inflows on Economic Growth under Different Conditions

	GDP(-1)	EDU	POPULATION	GOVERNMENT SIZE	TRADE OPENNESS	INFLATION	BANK	STOCK	RISK
GDP(-1)		-0.2046** (-4.03)	-0.2086** (-4.16)	-0.2248** (-4.16)	-0.1770** (-3.87)	-0.2133** (-4.14)	-0.2162** (-4.42)	-0.1949** (-3.62)	-0.2218** (-4.38)
INV	0.1261 (1.62)	0.2798** (3.15)	0.2792** (2.78)	0.3154** (3.29)	0.2634** (2.63)	0.2917** (2.91)	0.2991** (2.93)	0.2905** (2.64)	0.3625** (3.04)
EDU	0.0021 (0.15)		0.0409** (3.06)	0.0373** (2.46)	0.0359** (2.05)	0.0395** (2.89)	0.0408** (3.26)	0.0426** (3.03)	0.0461** (3.47)
POPULATION	0.0026 (0.36)	-0.0060 (-0.94)		-0.0086 (-1.22)	-0.0112 (-1.33)	-0.0068 (-1.04)	-0.0058 (-0.90)	-0.0062 (-0.90)	-0.0024 (-0.37)
FDI03 * interaction	0.0003 (0.22)	0.0317** (2.91)	-0.0010 (-0.09)	0.0974* (1.81)	0.0461** (2.73)	-0.0127** (-5.29)	0.0001 (0.62)	0.0088* (1.91)	0.0012 (0.30)
GOVCON	-0.2073 (-1.63)	-0.1430 (-1.05)	-0.1793 (-1.38)		-0.2011 (-1.21)	-0.1720 (-1.46)	-0.1678 (-1.36)	-0.2013 (-1.49)	-0.2859** (-2.67)
TRADE	0.1001** (3.35)	0.1302** (4.30)	0.1479** (4.57)	0.1386** (4.01)		0.1451** (4.48)	0.1421** (4.15)	0.1523** (4.43)	0.1522** (3.59)
INFLATION	-0.0008** (-4.52)	-0.0006** (-4.57)	-0.0007** (-5.62)	-0.0006** (-4.37)	-0.0006** (-3.89)		-0.0007** (-4.52)	-0.0007** (-4.55)	-0.0010** (-10.88)
DCBANK	-0.0003** (-2.21)	0.0000 (-0.25)	0.0000 (0.12)	0.0000 (0.02)	-0.0001 (-0.28)	0.0000 (0.08)		0.0000 (0.05)	-0.0001 (-0.27)
STOCAP	0.0069 (1.37)	0.0086* (1.65)	0.0158** (3.71)	0.0131** (2.56)	0.0138** (2.21)	0.0153** (3.39)	0.0131** (2.36)		0.0157** (2.45)
LOG(ICRG)	0.1565** (2.61)	0.1633** (3.81)	0.1431** (3.45)	0.1718** (3.90)	0.1803** (3.06)	0.1453** (3.32)	0.1503** (3.33)	0.1552** (3.34)	

Notes:
The dependent variable is annual rate of GDP per capita growth
The FDI indicator of interest is FDI03: Gross stock of FDI as a share of GDP
The t-statistics is in parentheses
*indicates significance at the 10% level
** indicates significance at the 5% level

Table 9 Growth Impact of Gross FDI on Economic Growth under Different Conditions

	GDP(-1)	EDU	POPULATION	GOVERNMENT SIZE	TRADE OPENNESS	INFLATION	BANK	STOCK	RISK
GDP(-1)		-0.2100** (-4.46)	-0.1988** (-4.50)	-0.2260** (-4.57)	-0.1875** (-4.31)	-0.2136** (-4.46)	-0.2217** (-4.87)	-0.1998** (-4.01)	-0.2094** (-4.72)
INV	0.1245 (1.56)	0.2904** (3.33)	0.2719** (2.81)	0.3196** (3.42)	0.2708** (2.66)	0.2976** (3.02)	0.3120** (3.13)	0.2971** (2.79)	0.3583** (3.14)
EDU	0.0031 (0.23)		0.0398** (3.25)	0.0369** (2.46)	0.0360** (2.01)	0.0386** (2.85)	0.0405** (3.18)	0.0414** (3.03)	0.0425** (3.24)
POPULATION	0.0007 (0.11)	-0.0102 (-1.36)		-0.0138* (-1.76)	-0.0163** (-2.26)	-0.0123 (-1.59)	-0.0109 (-1.35)	-0.0111 (-1.41)	-0.0064 (-1.04)
FDI04 * interaction	-0.0005 (-0.18)	0.0570** (2.72)	0.0003 (0.03)	0.1273 (1.45)	0.0598** (3.05)	-0.0143** (-5.23)	0.0002 (0.88)	0.0233** (2.08)	0.0023 (0.34)
GOVCON	-0.2262* (-1.95)	-0.1551 (-1.23)	-0.1967 (-1.52)		-0.2211 (-1.39)	-0.1759 (-1.58)	-0.1688 (-1.46)	-0.1974 (-1.59)	-0.2862** (-2.71)
TRADE	0.1059** (3.54)	0.1335** (4.37)	0.1475** (4.68)	0.1410** (4.25)		0.1439** (4.60)	0.1398** (4.27)	0.1512** (4.54)	0.1471** (3.75)
INFLATION	-0.0009** (-5.16)	-0.0007** (-4.62)	-0.0008** (-5.68)	-0.0006** (-4.58)	-0.0006** (-4.07)		-0.0007** (-4.60)	-0.0007** (-4.66)	-0.0010** (-10.97)
DCBANK	-0.0003* (-1.92)	-0.0001 (-0.34)	0.0000 (0.04)	0.0000 (0.02)	0.0000 (-0.14)	0.0000 (0.05)		0.0000 (-0.10)	-0.0001 (-0.50)
STOCAP	0.0070* (1.86)	0.0109** (2.21)	0.0149** (3.55)	0.0143** (2.84)	0.0186** (3.20)	0.0143** (3.01)	0.0123** (2.34)		0.0153** (2.75)
LOG(ICRG)	0.1163* (1.92)	0.1398** (3.18)	0.1187** (2.77)	0.1498** (3.48)	0.1498** (2.61)	0.1270** (2.96)	0.1327** (3.02)	0.1360** (3.06)	

Notes:
The dependent variable is annual rate of GDP per capita growth
The FDI indicator of interest is FDI01: Stock FDI inflows as a share of GDP
The t-statistics is in parentheses
*indicates significance at the 10% level
** indicates significance at the 5% level

Details of Indicators

Variable	Symbol	Description	Source
Economic Growth Rate	**g**	Annual growth rate of per capita GDP	1
Investment Share of GDP	**INV**	Gross fixed capital formation	1
Lagged GDP per capita	**GDP(-1)**	Previous year GDP per capita, in natural logarithm	1
Secondary Education Enrolment Rate	**EDU**	The proportion of population that enrols in secondary education	1
Population Growth Rate	**POPU**	The annual growth rate of population is calculated by the difference in the natural logarithm of population	1
Institutional, Legal and Investment Environment Indicator	**ICRG**	International Country Risk Index ranging from 0 (highest risk) to 100 (lowest risk). This indicator enters the model in natural logarithm form.	1
Inflation	**INF**	This is defined as the first difference in the natural logarithm of consumer priced index	2
Trade Openness	**TRADE**	Total Import and Export as share of GDP	3
The size of stock market	**STOCAP**	the stock market capitalization to GDP ratio which equals the value of listed shares divided by GDP. Both numerator and denominator are deflated appropriately, with the numerator equalling the average of the end-of-year value for year t and year t-1, both deflated by the respective end-of-year CPI, and the GDP deflated by the annual value of the CPI.	4
The scale of domestic stock market activity or liquidity	**STOACT**	the total value of trades of stock on domestic exchanges as a share of GDP. Since both numerator and denominator are flow variables measured over the same time period, deflating is not necessary in this case.	4
Stock market efficiency	**STOTO**	the stock market turnover ratio as efficiency indicator of stock markets. It is defined as the ratio of the value of total shares traded and market capitalization. It measures the activity or liquidity of a stock market relative to its size. A small but active stock market will have a high turnover ratio whereas a large, while a less liquid stock market will have a low turnover ratio. Since this indicator is the ratio of a stock and a flow variable, we apply a similar deflating procedure as for the market capitalization indicator.	4
Domestic Credit	**DCBANK**	Domestic credit provided by banks and financial institution	1

Notes:
1: World Bank's World Development Indicators 2004 CDRom
2: IMF's International Financial Statistics
3: IMF's Direction of Trade Statistics or World Bank's World Development Indicators 2004
4: Standard and Poor's, Emerging Stock Markets Factbook and supplemental SandP data, and World Bank and OECD GDP estimates.

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Institute for International Integration Studies
The Sutherland Centre, Trinity College Dublin, Dublin 2, Ireland