Foreign Direct Investment and Foreign-educated Labor

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The relationship between foreign direct investment (FDI) and foreign-educated labor is investigated. Students who have studied abroad in a foreign country form a pool of labor that could be conducive to FDI originating from the country where the students have received education. It may be due to the fact that they have acquired the human capital more productive for subsidiaries from the foreign country than the domestically educated labor has (e.g. language efficiency and organizational knowledge). In a small open economy model, we show that more foreign-educated labor attracts more FDI. We test this and other implications against bilateral FDI and foreign student data for 67 developed and developing countries over the period of 1963-1998. Our empirical findings strongly support our predictions.

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I. Introduction

Past two decades have witnessed an unprecedented increase in foreign direct investment (FDI) in the world: annual worldwide FDI flows have increased fifteen folds from 1980 to 1998 whereas world trade only tripled during the same period. The share of FDI in total international capital flow has climbed up from 12% in the early 1980s to 29.5% in 1998.[1] As FDI gains importance in international trade in capital, a variety of theoretical and empirical studies on FDI have come forth in the literature, investigating the determining factors of FDI and the effect of FDI on economic performances in FDI-receiving countries. In this paper, we focus on the former part of FDI research and offer another important determinant of FDI: foreign-educated labor.

Production technology involves the process of combining physical production inputs as well as human capital of employees, including their firm-specific technological knowledge and managerial skills specific to the organization, and the method of efficient communication among employees. For the firms investing in foreign countries through subsidiaries, therefore, host country labor that has acquired those various forms of human capital specific to the subsidiary (and to its parent firm) can be more productive. For instance, local managers in a foreign subsidiary firm who speak the same language as the management of the parent firm or local workers who have a good knowledge on how the parent firm and its subsidiaries are organized and operated should deliver higher productivity in the subsidiary firm. Since these types of human capital specific to a firm and its foreign subsidiaries are acquired through the education provided in the country of the parent firm, the availability of workers in a potential FDI-recipient country who have studied in the parent-firm country can be an important deciding factor for a

[1] International Financial Statistics, IMF, 2001

firm in investing abroad through its foreign subsidiary.[2] This paper presents theoretical derivation and empirical evidence on the role of country-specific foreign-educated labor as a determinant of foreign direct investment.

Earlier theoretical models in international trade have attempted to explain the pattern of international capital movements. In a pioneering work, MacDougall (1960) attributed the differences in factor endowment as the primary cause for international capital movement, whereas Kemp (1966) and Jones (1967) found technology differences as its main cause. Given the fact that the factor prices are not generally equalized across countries, international trade theories have attributed the comparative cost differentials as the primary cause of international capital movements (see Bhagwati and Srinivasan, 1983, Grossman and Helpman, 1991).[3] More recent theories suggest that FDI is preferred to trade in goods to capture the potential benefits of internalizing transaction when transaction cost in exporting or licensing is high (see Williamson, 1975, Magee, 1977, Dunning, 1981, Edwards, 1990). The internalization theory further argues that there is a tendency to choose countries with larger market size or greater growth potentials. Government policies, country-specific incentives and political variables are also suggested to play a role in attracting FDI (see Lim, 1983, Chen and Tang, 1986, Edwards, 1990, Hines, 1996). As the short-run fluctuations of FDI cannot be satisfactorily explained with the traditional comparative cost argument in trade theories, earlier empirical studies have indicated that the depreciation of the real exchange rate has attracted FDI inflows (see Caves, 1989, Froot and Stein, 1991, Blonigen, 1997). Our empirical result shows that the effect of country-specific foreign-educated labor on FDI is robust even after we control for these FDI determinants

[2] Parent firms often train local labor hired in subsidiary firms to develop firm-specific skills out of their own expense (see Labbs 1993 for the example of Gillette Corporation). However, some skill trainings such as foreign language education are general enough that they are typically acquired through foreign education and paid for by students.
[3] Extensive surveys on the determinants of FDI can be found in Caves (1996) and Dunning (1970).

suggested in the literature.

Our empirical analysis indicates that country-specific human capital attracts FDI from the country where the human capital was acquired, but does not increase the FDI inflow from other countries. Interestingly, we also find that the effect of the general level of human capital in a host country on the FDI inflow is statistically insignificant.[4] This implies that the foreign-educated human capital, rather than the general level of human capital, plays an important role as an absorptive capacity to induce and facilitate FDI.

Developed countries may selectively admit students from a particular developing country in order to improve political and economic relationship with the developing country, which may later result in greater trade and greater FDI flows. In our empirical result, we find that the effect of foreign education is robustly pronounced in the FDI flow from an economically advanced "North" country to another "North" country as well as to a "South" country. This suggests that attracting students for the improvement of political and economic relationship cannot account for the positive relationship between foreign-educated students and FDI.

The paper is organized as follows. Section 2 lays out a basic theoretical model of linking foreign-educated labor with FDI. In this section we also present an extended model with the consideration of endogenous foreign education decision. The empirical methodology and data used in the analysis are described in Section 3. The empirical findings and implications are addressed in Section 4. Section 5 concludes the paper and includes policy implications and a discussion of the importance of foreign-educated labor in explaining observed time-series change in FDI since 1980.

[4] Lucas (1990), Benhabib and Spiegel (1994), and Borenzstein et al. (1998) have discussed physical capital – human capital complementarity in economic growth.

II. Theoretical Model

2.1 Basic Model

There are n countries where each country produces one composite tradable good the price of which is determined perfectly competitively and normalized to one.[5] This good can be produced in each country with capital and two types of labor: domestic-educated and foreign-educated labor. We assume that workers in each country can acquire education at home or abroad. After the completion of education, the workers choose to participate in either host or home country labor market. Once the choices have been made, they stay in the labor pool of their choice due to large transaction and informational costs involved in transferring to another labor market. Thus, we assume labor is internationally immobile, but perfectly mobile across sectors within a country. We define foreign-educated labor as the pool of workers educated in a foreign country and who have returned to their home country for employment. Furthermore, the foreign-educated labors are distinguished by their host country of study. Physical capital is assumed perfectly mobile across borders at the constant cost of capital. Composite tradable goods production for a representative firm in a country takes the following CES production function with the constant returns to scale (CRS) technology

$$y = \left(\alpha l_h^{\rho} + \sum_{j \neq h} \beta l_j^{\rho} + \gamma k^{\rho} \right)^{1/\rho}$$

, where y is output, l_h is domestic-educated labor (those educated at home), l_j's ($j \neq h$) are foreign-educated labor (those educated abroad in host country j), and k is capital. α, β, and γ are positive constants and $\rho \in [-\infty, 1]$. The factor intensities for domestic-educated labor and

[5] Prices are normalized to one for expository purpose. The propositions in this section can also be shown under less restrictive assumptions with different prices for each composite tradable good in each country.

foreign-educated labors are different. However, the factor intensities are the same for different kinds of foreign-educated labors hired in a domestic firm regardless of the host country of study. Following the discussion in the introduction, we assume that $\alpha > \beta$. That is, the labor educated in each firm's own country is more productive than the labor educated in another country, possibly due to communication and language efficiency, and/or country-specific human capital on how businesses are conducted. We assume that a firm from one country can establish a subsidiary in the other country and that the parent and its subsidiary firms share the same production technology.[6]

To simplify the analysis, we assume that n=3 in the following. From this point on, we investigate exclusively the equilibrium in one country, which we call country 1. Initially, we assume that the country 1 is a small open economy, the economic decisions of which do not affect the international prices. There are three types of firms in country 1: domestic firms (firm 1) and subsidiaries of foreign multinational firms from country 2 and 3 denoted by firm 2 and firm 3, respectively. The production technologies for the three representative firms located in country 1 are

$$(2.1) \qquad y_j = \left(\alpha l_{jj}^{\rho} + \sum_{i \neq j} \beta l_{ij}^{\rho} + \gamma k_j^{\rho} \right)^{1/\rho} \qquad j = 1,2, \text{ or } 3$$

where y_1 (j=1) is the output of the domestic firm (firm 1), y_j (j=2,3) is the output of the foreign firm j originated from country j located in country 1. In general, l_{ij} is the labor educated in country i and employed in firm j. For example, l_{11} is the domestic-educated (educated in country 1) labor employed in the domestic firm and l_{i1} is the labor educated in country i and employed in the domestic firm 1. k_j is the capital used in firm j. This setting provides us with a three-sector

[6] Our main propositions provided later in this section can be shown to hold under a general neo-classical production function with CRS property. For the expository purpose, we have chosen a more restrictive Cobb-Douglas form.

model.[7]

Note that the domestic and foreign firms can only hire local labor in country 1 since we assume labor immobility across countries. Note also that the factor intensities of domestic (l_1) and foreign-educated labors (l_2, l_3) are different in each production function. It is because foreign-educated labor educated in country j (j=2,3) has the advantage of domestic education for the foreign firm from country j.[8] As we assumed that $\alpha>\beta$, the labor educated in each firm's own country (l_{jj}) is more productive than the labor educated in another country.

2.2 Firm's Optimization Problem

Taking the wage rates and the cost of capital as given, each firm j solves the following cost minimization problem:

(2.2) $\min w_1 l_{1j} + w_2 l_{2j} + w_3 l_{3j} + rk_j$ subject to $y_j^\rho = \alpha l_{jj}^\rho + \sum_{i \neq j} \beta l_{ij}^\rho + \gamma k_j^\rho$

,where w_1, w_2 and w_3 are the wage rates for domestic-educated labor and for foreign-educated labors who were educated in country 2 and 3 , respectively. The wage rates are determined in the competitive labor market. The cost of capital is constant at r, reflecting the open capital market and small economy assumptions. Given $\varpi = (w_1, w_2, w_3, r)$, the first-order conditions for optimization result in the following cost functions:

(2.3) $c_j(\varpi, y_j) = v_j(\varpi) \cdot y_j$, where $v_j(\varpi) = \left[\alpha \left(w_j / \alpha \right)^{\frac{\rho}{\rho-1}} + \sum_{i \neq j} \beta (w_i / \beta)^{\frac{\rho}{\rho-1}} + \gamma (r/\gamma)^{\frac{\rho}{\rho-1}} \right]^{\frac{\rho-1}{\rho}}$

Perfect competition forces zero profit conditions for each product : $p_j = v_j(\varpi)$. By

[7] This model is a generalized version of MacDougall (1960) to include different types of labor factors which will have influence on the international capital movement due to complementarity.

[8] We can show that our results are robust in a more general case where we only assume that the relative labor factor intensities are different in the domestic and foreign firms.

assumption, we normalized the prices to one: $p_1=p_2=p_3=1$. These conditions will determine the equilibrium wages w_1, w_2 and w_3, given the international price of r.[9]

$$(2.4) \qquad w_1 = w_2 = w_3 = w = \left[(1-\gamma^{\frac{1}{1-\rho}} r^{\frac{\rho}{1-\rho}}) / (\alpha^{\frac{1}{1-\rho}} + 2\beta^{\frac{1}{1-\rho}}) \right]^{\frac{\rho-1}{\rho}}$$

Under the given equilibrium factor prices, the input demands for each type of firms are as follows.

$$(2.5) \qquad l_{jj} = \left(\alpha v_j(\varpi) / w_j\right)^{\frac{1}{1-\rho}} \cdot y_j \quad \text{and} \quad l_{ij} = \left(\beta v_j(\varpi) / w_i\right)^{\frac{1}{1-\rho}} \cdot y_j \quad \text{for all} \quad i \neq j$$

$$k_j = \left(\gamma v_j(\varpi) / r\right)^{\frac{1}{1-\rho}} \cdot y_j$$

2.3 Market Clearing

We have the following three labor market clearing conditions in country *h*.

$$(2.6) \qquad L_1 = L_{11} + L_{12} + L_{13}$$

$$L_2 = L_{21} + L_{22} + L_{23}$$

$$L_3 = L_{31} + L_{32} + L_{33}$$

where L_{ij} is the total labor educated in country i employed in the firm type j. L_1, L_2 and L_3 are the total number of workers educated domestically and educated abroad in country 2 and 3, respectively. Denote L ($=L_1+L_2+L_3$) as the total labor available in country 1. We assume that the sum of foreign-educated labor pools is smaller than the domestic-educated labor pool ($L_2+ L_3< L_1$). If Y_j's are total outputs produced by each type of firm j, respectively, then the market clearing conditions can be expressed in terms of outputs.

[9] Given that the countries share the production technologies, when all goods are traded and their prices are equalized for all countries, the relative factor prices for all mobile and immobile factors will also be equalized across borders, as suggested by factor price equalization theorem.

(2.7) $\left(\alpha v_j(\varpi)/w_j\right)^{\frac{1}{1-\rho}} \cdot Y_j + \sum_{i \neq j}\left(\beta v_i(\varpi)/w_j\right)^{\frac{1}{1-\rho}} \cdot Y_i = L_j \quad j=1,2, \text{ or } 3$

Solving the above equations,

(2.8) $Y_j = v_j(\varpi)^{\frac{1}{\rho-1}}\left((\alpha^{\frac{1}{1-\rho}} + \beta^{\frac{1}{1-\rho}})w_j^{\frac{1}{1-\rho}} L_j - \sum_{i \neq j}\beta^{\frac{1}{1-\rho}} w_a^{\frac{1}{1-\rho}} L_a\right)/D \quad j=1,2, \text{ or } 3$

where $D=(\alpha^{\frac{1}{1-\rho}} + \beta^{\frac{1}{1-\rho}})(\alpha^{\frac{1}{1-\rho}} - \beta^{\frac{1}{1-\rho}})$.

2.4 Implications of the model

Proposition 1 If the share of foreign-educated labor educated in country *j* (*j*=2 or 3) to all labor (L_j/L) is below a critical level, the foreign firm *j* will not operate in country 1. The threshold level for the labor endowment ratio (L_j/L) is δ, where $\delta = \beta^{\frac{1}{1-\rho}}/(\alpha^{\frac{1}{1-\rho}} + 2\beta^{\frac{1}{1-\rho}})$.

Proof From (2.4) and (2.8), the condition for Y_j to be positive is as follows.

$(\alpha^{\frac{1}{1-\rho}} + \beta^{\frac{1}{1-\rho}})L_j - \beta^{\frac{1}{1-\rho}}(L - L_j) > 0$ and consequently $L_j/L > \beta^{\frac{1}{1-\rho}}/(\alpha^{\frac{1}{1-\rho}} + 2\beta^{\frac{1}{1-\rho}})$ ■

In order for the foreign firm to be economically viable in country 1, the share of total foreign-educated labor *j* in total labor needs to grow above a critical level determined by the relative ratios of the labor intensities. When the foreign-educated labor pool is relatively small and thus $(L_j/L)<\delta$ in country 1, the country will not attract foreign direct investment from a foreign country *j*. We can show that the condition for the domestic firm to operate is $(L_1/L)> \delta$, which is satisfied as long as the sum of foreign-educated workers is smaller than that of domestic-educated workers ($L_2+ L_3< L_1$) as assumed above.

We can show that a rise in the supply of foreign-educated labor educated in country *j* (*j*=2 or 3) will expand the outputs of the foreign firms *j* as well as the demands for each input, provided that there is an interior solution, that is, when the relative factor endowments are inside

the cone of diversification.

Proposition 2. Suppose $\left(L_j/L\right) > \delta$ (j=2 or 3). An increase in foreign-educated labor educated in country j will raise the input demands and the production of the subsidiary foreign firm originated from country j (i.e. $\partial L_{ij}/\partial L_j > 0$, for i=1,2, and 3, $\partial K_j/\partial L_j > 0$, $\partial Y_j/\partial L_j > 0$) and reduce the input demands and the production of the domestic firm and of the foreign subsidiary originated from the other foreign country (i.e. if $q \neq j$, $\partial L_{iq}/\partial L_j < 0$, for i=1,2, and 3, $\partial K_q/\partial L_j < 0$, $\partial Y_q/\partial L_j < 0$) .

Proof See Technical Appendix A. ■

Intuitively, all firms would use more foreign-educated labor as its supply increases. However, this proposition indicates that the demands for foreign-educated labor and all other inputs will fall in the domestic firms. This result is due to the following general equilibrium effect. An increase in foreign-educated labor of type j will initially put a downward pressure for the productivity of foreign-educated labor of type j in all firms since all firms attempt to hire more foreign-educated labor of type j. The marginal product of domestic-educated labor in all firms will tend to rise, but, due to the factor productivity differences in the three types of firms and the complementarity between domestic-educated labor and foreign-educated labors, the marginal product of domestic-educated labor will rise more in the foreign firms of type j than in the domestic firms and the other foreign firms. Given that the supplies of domestic-educated labor and the other type of foreign-educated labor pools are fixed, these two types of labor will gravitate toward the foreign firm of type j. Subsequently, this will bring down the marginal product of foreign-educated labor of type j in the domestic firms and the other type of foreign

firms. The foreign-educated labor of type *j* will further move to the foreign firms of type *j*. A new equilibrium will be reached with increased production in the foreign firms of type *j* and reduced production in the rest of the firms.

Due to the complementarity between labors and capital, the marginal product of capital will rise in the foreign firm *j*. This will attract capitals both from within the country and from abroad until the rate of returns to capital is equalized to the international level. Existing or new establishments of foreign firms from country *j* may finance the newly increased demands for capital in various forms of debt or equity from varying sources. However, as the subsidiary firms need to maintain the appropriate level of leverage ratio and the majority percentage ownership of the parent firm in the equity stake of the subsidiary firm, an increased demand for capital in firm *j* will lead to an increase in the capital inflow originating from the country *j*.

If the foreign-educated labor pool of type *j* gets smaller, the corresponding foreign firm of type *j*'s production will be reduced by the same above argument until to the point where its production is not economically viable as described in Proposition 1

Proposition 2 closely resembles the Rybczynski Theorem in trade theory which states that, for a small open economy with two sectors and two inputs, an increase in one input will lead to a rise in production of the good which uses the input more intensively in the production and a fall in production of the other good which uses the input less intensively. We may consider our final good produced by three firms as three goods which are perfectly substitutable with the relative prices fixed at unity. For there is no constraint for capital as it can be acquired from abroad at the internationally competitive rate, the resource constraints exist only for three types of labor: domestic and foreign-educated labors. Furthermore, in our model, the factor intensity in the domestic and the foreign firm in country 1 differ in producing the final goods. As the

Rybczynski Theorem suggests, we show in Proposition 2 that as the supply of foreign-educated labor j rises, the foreign firm which uses L_j more intensively will increase the production and the input demands, including the demand for capital which will lead to inflow of foreign direct investment.

Rybczynski Theorem further implies that when there is a large change in the endowment ratio, a country's production will be specialized in only one sector. Proposition 1 corresponds to this result as it suggests that when the endowment ratio L_j/L is lower that a critical level, the country 1 specializes in domestic firm production.

In the following, we show that even if the interest rates are affected by the increased demand for capital in country 1, the implication of Proposition 2 in this section will still be valid. We consider a case where three countries are of equal size and the endowment changes in country 1 could affect the level of r. An increase in L_j will raise the marginal product of capital in the foreign firms of type j and consequently the demand for their capital. Although there will be reduction in demand for capital in other firms in country 1, the total net inflow of capital in country 1 will be positive. Since the world-wide supply of capital is fixed, this will lead to a rise in the interest rate r. Given all other things being equal, at a new higher equilibrium interest rate r, the amounts of capital used for all sectors in the other two countries will be lower than before. Furthermore, the consequent amounts of capital used in all firms other than firms of type j in country 1, K_q $(q \neq j)$, will be lower than the earlier small-country case levels of capital demanded before and after the increase in L_j. As the total world-wide supply of capital is fixed, therefore, the resulting amount of capital used in the foreign firms of type j will be higher than the initial level of capital used before the increase in L_j, even when we take into consideration the general equilibrium effect of L_j increase on the interest rate r. The changes to other variables

will be the same as the small-country case as is shown in Technical Appendix B.

2.5 Endogenous Human Capital

In this section, we extend the model to include endogenous education decision. For individuals, the decision to pursue foreign education will depend on the cost of and the benefit from obtaining education. If the cost of foreign education falls, more individuals will pursue foreign studies with other things being equal. We assume L individuals are ordered by index a according to their ability in obtaining foreign education, where higher a implies lower ability. Lower ability individuals for whom it takes more time in obtaining foreign education will bear a higher opportunity cost in terms of foregone wage. Let $c(a)$, $a \in [0,L]$, be an index function increasing with respect to a, $c' > 0$. We assume that the cost of obtaining foreign education is $c(a)w_1$ and foreign education will increase the effective units of labor by ε. Foreign-educated individuals will receive a wage of w_1 per effective unit.

Based on our model, those who have $\varepsilon \cdot w_j - c(a)w_1 \geq w_1$ will decide to obtain foreign education in country j. Let a^* be the individual whose effective wage with foreign education is the same as with domestic education: $\varepsilon \cdot w_j - c(a^*)w_1 = w_1$. As $c(a)$ is an increasing function of a, for all $a < a^*$, the effective wage will be greater when the individual obtains foreign education. Given the total labor L, the size of each labor pool is determined as follows: $L_j = \varepsilon \cdot a^*$ and $L_1 = (L - a^*)$. If $c(a) = c \cdot a$ where c is a constant, j^* equals $\left(\varepsilon w_j / w_1 - 1\right)/c$.

A reduction in c or a rise in ε due to, for example, lower transportation cost will reduce L_1 and increase L_j. We can easily show that the effect of a reduction in L_1 on the operation of foreign firm has the same direction as the effect of an increase in L_j, and therefore a fall in c will

raise the input demands in the foreign firm and reduce those in the domestic firm not just due to the increase in L_j but also due to the decrease in L_1.

Changes in exogenous variables such as higher degree of political and economic proximity may lower the cost of foreign studies. At the same time, these same shocks may also lower the fixed cost involved in establishing foreign production units in the host country. This poses an endogeneity problem in the empirical estimation of our model. The endogeneity problem will be more serious between contemporaneous FDI inflow and foreign education variable. To isolate the employment effect in our story, we investigate the effect of study abroad in the past on the current FDI inflow.[10] Furthermore, we also check for the robustness of our result by using the instrumental variable estimation method.

III. Empirical Implementation

We test our theoretical implications in the previous section against bilateral FDI panel data of 63 developing and developed economies for the period of 1980 to 1998 and bilateral student flow panel data for the period of 1963 to 1996. We estimate a reduced-form regression model with the theoretical endogenous variable, foreign direct investment, as the dependent variable. A set of explanatory variables which includes the number of foreign-educated students represent the parameters of our model. We also include other explanatory variables identified in the earlier studies on FDI.

3.1 Sources and Descriptions of Variables Used

We measure the size of foreign-educated labor, L_j, by the number of students who studied

[10] The students studying abroad are lagged 15 years to proxy the current pool of foreign-educated labor in the empirical implementation. See section 3.2 for details.

abroad in country j. Our data on students abroad are taken from the *Statistical Yearbooks* published annually by UNESCO. The data contain bilateral flows of students studying abroad each year: the number of students from each sending country who were enrolled at institutions of higher education in each host country. The data are available for 63 countries over the period of 1963-1996. However, in most countries, data are not available for all years.

One concern for using this variable as a measure of L_j is that some students don't return to their home countries after the completion of study abroad. However, as long as the return rates of foreign students are significant and constant over our sample period, our measure would be able to proxy the change in the foreign-educated labor pool in the home country. In addition, the non-returning students typically maintain a close connection with their home countries and they in many cases choose to work in their home countries as managers for multinational firms (see Glaser, 1979). Another concern is that our measure is not a stock variable. However, in the long-run steady state equilibrium, the flow variable of foreign students should have a one-to-one, positive relationship with the stock variable L_j and our empirical specifications attempt to estimate the relation of L_j and FDI in the steady state equilibrium. In the short run, it is possible that our variable may not proxy the theoretical counterpart and this is one reason, among many, for considering the variable as an endogenous variable and using the IV estimation method in one of the alternative specifications in the next section.

The data for foreign direct investment inflows and outflows are taken from *International Direct Investment Statistics Yearbook* (OECD, 1999) which includes annual bilateral foreign direct investment series for 67 countries for the period of 1980 to 1998.

We control for transportation cost in FDI by including the distance between a sending and a receiving countries as an explanatory variable. The estimated effect of students abroad on FDI,

therefore, cannot be ascribed to the geographical proximity of countries, which will generate a bias toward a positive association between students abroad and FDI. We include three more variables that may affect simultaneously the cost of FDI and the cost of foreign education: binary variables for whether two countries involved in FDI speak the same language, for whether they have the same religion, and for whether one country was once a colony of the other. Data on language, religion and colony are from *Encyclopedia Britannica* and data on distance are from Ross (19??) and the map search engine at www.indo.com/distance.

Our explanatory variables include other variables that are identified as determinants of FDI in earlier studies. We include the ratio of real GDP per capita of an FDI-receiving country to that of an FDI-sending country to proxy the (inverse of the) relative return on capital. We expect that the more FDI will be invested, the higher (lower) the rate of returns to capital in the FDI-receiving (sending) country.[11] The coefficient for this variable is therefore expected to be negative. Secondly, per capita income in the sending country may proxy the demand for clean environment, which can be a push factor for FDI to relocate polluting manufacturing facilities to other countries. This latter argument will reinforce the negative effect of this variable.

Controlling for the effect of scale economies, the real GDP of both the recipient and the sender of FDI are included as explanatory variables. Both variables are expected to have a positive association with FDI. Furthermore, since a faster-growing economy will attract more FDI due to the potential market growth in the future, we include the growth rates of real GDP of both countries to account for this effect.

Since FDI is argued to substitute for domestic investment, our regressions use the GDP share of domestic investment in an FDI-receiving country as an explanatory variable. In our

[11] See Edwards (1990) and Caves (1996) for the survey of determinants of FDI which were discussed in the earlier studies.

small open economy model, both are endogenously determined. Since domestic and foreign firms compete to produce the same product, the correlation should be negative. However, the previous literatures have suggested that domestic investment may reflect the existing atmosphere in the host country towards private enterprise, which implies a positive correlation between domestic investments and FDI. Therefore, the combined effect is ambiguous. The GDP share of government spending in the receiving country is entered as a regressor to control for the involvement of government in the economy which may shape the environment for private business and foreign direct investment.

As a proxy for international competitiveness, we have the real exchange rate of a receiving country as an explanatory variable. If real exchange rate is overvalued, then the country will lose its price competitiveness, which will result in a reduction in its exports and increase in imports. Considering the fact that trade and FDI are substitutes in our basic model, this will reduce FDI. However, if a large portion of the intermediate goods for foreign firms in the FDI-receiving country is imported, the overvalued real exchange rate would induce greater FDI. Therefore, the correlation is ambiguous. Real GDP, domestic investment, government spending, real exchange rate, population, and GDP growth rate are obtained from The Penn World Tables (Mark 6).

Alternative specifications with additional regressors are investigated to check the robustness of our main prediction. Even if exports should be treated as endogenous, we include exports as an additional regressor in one specification for sensitivity test of our result.[12] Bilateral trade flow statistics are from World Bank Institute's *Trade and Production Database* which includes data for 67 countries for the period of 1976 to 1999. We expect several channels through

[12] Culem (1988) and Billington (1999) have empirically shown that FDI inflows and imports are complements rather than substitutes.

which tariff rates in an FDI-receiving (goods-importing) country may have influence on the FDI decision. First, higher tariff in an FDI-receiving country will reduce import and instead increase FDI to the receiving country, as the relative cost of import will rise with tariff. Second, an increase in tariff will raise the price for imported intermediate goods used by multinational firms and therefore discourage FDI. Third, the tariff rates reflect the degree of economic and political openness. Thus the effect of tariff on FDI is theoretically ambiguous. Data on tariff rates are from *Trends in Average Tariff Rates for Developing and Industrial Countries 1980-99* at the World Bank Institute website.

We also include the total annual number of tourists in an FDI-receiving country as an additional explanatory variable to control for the degree of economic and political openness which should influence student exchange and FDI. Data on tourists are from the World Bank's World Development Indicator (2001). To isolate the effect of foreign students from domestic human capital level, we include average years of schooling in population as an additional regressor. Human capital index is obtained from Barro and Lee (2000).

3.2 Econometric Model Specification

Our benchmark specification is a log-linear, fixed-effects model:

$$\ln(FDI_{ijt}) = \alpha_i + \delta_j + \beta_0 \ln(STDT_{ijt-15}) + \boldsymbol{\beta}'\mathbf{X}_{ijt} + \varepsilon_{ijt},$$

where FDI_{ijt} is the level of real FDI from country i to country j in year t and $STDT_{ijt-15}$ is the number of students abroad from country j who studied in country i in year t-15. The variable of students abroad and the FDI variable are paired in a reverse direction as is commanded in our theory: FDI from country i to country j and students from country j to country i. Note also that students abroad 15 years ago is paired with FDI this year to account for the time needed to

acquire education and to return home. The time lag will also help avoid the reverse causality problem as well as the endogeneity problem discussed in Section 2.[13] $\mathbf{X}_{ijt}$ is a vector of regressors, including the logarithms of all the explanatory variables discussed in the previous section. α_i is a country-specific constant term for an FDI-sending country and δ_j is a country-specific constant term for an FDI-receiving country. We apply a fixed-effects model for both the sending and the receiving country to allow for missing country-specific factors. The error term ε_{ijt} is assumed to be distributed i.i.d. with zero mean.

As part of our sensitivity analysis, we have various types of regression specifications, as reported in Table 2. In addition to the base model in log form, we include a model with all dependent and explanatory variables in linear form, a regression without fixed effects, 2-way fixed-effects specification with both country and year dummies, a regression with the share of FDI in GDP as the dependent variable, a regression with STDT with 10 year lag, a model with the correction for serially correlated error term, and two stage least squares regression.

To seek economic favors from a particular developing country such as provision of incentives for FDI inflows or reduction of regulations on FDI, a developed country may admit more students from the developing country who would later have a favorable view toward the developed country. A positive relation between STDT and FDI may arise due to this reason that is beyond the employment effect proposed in our model. Since this kind of political consideration is expected to play a more important role between a developed and a developing country in their inter-country exchange of students, we estimate our regression model with a sub-sample which includes only the FDI flows between developed (North) countries. The regressions involving the flows of FDI from North to South and from South to North are also reported in

[13] Instead of the 15-year gap, we have also used the gaps of different years (10 and 5 years) as alternatives, which yielded qualitatively the same result regarding the effect of STDT on FDI.

Table 3.

In Table 4, we further attempt to isolate the autonomous effect of students abroad by including additional regressors such as trade volume, number of tourists and tariff rates. Table 4 also reports the regression results which examine whether the FDI effect of foreign-educated labor is country-specific or more general.

Since our main variables exhibit upward time trends, we test for their non-stationarity using a panel unit-root test developed by Im, Pesaran and Shin (1997). The Lagrange multiplier (LM) statistics for the logs of FDI and STDT indicate that we can reject non-stationarity of both variables at the significance level of 1%.[14]

IV. Empirical Findings

The dependent variable in Table 2 is real foreign direct investment in the 1990 constant U.S. dollars. In model (1), we first report the benchmark OLS regression result with all the dependent and independent variables in log form except binary variables and real per capita GDP ratio. All the variables are in linear form in model (2). Model (3) reports the regression result without any country-specific fixed effects while we have the 2-way fixed effects for both country-specific and calendar year-specific effects in model (4).

In model (5), we have the ratio of FDI to GDP of an FDI-sending country as a dependent variable and the population share of students abroad as an explanatory variable. We implement the same specification in model (1) without the aggregate real GDP and the GDP growth rate of

[14] The tests are performed on a panel data set including the countries for which the observations are available for five or more consecutive years. The test statistics are available from the authors upon request.

the sending country as regressors.[15] Model (6) uses a 10-year gap between FDI and STDT instead of the 15-year gap. The models (7) and (8) report the regression results with the correction for the serially correlated error term and with the two-stage least squares method, respectively. The instrumental variables used in model (8) (in addition to the included exogenous regressors and country dummies) to derive the estimated values of STDT are the population in the age group of 20 to 29 in a student-sending country and one-year lagged STDT. The former variable is intended to account for the effect of the population size at ages for higher education on STDT.

Table 2 shows that the effect of STDT on FDI is statistically significant and consistent with our prediction in proposition 2: more foreign direct investment flows into a country with a bigger pool of students who studied in the FDI-sending country. This effect is robustly pronounced in all specifications in this table.

As predicted in Section 3.1, shorter distance, using the same language, and having the same religion reduce the transaction costs and increase foreign direct investment flows. The result in Table 2 also indicates that more FDI flows into those countries that used to be colonies of an FDI-sending country, although this effect is not confirmed in the linear-form model. The explanatory variables that are identified as determinants of FDI in earlier studies, including the aggregate real GDP levels and the GDP growth rates in both FDI-receiving and sending countries, real per capita GDP ratio, investment and government ratio to GDP, and the exchange rate, generally show the expected effects on FDI as discussed in Section 3.1.

Proposition 1 predicts that FDI will not flow in as long as foreign-educated labor stock is

[15] The aggregate real GDP and the GDP growth rate in an FDI-sending country are excluded from the regression, as the ratio of FDI to GDP regression involves investigating how shares of FDI are distributed among recipient countries.

below a threshold level. Using our regression result in model (2) with all variables in linear form, we can estimate the threshold level of foreign students. The estimated threshold of STDT is 2,982 given that other regressors of the model take the sample mean values.[16]

Table 3 reports the regression results of our benchmark specification with three sub-samples: "North to North" FDI flows in model (1), "North to South" FDI flows in model (2), and "South to North" FDI flows in model (3). We find that the effect of STDT is yet more pronounced in the regression based on the "North to North" sub-sample than other sub-sample runs. This result indicates that we cannot attribute the relation between STDT and FDI to the political consideration discussed in Section 3.2. A rather surprising fact is that the effect of STDT is stronger for the FDI flows between two developed countries than for the FDI flows from developed to developing countries. One possible reason is that the quality of education acquired by students from "North" countries is higher than those from "South" countries so that foreign-educated labor in "North" countries attracts more FDI.[17]

We see an insignificant effect of STDT on FDI for the "South to North" sub-sample possibly due to small number of countries included and short time series for each country. In the country fixed-effect model with short time series, within-country variation may be relatively small. In order to capture between-country variation, we run a regression without country dummies in model (4) for the "South to North" sub-sample to capture both between- and within-

[16] To derive the threshold of STDT, we first calculate the sample means of all regressors in model (2) except STDT and then add up the product terms with estimated coefficients in model (2) and the sample means. This gives us a linear equation with respect to FDI and STDT. We solve the equation when FDI=0 to calculate the threshold of STDT. Using two other specifications with the population size or the quadratic term of STDT as an additional regressor, the projected threshold levels are 2,765 and 1,941, respectively.

[17] In the 2000-01 academic year, only 29% of all foreign students from Africa who studied in the U.S were enrolled in graduate programs while 40% of students from Europe were enrolled in graduate programs (see *Open Doors*, 2001). According to the UNESCO Statistical Yearbook, the U.S. is the largest host country of foreign students, attracting more than 30% of foreign students worldwide in 1996, and France is the second largest with 12% of foreign students.

country variations. We find that the significance of the STDT effect is improved.

In Table 4, we introduce additional regressors to the model (1) of Table 2 to isolate the autonomous effect of STDT: export from an FDI-sending country to an FDI-receiving country (TRADE) in model (1), tariff rate in an FDI-receiving country (TARIFF) and the number of tourists in an FDI-receiving country (TOURIST) in model (2), and the average schooling years of the population with the age 25 or older in an FDI-sending country (SCHOOL_1) and in an FDI-receiving country (SCHOOL_2) in model (3). All specifications in Table 4 confirm our prediction: STDT exhibits a pronounced and significant positive effect on FDI as in Table 2.

In model (1), TRADE shows, not surprisingly, a significantly positive association with FDI. What is surprising to us is a strong and significant effect of STDT on FDI even when we include TRADE as a regressor. TOURIST, as a proxy for openness, is shown in model (2) to have a marginally significant and positive effect on FDI as predicted. Model (2) also shows that higher tariff rate in an FDI-receiving country generally has an adverse effect on FDI. One possible reason is that multinational firms are discouraged due to higher prices of intermediate goods they need to import to operate.

In case of the FDI flows to developing economies, the level of human capital at the receiving end may be an important factor in facilitating FDI. Model (3) shows that the effect of the average schooling years in the FDI host country is insignificant and negative whereas the positive effect of STDT is intact, suggesting that country-specific human capital is important rather than the general human capital level of the population. The negative coefficient on the average schooling years may result from the fact that the average schooling years may represent the general wage levels of the host economy and that FDI flows are attracted to lower-wage economies.

In models (4) – (6) we attempt to test if a rise in the number of foreign-educated students who studied in one country affects FDI inflow from other countries. In model (4) we include, in addition to the number of students from country j who studied in country i (STDT), a regressor of the total number of students from country j who studied in foreign countries other than country i (STDTREST). Model (4) shows that STDTREST has a negative impact on the FDI inflow from country i to country j while the effect of STDT is significant and positive. The negative cross-effect is again confirmed in model (5) where the FDI inflows from countries other than country i (FDIREST) is associated with STDT: a rise in the country-specific STDT reduces FDI inflows from the rest of the countries. The negative association could be explained by the fact that there is competition amongst FDI-sending countries. Although any rise in country-specific foreign-educated labor will make a favorable environment for all FDI inflows in the host country, it will be most favorable for the FDI from the country where the workers were educated. The competition may then draw away the opportunity of investment from the rest of the countries. However, model (6) indicates that the net impact on the total FDI inflow from all countries (TOTFDI) is positive.

The estimated effect of students abroad on FDI presented in Tables 2 through 4 is not just significant statistically, but quantitatively as well. According to our simple calibration exercise the change in STDT can explain approximately 10.1% of the actual change in FDI flows from 1980 to 1998.[18]

[18] We perform this calibration based on model (1) of Table 2 with the assumption that all variables other than FDI and STDT are constant at the cross-sample mean value of each variable in the initial year of 1980. In our data, the actual sample mean values of FDI were 1.0412 in 1980 and 5.2463 in 1998 while the corresponding sample means of STDT were 179.8 and 750.9, respectively. Using the estimated coefficients of model (1) of Table 2, we can calculate the predicted change in the mean value of the FDI flows during 1980 to 1998 due to the change in the sample mean value of STDT from 1965 to 1983. The predicted mean value of the FDI was 1.46523 and the predicted change in mean value was 0.42403, whereas the actual change in the sample mean value of the FDI flow

V. Concluding Remarks

This study develops a simple model considering foreign-educated labor as an important determinant of FDI inflows. We use bilateral FDI and foreign student data for 67 developed and developing countries over the period of 1963-1998 to test our proposition: an increase in country-specific foreign-educated labor will raise FDI inflow from the foreign country where the labor was educated.

Empirical evidence in this study strongly confirms our proposition under various alternative specifications controlling for other determinants discussed in the earlier literature. Our results also indicate that country-specific foreign-educated labor does not attract FDI from countries other than the country of foreign education. In fact, the FDI inflows from other countries are crowded out. However, the net effect of foreign-educated labor on total FDI inflow is positive. Combining this with the result that the average schooling years of the population in the FDI-receiving country do not have positive influence in attracting FDI, we conclude that country-specific human capital rather than the general human capital level induces country-specific FDI inflows. Foreign education of domestic labor accumulates country-specific human capital which facilitates the foreign-firm-specific production in the host country whereas general human capital does not. The estimated effect of students abroad on FDI is not just significant statistically, but quantitatively as well.

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Technical Appendix A

(A -1) Proof of $\frac{\partial Y_j}{\partial L_j}>0$, $\frac{\partial Y_j}{\partial L_j}=\frac{\alpha^{\frac{1}{1-\rho}}v_j(\varpi)}{\left(\alpha^{\frac{1}{1-\rho}}-\beta^{\frac{1}{1-\rho}}\right)}>0$

As $\frac{\partial L_{ij}}{\partial L_j}=\frac{\partial L_{ij}}{\partial Y_j}\frac{\partial Y_j}{\partial L_j}$ and $\frac{\partial L_{ij}}{\partial Y_j}>0$, we have $\frac{\partial L_{ij}}{\partial L_j}>0$ (i=1,2, and 3).

As $\frac{\partial K_j}{\partial L_j}=\frac{\partial K_j}{\partial Y_j}\frac{\partial Y_j}{\partial L_j}$ and $\frac{\partial K_j}{\partial Y_j}>0$, we have $\frac{\partial K_j}{\partial L_j}>0$.

For $q\neq j$, we have $\frac{\partial Y_q}{\partial L_j}=\frac{-\beta^{\frac{1}{1-\rho}}v_q(\varpi)}{\left(\alpha^{\frac{1}{1-\rho}}-\beta^{\frac{1}{1-\rho}}\right)\left(\alpha^{\frac{1}{1-\rho}}+\beta^{\frac{1}{1-\rho}}\right)}<0.$

By the same argument as above, we have $\frac{\partial L_{iq}}{\partial L_j}<0$ (i=1,2, and 3) and $\frac{\partial K_q}{\partial L_j}<0$.

Technical Appendix B

The discussion in the large-country assumption implies the following.

$$\frac{dK_j}{dL_j}=\frac{\partial K_j}{\partial Y_j}\frac{dY_j}{dL_j}+\left[\frac{\partial K_j}{\partial v_j}\left(\frac{\partial v_j}{\partial w}\frac{\partial w}{\partial r}+\frac{\partial v_j}{\partial r}\right)+\frac{\partial K_j}{\partial r}\right]\frac{dr}{dL_j}=\frac{\partial K_j}{\partial Y_j}\frac{dY_j}{dL_j}+\frac{\partial K_j}{\partial r}\frac{dr}{dL_j}\ <0.$$

Since $\partial K_j/\partial Y_j>0$, $\partial K_j/\partial r<0$ and $dr/dL_j>0$, the above equation needs dY_j/dL_j to be positive. Even when interest rate may be affected by the changes in demands for capital, a rise in L_j leads to a rise in Y_j. Other firm productions ($q\neq j$) will be reduced as are shown below.

$$\frac{dY_q}{dL_j}=\frac{\partial Y_q}{\partial L_j}+\left[\frac{\partial Y_q}{\partial v_q}\left(\frac{\partial v_q}{\partial w}\frac{\partial w}{\partial r}+\frac{\partial v_q}{\partial r}\right)+\frac{\partial Y_q}{\partial w}\frac{\partial w}{\partial r}\right]\frac{dr}{dL_j}\ =\frac{\partial Y_q}{\partial L_j}+\frac{\partial Y_q}{\partial w}\frac{\partial w}{\partial r}\frac{dr}{dL_j}\quad(q\neq j)$$

Since $\partial Y_q/\partial L_j<0$, $\partial Y_q/\partial w>0$, $\partial w/\partial r<0$, $dr/dL_j>0$, we have $dY_q/dL_j<0$.

The signs of the derivatives regarding the labors will be the same as those of the small-country model.

$$\frac{dL_{iq}}{dL_j}=\frac{\partial L_{iq}}{\partial Y_q}\frac{dY_q}{dL_j}+\left[\frac{\partial L_{iq}}{\partial v_q}\left(\frac{\partial v_q}{\partial w}\frac{\partial w}{\partial r}+\frac{\partial v_q}{\partial r}\right)+\frac{\partial L_{iq}}{\partial w}\frac{\partial w}{\partial r}\right]\frac{dr}{dL_j} \quad (i=1,2,3 \text{ and } q=1,2,3)$$

$$=\frac{\partial L_{iq}}{\partial Y_q}\frac{dY_q}{dL_j}+\frac{\partial L_{iq}}{\partial w}\frac{\partial w}{\partial r}\frac{dr}{dL_j}$$

$$=\frac{\partial L_{iq}}{\partial Y_j}\left(\frac{\partial Y_q}{\partial L_j}+\frac{\partial Y_q}{\partial w}\frac{\partial w}{\partial r}\frac{dr}{dL_j}\right)+\frac{\partial L_{iq}}{\partial w}\frac{\partial w}{\partial r}\frac{dr}{dL_j}$$

$$=\frac{\partial L_{iq}}{\partial Y_q}\frac{\partial Y_q}{\partial L_j}+\left(\frac{\partial L_{iq}}{\partial Y_q}\frac{\partial Y_q}{\partial w}+\frac{\partial L_{iq}}{\partial w}\right)\frac{\partial w}{\partial r}\frac{dr}{dL_j}$$

$$=\frac{\partial L_{iq}}{\partial Y_q}\frac{\partial Y_q}{\partial L_j}$$

(since if $i=q$, $\frac{\partial L_{iq}}{\partial Y_q}\frac{\partial Y_q}{\partial w}+\frac{\partial L_{iq}}{\partial w}=\frac{1}{1-\rho}\frac{Y_q}{w}\left(\frac{\alpha v_q}{w}\right)^{\frac{1}{1-\rho}}-\left(\alpha v_q\right)^{\frac{1}{1-\rho}}Y_q\left(\frac{1}{1-\rho}w^{\frac{\rho-2}{1-\rho}}\right)$

$$=\frac{1}{1-\rho}\left(\alpha v_q\right)^{\frac{1}{1-\rho}}Y_q\left[\left(\frac{1}{w}\right)^{\frac{2-\rho}{1-\rho}}-w^{\frac{\rho-2}{1-\rho}}\right]=0$$

and if $i\neq q$, $\frac{\partial L_{iq}}{\partial Y_q}\frac{\partial Y_q}{\partial w}+\frac{\partial L_{iq}}{\partial w}=\frac{1}{1-\rho}\frac{Y_q}{w}\left(\frac{\beta v_q}{w}\right)^{\frac{1}{1-\rho}}-\left(\beta v_q\right)^{\frac{1}{1-\rho}}Y_q\left(\frac{1}{1-\rho}w^{\frac{\rho-2}{1-\rho}}\right)$

$$=\frac{1}{1-\rho}\left(\beta v_q\right)^{\frac{1}{1-\rho}}Y_q\left[\left(\frac{1}{w}\right)^{\frac{2-\rho}{1-\rho}}-w^{\frac{\rho-2}{1-\rho}}\right]=0 \quad)$$

Since $\partial L_{iq}/\partial Y_q>0$, dL_{iq}/dL_j has the same sign as $\partial Y_q/\partial L_j$. Therefore,

sgn (dL_{iq}/dL_j) = sgn($\partial L_{iq}/\partial L_j$).

Table 1. Descriptions, Sources and Summary Statistics of Variables Used

Variable	Description	Mean	St. Dev.
$STDT_{ij}$	Number of students from country j who were enrolled at institutions of higher education in country i	669.3	1898
FDI_{ij}	Level of real FDI from country i to country j (1991 U.S. billion $)	4.817	17.72
DISTANCE	Distance between the capitals of FDI-sending and FDI-recipient countries (100 km)	58.41	48.02
LANGUAGE	Dummy variable for the same language (=1 if the most popular languages in both countries are the same.)	.2055	.4041
RELIGION	Dummy variable for the same religion (=1 if the most popular religions in both countries are the same.)	.3282	.4696
COLONY	Dummy variable for colony (=1 if the FDI-receiving country used to be a colony of the sending country.)	.0225	.1482
GDP 1	Real GDP of the FDI-sending country (1991 US $)	1.31E+9	1.75E+9
GDP 2	Real GDP of the FDI-receiving country (1991 US $)	8.10E+8	1.39E+9
RELPCGDP	Per capita real GDP of the FDI-receiving country relative to that of the FDI-sending country.	.9705	1.268
GROW 1	Real GDP growth rate of the FDI-sending country	.0394	.1267
GROW 2	Real GDP growth rate of the FDI -receiving country	.0578	.3332
I	Domestic investment rate of the FDI-receiving country	21.70	6.773
G	Share of government spending in GDP of a FDI-receiving country	17.36	5.369
EXCHANGE	Real exchange rate of the FDI-receiving country	82.33	36.59
$TRADE_{ij}$	Real exports of country i to country j (1991 US $ million)	62426	129268
TARIFF	Average tariff rate of the FDI-receiving country	13.24	12.38
TOURIST	Total annual number of tourists in the FDI-receiving country	1.18E+7	1.36E+7
SCHOOL 1	Average schooling years of the population with the age 25 or older in the FDI-sending country	8.461	1.809
SCHOOL 2	Average schooling years of the population with the age 25 or older in the FDI-receiving country	7.789	2.331

Table 2. FDI Regression Results

	(1) Base	(2) Linear	(3) w/o FE	(4) 2-way FE	(5) STDT/POP	(6) $STDT_{t-10}$	(7) AR(1)	(8) 2SLS
Dependent Var	ln(FDI)	FDI	ln(FDI)	ln(FDI)	ln(FDI/GDP)	ln(FDI)	ln(FDI)	ln(FDI)
ln(STDT)	**0.239**	**0.001**	**0.191**	**0.232**	**0.250**	**0.213**	**0.220**	**0.288**
	(13.20)	(6.27)	(12.26)	(12.79)	(14.80)	(11.81)	(6.59)	(13.48)
ln(DISTANCE)	**-0.533**	**-0.033**	**-0.379**	**-0.540**	**-0.506**	**-0.582**	**-0.543**	**-0.522**
	(-17.08)	(-6.89)	(-14.18)	(-17.3)	(-17.03)	(-18.51)	(-9.23)	(-15.23)
LANGUAGE	**0.150**	**3.823**	**0.254**	**0.154**	**0.185**	**0.159**	0.019	**0.137**
	(2.65)	(9.01)	(3.93)	(2.74)	(3.46)	(2.82)	(0.17)	(2.26)
RELIGION	**0.330**	**1.207**	**0.398**	**0.336**	**0.262**	**0.335**	**0.416**	**0.306**
	(6.98)	(3.35)	(6.79)	(7.11)	(5.90)	(7.13)	(4.44)	(5.98)
COLONY	0.228	**-4.765**	**0.636**	0.248	**0.295**	**0.361**	0.214	0.184
	(1.52)	(-3.92)	(3.51)	(1.65)	(2.08)	(2.42)	(0.77)	(1.11)
ln(GDP 1)	**1.891**	**0.000**	**0.757**	**0.845**		**1.937**	**1.279**	**1.509**
	(8.03)	(9.94)	(29.09)	(2.57)		(8.69)	(3.26)	(5.35)
ln(GDP 2)	**0.916**	**0.000**	**0.648**	0.313	**2.116**	**1.036**	**1.212**	**1.048**
	(4.47)	(13.79)	(28.84)	(1.22)	(18.14)	(5.36)	(3.21)	(4.49)
RELPCGDP	-0.054	**-2.855**	**-0.484**	-0.079	-0.064	**-0.160**	-0.248	**-0.180**
	(-0.73)	(-7.41)	(-21.02)	(-1.08)	(-1.00)	(-3.25)	(-1.44)	(-2.49)
ln(GROW 1)	**0.085**	-1.331	**0.247**	**0.093**		**0.129**	**0.093**	**0.111**
	(3.17)	(-1.25)	(7.47)	(3.04)		(4.65)	(3.02)	(3.89)
ln(GROW 2)	**0.070**	0.340	**0.208**	**0.072**	**0.064**	0.042	-0.011	0.049
	(2.62)	(0.61)	(6.34)	(2.64)	(2.60)	(1.62)	(-0.38)	(1.75)
ln(I)	0.065	0.003	0.113	0.116	-0.299	0.114	0.108	-0.054
	(0.37)	(0.20)	(1.21)	(0.60)	(-1.88)	(0.66)	(0.35)	(-0.27)
ln(G)	0.178	-0.064	**-0.426**	0.026	**0.356**	0.116	-0.049	**0.572**
	(0.92)	(-0.95)	(-4.90)	(0.13)	(1.99)	(0.60)	(-0.25)	(2.56)
ln(EXCHANGE)	**0.683**	0.013	**1.256**	**0.610**	**1.187**	**0.610**	**0.549**	**0.788**
	(6.04)	(1.62)	(18.37)	(4.71)	(11.59)	(5.29)	(3.27)	(6.35)
CONSTANT			**-30.829**					
			(-35.41)					
Observations	4765	8502	4765	4765	5454	4857	3042	4137
Adjusted R-sq	0.716	0.212	0.450	0.719	0.685	0.707	0.486	0.719
ρ in AR(1)							0.473	

* Numbers in parentheses are t-statistics.

Table 3. FDI Regressions for Regional Sub-Samples

	(1) N→N	(2) N→S	(3) S→N	(4) S→N
ln(STDT)	**0.340**	**0.164**	0.018	0.127
	(13.30)	(5.62)	(0.20)	(1.66)
ln(DISTANCE)	**-0.424**	**-0.993**	**-0.547**	0.005
	(-10.12)	(-12.5)	(-1.99)	(0.04)
LANGUAGE	0.004	**0.455**	0.009	0.178
	(0.05)	(3.93)	(0.03)	(0.63)
RELIGION	**0.287**	**0.407**	-0.177	**-1.342**
	(5.46)	(3.89)	(-0.41)	(-4.01)
COLONY	**0.937**	-0.063		
	(3.18)	(-0.35)		
ln(GDP 1)	0.143	**2.461**	1.601	-0.015
	(0.35)	(4.99)	(1.68)	(-0.14)
ln(GDP 2)	**2.607**	0.564	0.287	**0.472**
	(6.50)	(1.51)	(0.16)	(3.56)
RELPCGDP	**-1.630**	0.053	0.079	**-0.246**
	(-4.28)	(0.09)	(0.57)	(-6.12)
ln(GROW 1)	**0.122**	0.084	-0.042	0.035
	(3.72)	(1.78)	(-0.28)	(0.22)
ln(GROW 2)	0.032	**0.123**	-0.097	0.172
	(1.01)	(2.54)	(-0.70)	(1.20)
ln(I)	-0.390	**0.657**	-0.101	**-2.717**
	(-1.57)	(2.55)	(-0.07)	(-3.16)
ln(G)	**-1.230**	1.110	0.327	**-1.750**
	(-4.46)	(4.00)	(0.23)	(-2.48)
ln(EXCHANGE)	**1.132**	**0.406**	-1.248	0.384
	(7.11)	(2.37)	(-1.33)	(0.62)
CONSTANT				0.951
				(0.16)
Observations	2790	1626	287	287
Adjusted R-sq	0.743	0.687	0.594	0.365

* Notes: All variables are in log form. Dependent variable is log(FDI).

** Numbers in parentheses are t-statistics.

Table 4. Regressions of FDI under Alternative Specifications

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Var	ln(FDI)	ln(FDI)	ln(FDI)	ln(FDI)	ln(FDIREST)	ln(TOTFDI)
ln(STDT)	**0.163**	**0.229**	**0.238**	**0.249**	**-0.022**	**0.013**
	(8.77)	(10.80)	(5.89)	(12.11)	(-2.96)	(2.74)
ln(STDTREST)				**-0.135**		
				(-3.28)		
ln(DISTANCE)	**-0.128**	**-0.590**	**-0.586**	**-0.513**		
	(-3.14)	(-15.65)	(-8.61)	(-14.52)		
LANGUAGE	0.093	**0.237**	-0.018	0.114		
	(1.69)	(3.42)	(-0.14)	(1.8)		
RELIGION	**0.240**	**0.280**	**0.297**	**0.350**		
	(5.14)	(4.87)	(2.92)	(6.54)		
COLONY	0.099	0.183	0.165	0.202		
	(0.68)	(1.02)	(0.47)	(1.20)		
ln(GDP 1)	**1.611**	**1.510**	**2.304**	**1.979**		
	(6.93)	(4.61)	(2.98)	(7.37)		
ln(GDP 2)	**0.445**	0.459	0.668	**0.793**	**2.354**	**2.576**
	(2.17)	(1.60)	(1.09)	(3.40)	(33.13)	(72.88)
RELPCGDP	-0.135	-0.052	-0.150	0.064	**-0.129**	**-0.163**
	(-1.88)	(-0.6)	(-0.8)	(0.74)	(-4.65)	(-17.68)
ln(GROW 1)	**0.089**	**0.077**	**0.183**	**0.076**		
	(3.39)	(2.30)	(2.39)	(2.49)		
ln(GROW 2)	**0.057**	0.051	**0.317**	**0.065**	**0.098**	**0.087**
	(2.14)	(1.55)	(4.05)	(2.13)	(7.17)	(9.39)
ln(I)	-0.112	0.374	0.261	-0.034	**0.372**	**0.396**
	(-0.62)	(1.52)	(0.58)	(-0.17)	(4.08)	(8.28)
ln(G)	0.048	0.190	0.166	0.055	-0.104	**0.296**
	(0.25)	(0.85)	(0.36)	(0.25)	(-0.98)	(4.24)
ln(EXCHANGE)	**0.993**	**0.493**	**1.053**	**0.705**	**0.734**	**0.475**
	(7.90)	(2.61)	(4.37)	(5.41)	(10.69)	(11.77)
ln(TRADE)	**0.553**					
	(14.88)					
ln(TARIFF)		-0.239				
		(-1.94)				
ln(TOURIST)		0.236				
		(1.74)				
ln(SCHOOL 1)			-0.421			
			(-0.26)			
ln(SCHOOL 2)			-1.465			
			(-1.75)			
Observations	4678	3385	961	3692	5858	16561
Adjusted R-sq	0.730	0.724	0.732	0.713	0.8056	0.7967

Notes: All variables are in log format. Numbers in parentheses are t-statistics.