# Behavioral and Empirical Perspectives on FDI: International Capital Allocation across Asia

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**Abstract**

We investigate Asia's recent experience in international capital allocation through flows of foreign direct investment. A calibrated general equilibrium model with a new capital flow modelling component is applied to highlight underlying relationships between a Heckscher-Ohlin (labor and capital) endowment perspective and such considerations as human capital, productivity, endogenous growth, and institutional behavior. Our results support the argument that all these factors played a role in Asia's recent growth, to different degrees in different countries, with complex relationships to investment incentives. In addition, new directions for further research in the FDI-growth linkages policy area are identified.

Keywords: foreign direct investment, international capital allocation, Asia

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## 1. Introduction

International capital allocation has been a primary driver of modern growth dynamics, particularly for emerging economies, and this relationship has nowhere been more fortuitous than in Asia. Together with disciplined commitments to domestic and external economic reform, the region's economies have leveraged foreign savings to achieve growth and modernization beyond the imagining of prior generations. Despite the pervasive influence FDI has had on Asia's growth experience, the precise benefits of foreign investment remain challenging to quantify and the process of international capital allocation very difficult to predict. Given the nearly universal appeal of FDI as a growth catalyst, however, it would clearly be desirable for policy makers to better understand its fundamental determinants. As Asia transits from a loose federation of emerging economies to a more fully integrated and mature economic region, the need to understand multilateral investment dynamics will only increase.

During the region's evolution toward greater multilateralism, one of the most dramatic events has been the emergence of private agency across a web of supply networks and value chains, heavily mediated by FDI. Beneath an official veneer of negotiated trade agreements, there is now a remarkably diverse and dynamic mosaic of private commercial linkages that draw the region's economies into concerted value creation. These linkages are often part of global networks where tens, hundreds, even thousands of intermediate products change hands along extended value-added chains. The result is unprecedented geographic diffusion of economic activity, growth, and innovation, coexisting with, and often transcending, official networks of diplomacy and trade negotiation. The linkages involved are quite complex, and it is a significant challenge for policy makers to effectively pursue policies that facilitate dynamic and sustainable growth in such an environment. The precise interactions between financial integration and national growth remain the subject of intensive research and policy debate, but Asia's experience

indicates that the potential rewards are substantial.[1] Broadening the basis for such activities can amplify their benefits, distribute them more widely, and reduce risks of excessive economic concentration and instability.

In this paper, we advance FDI research by combining the latest GTAP database and a global forecasting model with a new capital flow modelling component.[2] The latter consists of independent data on foreign capital stocks and flows, calibrated to a sub-model that permits experimentation with diverse specifications of FDI behaviour. This hybrid approach has helped to clarify the research challenges in this area. Beyond this, it also yields illuminating evidence on the underlying relationships between a Heckscher-Ohlin (labor and capital) endowment and more modern considerations such as human capital, productivity, endogenous growth, competitive strategy, and the complex economic roles of institutional behavior. Our results indicate that all these factors have played a role in Asia's remarkable growth experience, to different degrees in different countries. Moreover, each has its own relationship to investment incentives, and policy makers must understand those relationships to attract and capture the many benefits FDI can offer.

## 2. Historical Trends in Asian FDI

Flows of FDI have seen a dramatic rise in recent years due to increasing openness of host economies. This trend is likely to continue. From only $53.8 billion in 1980, annual FDI outflows reached $1.2 trillion in 2000. (The global recession after that, however, considerably reduced outflows, which dropped by 39% in 2001 and a further 29% in 2002, picked up by 4% in 2003 and 45% in 2004, before falling again by 4% in 2005).

Relative to world output and exports, FDI outflows have risen tremendously since the early 1990s. World FDI outflows increased more than five times from 1990 to 2000 before falling from 2001 through 2002, while world output and exports grew at more modest paces between 1990 and 2005.

From 1980 to 2000, the growth rate of world FDI outflows surpassed that of world exports. This swift expansion in FDI was more pronounced during 1986-1990, when many host countries began to relax regulations in order to attract FDI, and 1996-

[1] See Kose et al (2003, 2006) for leadership in this very active literature.

[2] GTAP refers to the Global Trade Analysis Project. For more information see www.gtap.agecon.purdue.edu

2000, when many mergers & acquisitions (M&As) followed in the wake of privatization programs in Latin America and the 1997-98 Asian economic crisis.

Economies in developing Asia received increasingly larger shares of world FDI inflows, particularly during the 1990s. From an average of 7.5% in the 1970s, developing Asia's share in total FDI inflows increased to 18.6% in the 1990s. FDI inflows to developing Asia grew from only $842 million in 1970 to $146.5 billion in 2000, representing an average growth rate of 18.8% per year, before declining in 2001.

M&As have become important, particularly following the Asian financial crisis, as sharp local currency depreciations and liquidity constraints increased the availability of target firms. M&As in developing Asia rose more than 129 times by value between 1987 and 2001, from only $256.1 million to $33.1 billion. In descending order of size, Hong Kong, China; Republic of Korea (Korea); People's Republic of China (PRC); Singapore; and Indonesia were the top five recipients of M&A flows between 1987 and 2004.

The preferences of foreign investors for individual country destinations have shifted over time. While Europe and North America continue to be major recipients of FDI, the People's Republic of China (PRC) has emerged as another favored destination. Saudi Arabia, Malaysia, Egypt, and New Zealand, which were among the 20 largest FDI recipients during 1981-1985, were replaced by Sweden, Ireland, Russian Federation, and Bermuda during 2001-2005.

Among the favored Asian destinations for FDI, there has not been much change. Indonesia, Philippines, and Papua New Guinea, three of the top 10 FDI destinations in the early 1980s, dropped from the list and were replaced by India, Kazakhstan, and Azerbaijan in the early 2000s. Meanwhile, the PRC overtook Singapore; Hong Kong, China; and Malaysia as preferred FDI destination.

Among the countries in developing Asia, the top 10 recipients of FDI inflows in 2001-05 accounted for about 94.3% of total FDI in the region, with the top three recipients alone accounting for 76% (Table 2.1). Azerbaijan, however, which is only number 9 in the list of top developing Asian FDI recipients, had the highest ratio of FDI to GDP, reflecting the importance of new FDI in its hydrocarbons development. On the other hand, six out of the top 10 FDI recipients in developing Asia have FDI to GDP ratios lower than the average for developing Asia of 5.6%. This means that FDI to

developing Asia is heavily concentrated—only 12 out of 44 economies for which data are available have FDI shares equal to or exceeding their shares of GDP in developing Asia.

**Table 2.1. FDI Inflows in Selected Developing Asian Economies, 2001-05**

| Economy | % of Total FDI in Developing Asia | Ratio to GDP |
|---|---|---|
| PRC | 46.1 | 3.4 |
| Hong Kong, China | 18.9 | 13.9 |
| Singapore | 11.0 | 13.8 |
| India | 4.5 | 0.9 |
| Korea, Rep. of | 4.1 | 0.8 |
| Malaysia | 2.4 | 2.7 |
| Kazakhstan | 2.2 | 8.5 |
| Thailand | 1.9 | 1.7 |
| Azerbaijan | 1.6 | 25.2 |
| Taipei,China | 1.5 | 0.6 |

Sources: UNCTAD FDI September 2006 database; World Bank World Development Indicators online database; IMF WEO September 2006 database.

While the total value of FDI inflows to the top 10 Asian destinations surged during the last decade, developing Asia's share in the world total dropped from 21.3% in 1991-95 to 17.1% in 2001-05. At the per capita level, average FDI inflows have shown remarkable increases in some Asian economies. In Brunei Darussalam and Hong Kong, China, for instance, per capita inflows more than doubled between 1991-95 and 2001-05. The choice of time period matters, as some years show more remarkable increases than others. In Hong Kong, China, for example, per capita FDI inflows increased from only $574 in 1990 to $9,290 in 2000 – an expansion of 16.2 times. In Hong Kong, China and Azerbaijan, total annual inflows exceeded 60% of gross fixed capital formation in 2001-05. In other Asian economies, FDI amounts to less than 30% of gross fixed capital formation (Table 2.2).

It is important to note that it is increasingly difficult to characterize and typify foreign investment. In most economies, it enters practically all sectors. It originates from industrial and developing economies. It may take the form of long-term greenfield investment or short-term, opportunistic M&As. It ranges from the global investments of the world's largest corporations to smaller cross-border investments. The distinction between foreign and domestic investment is increasingly blurred, especially when a country's diaspora is actively involved. A world of increasingly seamless national

boundaries also connotes highly fluid capital whose national characteristics are often difficult to discern.

**Table 2.2. Top 10 Destinations for FDI in Developing Asia, 1991-95 and 2001-05**

| Rank | Host Economy | 1991-95 | Rank | Host Economy | 2001-05 |
|---|---|---|---|---|---|
| *Annual FDI Inflows (US$ million)* | | | | | |
| 1 | PRC | 22,835.2 | 1 | PRC | 57,232.3 |
| 2 | Singapore | 6,372.6 | 2 | Hong Kong, China | 23,402.2 |
| 3 | Hong Kong, China | 5,175.9 | 3 | Singapore | 13,653.2 |
| 4 | Malaysia | 5,063.6 | 4 | India | 5,551.2 |
| 5 | Indonesia | 2,341.8 | 5 | Korea, Rep. of | 5,145.2 |
| 6 | Thailand | 1,889.2 | 6 | Malaysia | 2,964.4 |
| 7 | Taipei,China | 1,200.2 | 7 | Kazakhstan | 2,673.6 |
| 8 | Philippines | 1,124.0 | 8 | Thailand | 2,377.3 |
| 9 | Viet Nam | 1,100.1 | 9 | Azerbaijan | 2,028.2 |
| 10 | Korea, Rep. of | 857.1 | 10 | Taipei,China | 1,906.0 |
| *FDI Inflows (as % of Gross Fixed Capital Formation)* | | | | | |
| 1 | Vanuatu | 62.1 | 1 | Hong Kong, China | 63.2 |
| 2 | Viet Nam | 41.5 | 2 | Azerbaijan | 61.3 |
| 3 | Singapore | 29.3 | 3 | Singapore | 55.4 |
| 4 | Papua New Guinea | 24.1 | 4 | Kazakhstan | 35.5 |
| 5 | Azerbaijan | 23.9 | 5 | Tajikistan | 31.9 |
| 6 | Cambodia | 22.9 | 6 | Armenia | 23.4 |
| 7 | Fiji Islands | 21.3 | 7 | Mongolia | 23.0 |
| 8 | Malaysia | 19.7 | 8 | Kyrgyz Republic | 21.2 |
| 9 | Kyrgyz Republic | 16.7 | 9 | Fiji Islands | 18.7 |
| 10 | Hong Kong, China | 14.8 | 10 | Cambodia | 15.1 |
| *FDI Inflows Per Capita (US$)* | | | | | |
| 1 | Singapore | 1,885.0 | 1 | Hong Kong, China | 3,415.8 |
| 2 | Hong Kong, China | 865.7 | 2 | Singapore | 3,227.4 |
| 3 | Brunei Darussalam | 414.6 | 3 | Brunei Darussalam | 3,051.6 |
| 4 | Malaysia | 261.5 | 4 | Marshall Islands, Rep. of | 2,018.6 |
| 5 | Vanuatu | 169.9 | 5 | Azerbaijan | 245.2 |
| 6 | Fiji Islands | 61.9 | 6 | Kazakhstan | 178.8 |
| 7 | Taipei,China | 57.1 | 7 | Kiribati | 170.0 |
| 8 | Papua New Guinea | 49.0 | 8 | Malaysia | 120.1 |
| 9 | Thailand | 33.2 | 9 | Korea, Rep. of | 107.3 |
| 10 | Solomon Islands | 33.2 | 10 | Taipei,China | 84.5 |

Sources: UNCTAD FDI September 2006 database; World Bank World Development Indicators online database; IMF WEO September 2006 database; National Statistics, Republic of China.

### *2.1. Impact of Foreign Direct Investment*

Supporters of FDI contend that in addition to helping overcome local capital constraints, foreign investors introduce a combination of other highly productive resources into the host economy. These include production and process technology, managerial expertise, accounting and auditing standards, and knowledge of international markets, advertising, and marketing. The challenge for the host economy is to benefit from the foreign presence, and to appropriate as much of the increased income accruing from the resultant productivity growth as possible, without discouraging further investment. The large literature on FDI impacts concludes that the host economy benefits are quite uneven, both across and within countries.[3] This suggests that host country policies are an important factor in the distribution of these benefits. Of particular relevance are policy influences on the commercial environment, institutional quality, and productive capabilities.

Distinguishing characteristics of FDI are its stability and ease of service relative to other forms of external finance, such as commercial debt or portfolio investment, as well as its nonfinancial contributions to production and sales processes. Even for countries with relatively easy access to international capital markets (such as Korea) or with substantial holdings of foreign reserves (such as the PRC or India), the nonmonetary benefits of FDI still make it an attractive source of investment.

The general conclusion in the empirical literature is that FDI confers net benefits on the host economy. The capital stock is augmented, productivity rises, and some of the increase is at least partially appropriated by domestic factors of production. These benefits appear to be especially important in connecting the host country to the global economy, and in the area of technology transfer. Nevertheless, the magnitudes, channels, and lags associated with these transfers are still subject to debate.

As trade has been liberalized, the old "tariff factory" model of FDI has given way to a new FDI-led, export-oriented paradigm. This is sometimes characterized as a switch from "rent-seeking" to "efficiency-seeking" FDI (see e.g. Blonigen et al:2004, Hill:2004, and Blonigen and Figlio:1998). In a globalizing world, competition for FDI is no longer

[3] See Fan (2003), Lim (2001), and Moran (2002) for literature surveys.

about rents but instead focuses on the establishment of an enabling, business-friendly commercial environment, consistent with national development objectives.

Most countries offer incentives to attract FDI. These often include tax concessions, accelerated depreciation on plants and machinery, and export subsidies and import entitlements. Such incentives aim to attract FDI and channel foreign firms to locations, sectors, and activities identified as policy priorities. At the same time, most countries have also limited the economic activities of foreign firms operating within their borders. Relevant regulations have included limitations on foreign equity ownership, local content requirements, local employment requirements, and minimum export requirements. These measures are designed to transfer benefits arising from the presence of foreign firms to the local economy. This 'carrot and stick' approach has long been a feature of the regulatory framework governing FDI in host countries (McCulloch 1991).

Tax breaks and subsidies are common, but generally influence investment location decisions only at the margin (see e.g. Hines:1996, Dagan:2000, and Desai et al:2004). More important to most potential investors are such factors as the size and expected growth rate of the market to be served, the long-term macroeconomic and political stability of the host country, the supply of skilled or trainable workers, and the presence of modern transportation and communications infrastructure. Once these criteria are satisfied, then financial incentives may influence the investor's choice among suitable sites.

Government intervention can enhance a host country's success in attracting FDI with minimal distortions to the domestic economy by significantly reducing the uncertainty, asymmetric information, and related search costs faced by foreign investors, as well as transaction costs—especially the amount of time and number of steps involved in acquiring approval. Too often, however, policies intended to maximize the net benefits of FDI for recipient economies have resulted in subscale manufacturing plants, frequently through mandated joint ventures that are not allowed to source inputs freely and contribute little to the technological, social, or economic development of the country (Carr et al:2001). Arrangements between foreign investors and host country authorities that block other new entrants from the industry or that inhibit alternative cheap sources of supply are also common but are generally not in the best interests of

the host country. Imperfect competition raises issues of national sovereignty and the need for competition policy, as well as rent-seeking behavior among countries.

A host country will offer fewer incentives, and benefit less, when foreign investment is directed toward serving small and protected domestic markets. The benefits to the host economy are greatest when international companies can exploit economies of scale both locally and globally, and are continually driven to update their technology and managerial practices in order to remain competitive (Blonigen et al:2005, Markusen:1998, Markusen and Maskus:2002).

A central issue is whether investment promotion measures alter the allocation of resources in production and trade, or just influence the distribution of rents between firms and host countries (Blonigen et al:2004). Both suppliers and recipients of FDI may gain from the liberalization of investment measures. Foreign investors may benefit from new investment opportunities resulting from liberalized investment regulations, while host countries may benefit from increased FDI inflows and resulting greater market discipline. Since many developing countries compete with one another to offer foreign investors generous tax, infrastructure, and financial incentives, it is important to note that the mutual scaling down of investment incentives could yield additional revenue for the host country governments (see e.g. Blonigen et al:2004, Blonigen and Davies:2005).

Moran (2002) has provided much evidence to show how counterproductive and damaging domestic content and joint venture requirements can be for host country development. He also demonstrates just how beneficial for host country growth and development adopting a policy of leaving wholly owned subsidiaries unfettered by local content mandates can be. Protection may induce an expansion of output and employment in certain sectors, but this expansion often carries a substantial cost for the society implementing such a policy.

Notwithstanding their diversity, almost all developing Asian economies have adopted progressively more open policies toward FDI during the past three decades, and this trend appears likely to continue. This more open posture has been accompanied by the adoption of more liberal trade regimes, a process that has had profound implications for both the motives for, and impact of, foreign investment. These changes have been so rapid in some cases that the policy framework has been unable to keep pace.

The upsurge in FDI to developing countries since the early 1990s was largely caused by the unilateral liberalization of their FDI policies and regulatory regimes, following trade policy liberalization. Theoretical and empirical evidence provides strong support for the proposition that neutral policies designed to enhance the efficiency of investment are better suited to attracting foreign investment and enhancing its contribution to development than interventionist methods (Bora 2001).

Thus, there appears to be increasing acceptance that liberal policy regimes for most industries bring the highest benefits to host countries. FDI policies can be put in place at both the national and international level. At present, however, they are predominantly national rather than international. Despite the existence of over 2000 bilateral investment treaties, there is still much disagreement on forming and implementing a multilateral framework on investment.

## 3. Modeling FDI in a Global CGE Framework

### *3.1. Aggregate Determinants of Inbound FDI*

Microeconomic determinants of FDI are so numerous that they have defied empirical generalization. A large literature exists on individual characteristics of the foreign investment decision, depending on the perspective of firms discussed above, i.e. whether they are outsourcers, market seekers, etc. These approaches are ably surveyed from a theoretical perspective by Markusen and several co-authors (1995, 1998, 2000, 2001, 2002), Helpman et al (1984, 2003), Brainard (1993), Raff and Srinivasan (1998), and Raff and Kim (1999). Empirical and industry case studies from these different perspectives include Lipsey (1999), Kleinert (2001, 2003), Head and Ries (2001), Andersson and Fredriksson (2000), Barrell and Pain (1996), and Wheeler and Mody (1992). While there are many detailed insights in this work, a general perspective on the main drivers of FDI is still lacking.

As a practical empirical response to this problem, other authors have put forth a variety of gravity models, essentially predicting FDI on the basis of historical correlations with other macroeconomic aggregates (see e.g. Anderson and Wincoop:2003). The present authors have examined a number of aggregate explanatory variables with time series data

for a diverse set of Asian economies, without obtaining satisfactory empirical performance (Brooks, Fan, and Roland-Holst: 2007). For these reasons, we instead adopt a simulation approach to assessing the potential significance of FDI to the region's economies.

### *3.2. FDI Behavior from a Simulation Perspective*

In the absence of definitive econometric evidence regarding FDI behaviour, a simulation framework may elucidate the primary interactions between initial conditions and outcomes using a variety of alternative behavioral specifications. In this section we use a global CGE model to examine how the ultimate effects of trade policy would vary under different hypothetical patterns of FDI behavior. Given the importance of private capital flows to the modern process of globalization, it is hardly surprising that trans-boundary investment behavior can strongly influence the effects of trade liberalization. Indeed, it is apparent even in this preliminary analysis that shifting FDI patterns can make the difference between success and failure for countries joining regional FTAs and larger trade reform initiatives.

The model we use is a standard multi-country, dynamic CGE calibrated to the GTAP VI database. The present version includes an option for endogenous determination of FDI flows, based on the same logic as the estimating equation of the previous section. The economic implications of this specification of FDI behavior can be analyzed with counterfactual elasticity values.

To do this, we conducted four experiments based on a scenario of global trade liberalization (GBL). Beginning with the Baseline dynamic calibration, we run the model forward assuming all tariffs and export subsidies are removed over the period 2005-2010. This scenario has the predictable results for global efficiency gains and growth, and then forms a policy reference for four FDI scenarios based on the following equation[4]:

$$\frac{Z_r}{GDP_r} = \lambda_r \left[ \alpha_r \left( \frac{P^w}{P} \right)^{\varepsilon_P} \left( \frac{TR_r}{WRR} \right)^{\varepsilon_P} (1+\gamma_r)^{\varepsilon_G} \right] + (1-\lambda_r) Z_{r,t-1} \qquad (3.1)$$

[4] See van der Mensbrugghe (2002, 2005) for details.

where for country r, Z denotes total investment, $P^w/P$ denotes the relative price of future consumption, TR/WRR is a the domestic to global rental rate, and $\gamma$ is the growth rate of real GDP. This specification explains domestic aggregate investment shares as a product of three components. The first is based on a forward discount rate, the second on an inter-country relative rate of return, and the third on an accelerator mechanism. The accelerator component includes both the growth rate of GDP and the lagged investment term in 3.1.

The benchmark values of FDI-related elasticity parameters are listed in Table 3.1 below. Using the GBL policy scenario, we run three sets of simulations to examine the possible impact of FDI on the economy through each of the component mechanisms. To control for each component, we hold it at baseline value and reduce the other two by one or two orders of magnitude.[5] The lagged investment parameter was set to 0.5 in all experiments. This biases the results in favor of the accelerator effect, but was necessary to maintain reasonable macro-stability in the solutions and is more consistent with the macroeconomics of investment behavior.

**Table 3.1: Elasticity Values for FDI Simulations**

| Scenario | | Forward Discount Rate | Elasticity Relative Rental Rate | Growth Rate of GDP |
|---|---|---|---|---|
| **FDIGBL** | Endogenous FDI under GBL | 10.00 | .50 | 10.00 |
| **FDR** | Forward Discount Rate | 10.00 | .01 | .10 |
| **RRW** | Domestic Relative Rate of Return | .10 | .50 | .10 |
| **GGDP** | Growth Rate of GDP | .10 | .01 | 10.00 |

Running the model forward with endogenous FDI yields a complex adjustment process. Because an individual country constraint has been redefined as a multilateral constraint (i.e. resources can be directly transferred), the growth benefits of the GBL scenario can now be shifted between countries. For this reason, the national effects of tariff reform are no longer monotone, i.e. there are winners and losers from multilateral trade reform. This case has often been made in defense of capital account controls, but our results do not necessarily support these arguments.

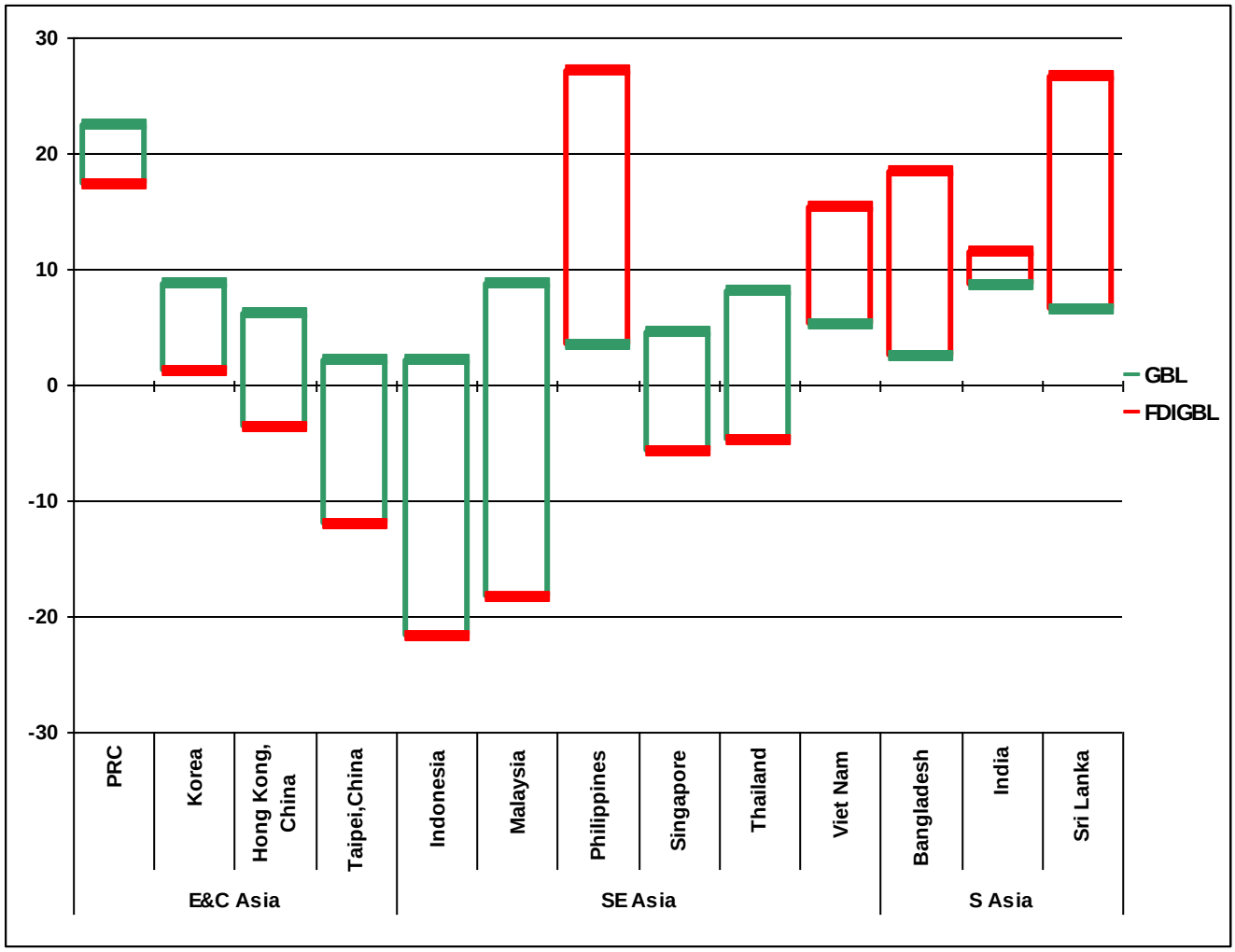
[5] In some cases, the choice of these values was informed by the FDI literature and constrained in some cases by model convergence considerations. For example, zero values were inadmissible for this reason.

Table 3.2 shows equivalent variation aggregate income (EV) for each Asian country under the globalization reference (GBL) and the four other scenarios, with results in each expressed as percentage changes from Baseline values in 2025. The most arresting feature of this table is the negative results (positive results are shaded), yet it is also important to notice that country results both exceed and fall short of the GBL scenario, depending on the country and scenario. Thus some kind of growth transfer process appears to arise from the capital movement, which is precisely what one might expect in a zero-sum, productivity-static framework like the present one.

**Table 3.2: Equivalent Variation Aggregate Income**
**(percent change from Baseline in 2025)**

| Region | Country | GBL | FDIGBL | FDR | RRW | GGDP |
|---|---|---|---|---|---|---|
| E&C Asia | PRC | 22.38% | 17.24% | 24.70% | 28.80% | 13.13% |
| | Korea | 8.78% | 1.11% | 2.34% | 2.32% | 1.13% |
| | Hong Kong, China | 6.18% | -3.77% | 0.25% | -0.68% | -3.46% |
| | Taipei,China | 2.03% | -12.17% | -10.37% | -10.90% | -12.00% |
| SE Asia | Indonesia | 2.06% | -21.78% | -23.54% | -22.20% | -23.78% |
| | Malaysia | 8.65% | -18.35% | -19.18% | -17.71% | -20.05% |
| | Philippines | 3.37% | 27.06% | 9.35% | 14.28% | 19.52% |
| | Singapore | 4.44% | -5.80% | -2.38% | -4.52% | -4.08% |
| | Thailand | 8.01% | -4.84% | -11.74% | -7.88% | -9.95% |
| | Viet Nam | 5.15% | 15.35% | 6.50% | 6.55% | 16.59% |
| S Asia | Bangladesh | 2.38% | 18.38% | 11.67% | 12.48% | 18.14% |
| | India | 8.59% | 11.44% | 7.35% | 7.06% | 12.55% |
| | Sri Lanka | 6.45% | 26.59% | 21.02% | 22.62% | 24.53% |
| | Mean | 6.81% | 3.88% | 1.23% | 2.32% | 2.48% |
| | Standard Deviation | 5.33% | 16.53% | 14.52% | 15.10% | 16.01% |

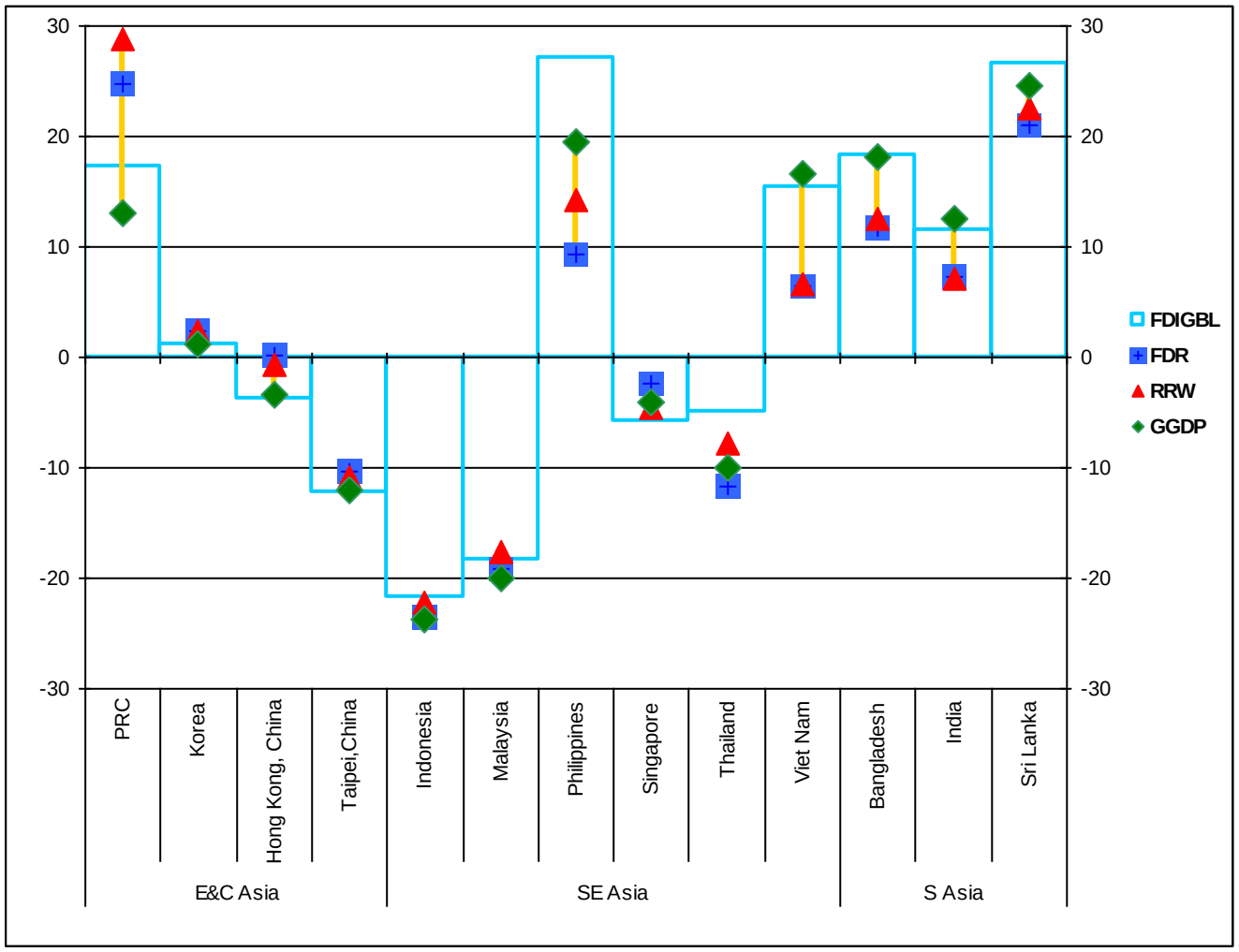
**Figure 3.1: EV Income Growth Relative to Baseline**
**(GBL with and without endogenous FDI,**
**percent changes from Baseline in 2025)**




One might reasonably expect efficient capital allocation to raise average productivity and even have positive local savings effects, both of which would mitigate or even eliminate the tradeoffs observed here. But compare first the GBL and combined endogenous FDI scenario (FDIGBL). These results are depicted in Figure 3.1. Endogenous FDI reduces the EV growth benefits of multilateralism in five countries while increasing it in eight. Two of the former group still experience positive EV gains against the Baseline, but the other three actually see income decline with trade liberalization. For the winners the gains can be substantial, adding more than 15 percentage points to EV growth and in some cases doubling or tripling gains from globalization without international capital mobility.

When we decompose the three drivers of endogenous FDI determination, a more complex picture emerges. Figure 3.2 shows aggregate EV changes for the four endogenous FDI scenarios. A few observations can be instructive.

**Figure 3.2: EV Results for Endogenous FDI**
**(percent changes from Baseline in 2025)**




Firstly, both the interest rate components (FDR and RRW) are highly correlated, as would be expected. Secondly, the accelerator and interest rate components work in somewhat offsetting directions. This is to say that the accelerator "pulls up" against interest rates when investment flows have a positive effect, but "pulls down" when the effects are negative (the result for Thailand is mixed). Again, this is consistent with conventional macroeconomic intuition, where interest rate sensitivity moderates Keynesian components

of the business cycle. In the present case, market rental rates vary dramatically across the endogenous FDI scenarios, as indicated in Table 3.3. As economic growth rises within a given economy, market determined rates can be expected to rise and temper that growth. This table presents simple (i.e. not GDP weighted) averages and variation in domestic rental rates, and strongly indicates that limited capital market competition raises both average returns and their absolute and relative variation across countries.

**Table 3.3: Domestic Average Rental Rates**
**(percent change from Baseline in 2025)**

| Region | Country | GBL | FDIGBL | FDR | RRW | GGDP |
|---|---|---|---|---|---|---|
| E&C Asia | PRC | 11.81% | 23.26% | 32.26% | 42.95% | 11.05% |
| | Korea | 7.91% | 19.24% | 18.00% | 19.42% | 18.41% |
| | Hong Kong, China | 3.56% | 18.40% | 12.55% | 15.10% | 16.85% |
| | Taipei,China | 2.24% | 38.82% | 32.91% | 34.84% | 38.17% |
| SE Asia | Indonesia | 2.35% | 30.24% | 32.13% | 30.38% | 33.24% |
| | Malaysia | 7.59% | 86.17% | 90.03% | 85.56% | 91.91% |
| | Philippines | 2.85% | -15.82% | -5.52% | -9.78% | -10.47% |
| | Singapore | 2.20% | 19.34% | 9.66% | 16.00% | 13.99% |
| | Thailand | 5.48% | 16.27% | 22.46% | 18.37% | 21.68% |
| | Viet Nam | 12.34% | -2.24% | 8.16% | 7.66% | -3.18% |
| S Asia | Bangladesh | 0.09% | -30.19% | -19.70% | -21.50% | -29.54% |
| | India | 1.81% | -5.91% | 3.08% | 3.19% | -7.17% |
| | Sri Lanka | 0.26% | -29.34% | -23.38% | -25.91% | -26.59% |
| | Mean | 4.65% | 12.94% | 16.36% | 16.64% | 12.95% |
| | Standard Deviation | 4.08% | 31.12% | 28.73% | 29.15% | 31.61% |

From a real growth perspective, it appears that capital flows reinforce superior growth rates (Table 3.4). Endogenous FDI creates international competition for an essential growth resource, and domestic rental rates reflect a kind of shadow price on this resource constraint within each economy. In the interest rate sensitive scenarios, capital flows respond to these signals, and accelerate expansion for economies with high baseline growth rates.

## Table 3.4: Real GDP
## (percent change from Baseline in 2025)

| Region | Country | GBL | FDIGBL | FDR | RRW | GGDP |
|---|---|---|---|---|---|---|
| E&C Asia | PRC | 14.59% | 10.23% | 17.01% | 25.14% | 8.52% |
| | Korea | 3.59% | -3.74% | -3.18% | -3.72% | -3.36% |
| | Hong Kong, China | 1.88% | -10.95% | -6.39% | -8.33% | -9.85% |
| | Taipei,China | 1.85% | -13.25% | -11.59% | -12.16% | -13.07% |
| SE Asia | Indonesia | 1.52% | -15.10% | -16.21% | -15.46% | -16.29% |
| | Malaysia | 2.28% | -21.69% | -22.59% | -21.76% | -22.76% |
| | Philippines | 6.36% | 3.97% | 4.36% | 3.54% | 4.76% |
| | Singapore | 2.39% | -11.60% | -5.93% | -10.01% | -8.33% |
| | Thailand | 5.29% | -1.32% | -4.43% | -2.70% | -3.56% |
| | Viet Nam | 3.32% | 11.78% | 4.40% | 4.61% | 12.59% |
| S Asia | Bangladesh | 6.01% | 13.57% | 9.39% | 9.99% | 13.12% |
| | India | 12.41% | 12.45% | 12.48% | 12.22% | 13.03% |
| | Sri Lanka | 6.72% | 12.96% | 11.23% | 11.66% | 12.31% |
| | Mean | 5.25% | -0.98% | -0.88% | -0.54% | -0.99% |
| | Standard Deviation | 4.11% | 12.58% | 11.91% | 13.22% | 12.51% |

Still, it is clear from detailed inspection of these results that the accelerator component is dominant. Table 3.5 shows how closely real GDP results conform to EV. Even more strongly, relative (between-country) real GDP growth in Table 3.6 mirrors the left-hand variable in expression 3.1, Investment as a share of GDP. Countries that respond relatively slower to globalization will see capital diverted from them to those who respond faster. The interesting fact is that this happens regardless of Baseline growth rates. The PRC has the highest average Baseline rate, yet when FDI is endogenous the league table shifts in favour of PRC, Philippines, Viet Nam and South Asia.

**Table 3.5: Relative Real GDP Growth Across Countries**
**(Table 4 values, normalized by mean and standard deviation in each scenario)**

| Region | Country | GBL | FDIGBL | FDR | RRW | GGDP |
|---|---|---|---|---|---|---|
| E&C Asia | PRC | 2.27 | .89 | 1.50 | 1.94 | .76 |
| | Korea | -.40 | -.22 | -.19 | -.24 | -.19 |
| | Hong Kong, China | -.82 | -.79 | -.46 | -.59 | -.71 |
| | Taipei,China | -.83 | -.98 | -.90 | -.88 | -.97 |
| SE Asia | Indonesia | -.91 | -1.12 | -1.29 | -1.13 | -1.22 |
| | Malaysia | -.72 | -1.65 | -1.82 | -1.60 | -1.74 |
| | Philippines | .27 | .39 | .44 | .31 | .46 |
| | Singapore | -.70 | -.84 | -.42 | -.72 | -.59 |
| | Thailand | .01 | -.03 | -.30 | -.16 | -.20 |
| | Viet Nam | -.47 | 1.01 | .44 | .39 | 1.09 |
| S Asia | Bangladesh | .18 | 1.16 | .86 | .80 | 1.13 |
| | India | 1.74 | 1.07 | 1.12 | .96 | 1.12 |
| | Sri Lanka | .36 | 1.11 | 1.02 | .92 | 1.06 |

Given the complexity of the macro-adjustment process, and indeed its ambiguous effects on capital allocation and growth patterns, it is reasonable to look more carefully at the endogenous growth effects associated with FDI. It was emphasized earlier that FDI confers dynamic benefits in terms of (domestic and internal) market expansion and productivity growth. In the following two sections, we assess the empirical significance of these with the simulation framework.

### *3.3. FDI and Market Expansion*

FDI enables propagation of production linkages by establishing new upstream or downstream capacity for existing enterprises, either as wholly owned subsidiaries or in joint ventures. One distinctive characteristic of the new production facility is that it is created with established market linkages, in contrast with autonomous new enterprises who must initiate market linkages for themselves. For this reason, FDI is often thought to accelerate market growth and intra-industry trade for recipient countries. In this section, we present a few experiments to indicate how these growth externalities could influence Asian FDI recipients.

Consider an individual country receiving FDI. At the individual enterprise level, FDI might interact with established upstream, downstream, or both, linkages. Thus creation of this new capacity would stimulate absorption and/or output, regardless of whether the

origin or destination is in the domestic market or abroad. To get a sense of the potential significance of this network effect, we consider import and export stimulus, since much FDI is targeted at export promotion.

It is difficult to overstate the significance of private agency and supply networks in the global economy. Modern globalization is now a world wide web of interconnected asset ownership and contractual ties that bind assets and capital flows. Over 70 percent of US-Japan bilateral trade is between wholly owned subsidiaries (Zelie:2002) and over 50 percent of China's exports to the US are produced by foreign owned companies (CRS:2006) from US subsidiaries. In this process, FDI is expanding markets and markets are expanding FDI.

We focus the present discussion on aggregate interactions to give a sense of the relative magnitudes at the national level. Thus we assume that the market expansion effect of FDI is confined to trade, and we further assume for simplicity that the effect is purely bilateral. In other words, we posit a relationship of the form

$$\hat{T}_{ij} = -\varepsilon_{ij}\hat{K}^F$$

where $T_{ij}$ denotes trade costs from country i to j, $K^F$ denotes the domestic stock of foreign capital,

$$\hat{T}_{ij} = \frac{\Delta(T_{ij} + T_{ji})}{T_{ij} + T_{ji}}$$

and

$$\hat{K}_F = \frac{FDI_{ij}}{K^F}$$

Because we lack information on FDI by origin, in the following CGE simulation experiments we consider the aggregate relationship

$$\hat{T}_i = -\varepsilon_i\hat{K}^F$$

for country i's total trade costs and the average trade cost elasticity of foreign capital inflows to show how FDI can benefit an economy through market expansion.

**Table 3.6: Equivalent Variation Aggregate Income**
**(percent change from Baseline in 2025)**

| | | Scenario | | | |
|---|---|---|---|---|---|
| | | *1* | *2* | *3* | *4* |
| **Region** | **Country** | **GBL** | **TC** | **FDIGBL** | **FDITC** |
| **E&C Asia** | **PRC** | 22.38% | 50.12% | 17.24% | 51.02% |
| | **Korea** | 8.78% | 25.07% | 1.11% | 9.87% |
| | **Hong Kong, China** | 6.18% | 33.86% | -3.77% | 19.86% |
| | **Taipei,China** | 2.03% | 62.17% | -12.17% | -6.91% |
| **SE Asia** | **Indonesia** | 2.06% | 132.57% | -21.78% | -16.57% |
| | **Malaysia** | 8.65% | 56.07% | -18.35% | -1.42% |
| | **Philippines** | 3.37% | 13.51% | 27.06% | 68.00% |
| | **Singapore** | 4.44% | 35.59% | -5.80% | 12.55% |
| | **Thailand** | 8.01% | 87.61% | -4.84% | 28.37% |
| | **Viet Nam** | 5.15% | 22.77% | 15.35% | 204.89% |
| **S Asia** | **Bangladesh** | 2.38% | 8.17% | 18.38% | 30.56% |
| | **India** | 8.59% | 14.49% | 11.44% | 20.55% |
| | **Sri Lanka** | 6.45% | 16.43% | 26.59% | 44.80% |
| | **Mean** | 6.81% | 42.96% | 3.88% | 35.81% |
| | **Standard Deviation** | 5.33% | 35.44% | 16.53% | 56.03% |

Table 3.6 presents the EV results from the four scenarios. Two reference counterfactuals (globalization with and without endogenous capital flows) are evaluated with and without taking account of market expansion effects. The most salient feature of these results is that market expansion effects are uniformly positive, even reversing net losses in half the cases where capital mobility would otherwise be detrimental to domestic growth. This conclusion bears out our prior research on trade costs (Roland-Holst et al:2005), and supports the notion that structural barriers are important impediments to realizing the benefits from more liberal trading arrangements. For countries with capital insufficiency and substantial structural trade barriers, like Viet Nam, the combined effect can be very significant, increasing the gains from globalization by a factor of 40.

### *3.4. FDI and Productivity Growth*

Over the last two decades, the emergence of investment opportunities in Asia has provided a new universe of choices for multinational firms and financial institutions. These markets present above average expected returns but also higher volatility. More importantly, relatively low correlation with OECD equity markets significantly reduces the unconditional portfolio risk for a global investor. Gross capital flows between OECD economies over the period 1995-2004 **rose** by 300 per cent, while growth of total trade and real GDP were more modest, at 63 percent and 26 percent, respectively. Recent

research on determinants of FDI flows has focused on portfolio theory, particularly international arbitrage and diversification. Here we summarize the main contributions of this work and make a few observations about its implications for forecasting.

## 4. Conclusions and Extensions

International capital mobility has been an essential component of modern globalization and a strong catalyst for growth in many emerging market economies. For Asia in particular, FDI has played a prominent role in the majority of dynamic and sustained success stories, supplementing domestic savings and transferring a variety of technical and market externalities to accelerate modernization and outward orientation. The development process across Asia is only partially complete, however, and the next phase of regional growth will need to propagate successful experiences across a more diverse set of initial conditions. To take full advantage of the transformative role that FDI can play in this process, a better understanding of the fundamentals of international capital allocation is essential.

This paper reviews the literature on FDI determinants from a regional perspective, followed by application of a variety of empirical approaches to elucidating these issues. Absence of definitive econometric results in this area lead us to apply a simulation framework to the same kind of specification in an effort to assess the potential significance of each of the three drivers. For plausible elasticity values (borrowed from the investment literature), we find again that real GDP is the primary determinant of regional capital allocation when FDI is endogenous. In the context of globalization scenarios for multilateral tariff reduction, this apparently induces transfers of growth impetus between economies, making former winners from globalization into losers. To the extent that accelerator effects may be amplified by FDI, it is essential to get better estimates of these effects.

Looking beyond the empirical evidence on macro drivers of FDI, we use our modelling framework to examine how FDI might be linked to trading efficiency and domestic productivity. Here we see that, for moderate levels of efficiency and productivity effects, growth dividends in the Asian region can be very substantial. In particular, our findings echo earlier work indicating that structural barriers to trade are now much more significant impediments to regional integration and expansion that nominal protection. We

also find, to the extent that regional capital allocation follows principles of modern portfolio theory, capital-productivity linkages can accelerate growth dramatically.

The analysis here thus shows that further research in several areas could be productive. In particular, incorporation of the portfolio model in CGE analysis could highlight direction and magnitude of capital allocations. While considerable work has already been done to identify the determinants of FDI flows, this portion of the feedback loop between growth and investment still lacks consensus. Better estimation of the accelerator effects of capital-productivity linkages on growth would also improve out understanding.

As Asian regional savings and investment flows rise to unprecedented levels, it becomes ever more important to improve our understanding of FDI-growth linkages. The results presented here offer guidance about new directions for more detailed research in this important policy area. If the forces at work are as momentous as some believe, then growth need not be a fixed-sum game and all could benefit from more efficient regional resource allocation. To ascertain the potential of such win-win scenarios, more experimental study of the FDI-growth nexus is needed.

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