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AND REAL EXCHANGE RATE LINKAGES
IN SOUTHEAST ASIA AND LATIN
AMERICA

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Foreign Direct Investment, Trade and Real Exchange
Rate Linkages in Southeast Asia and Latin America
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ABSTRACT

We investigate the relationships among trade, foreign direct investment and the real exchange rate between a set of Southeast Asian and Latin American countries and both the United States and Japan. Foreign direct investment by both Japan and the United States to the Southeast Asian countries in our sample is significantly affected by bilateral real exchange rates. Also, trade between the countries in our sample and the United States and Japan is significantly affected by foreign direct investment. These sets of relationships, between the real exchange rate and foreign direct investment, and between foreign direct investment and trade, support two channels through which the real exchange rate affects trade: a direct effect on the relative price of goods and an indirect effect through foreign direct investment.

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1 Introduction

Trade flows and foreign direct investment (FDI) are linked in a variety of ways. Direct investment may set the stage for export promotion, import substitution, or greater trade in intermediate inputs, especially between parent and affiliate producers. These trade implications of foreign direct investment may be observed between the host and source country or with a set of third-country markets. In addition to this direct linkage, there is an indirect linkage between trade flows and direct investment since each shares the common determinant of the real exchange rate. In this paper we work toward disentangling the scale of the direct and indirect linkages between trade flows and direct investment in order to trace completely the role of the real exchange rate on each of these activities. The data we examine are for the trade and investment between a set of developing countries from Southeast Asia and Latin America with both Japan and the United States.

As with much other empirical research, we find that the real exchange rate significantly affects trade. For our sample of developing countries, import elasticities with respect to real exchange rates exceed their export elasticities. We also find that for Southeast Asian countries exchange rates affect direct investment not only from Japan but also from the United States. FDI from Japan into Southeast Asia has been very sensitive to changes in the yen-dollar exchange rate: dollar depreciations lead to investment surges from Japan. Moreover, holding constant the effect of the real exchange rate, direct investment from Japan promotes trade between Asia and both Japan and the United

States. Japanese direct investment expands both the export and import linkages of Southeast Asia. United States FDI plays a different role in the region: it substitutes for Southeast Asian imports from the United States. In contrast to our findings for Southeast Asia, FDI into Latin America from the United States and Japan are not responsive to real exchange rates. Moreover, the trade-promoting effects of this FDI appear to be weak or insignificant with regard Latin American trade with the United States and Japan.

The next section sets the stage for our detailed empirical analysis by profiling the sectoral composition of trade and FDI between the respective Southeast Asian and Latin American countries and the United States and Japan. Section 3 presents the main econometric methodology and linkage results of the paper. Section 4 emphasizes that the practice of dollar pegging by Southeast Asian countries was important for the expansion of trade and FDI linkages of that region. Countries in this region are highly negatively exposed when the yen weakens vis-à-vis the United States dollar.

Our work complements three recent strands of analysis of trade and currency issues in various regions. First, we add a temporal dimension and an explicit role for exchange rates to the insights gained from the (methodologically distinct) gravity approach to modeling trade and investment. Therein, country endowment sets and distance parameters provide a measure of natural tendencies toward interindustry and intraindustry trade flows (see Frankel (1993) on Japan, and Eaton and Tamura (1994) on flows between Japan and the United States and various regions of the world.) Second, our

focus on the implications of exchange rate movements for trade and capital flows between countries provides a nice complement to studies of the determinants of real and nominal exchange rate movements in Southeast Asia (see Frankel and Wei (1994)). Third, our work complements a literature on capital flows to other developing countries, which in recent years has tended to focus more on hot money and short-term capital flows than on foreign direct investment (e.g., see Calvo, Leiderman, and Reinhart (1993), Kletzer and Spiegel (forthcoming), and Bohn and Tesar (forthcoming)). Our emphasis on FDI is especially pertinent in light of some recent developing country efforts to redirect the composition of capital inflows away from short-term and toward longer-term equity holdings.

2 Bilateral Trade and FDI Patterns

There have been dramatic changes in FDI activity over the 1980s.

Although the United States continued its role as a large capital exporter, it also became a destination for increasing amounts of foreign capital. Japan's role as a source country for long-term capital ratcheted upward, via both an increase in merger and acquisition activity in industrialized countries and by increased greenfield investments in developing countries. With expanded privatization programs underway, foreign direct investment also regained prominence in Latin America and surged in many emerging market economies.

The resulting recent empirical and theoretical research on FDI has been largely oriented toward explaining the merger and acquisition phenomenon in industrialized nations (e.g., see Klein and Rosengren (1994) and the collection of papers in Froot (1993)).¹ While the Southeast Asian experience also has received some attention recently (as in the collections of papers in Ito and Krueger (1996)), there has been very little systematic examination of FDI activity in developing countries or the role of currency movements in this context.²

Existing empirical studies of FDI into developing countries either purely document directional patterns or compare observed flows with some globally based benchmarks that are drawn from country characteristics. An example of the first group of studies is Kohsaka's (1996) careful tracing of levels and composition of capital flows to Latin America and Asia.³ Examples of the second class of studies include work using gravity models. Eaton and Tamura (1994, 1996), for instance, relate the bilateral trade and investment flows of the United States and Japan with various regions to transportation costs (distance between countries), market size (population), overhead investment costs (human capital), and per capita GNP. Frankel (1993) and Frankel and Wei (1993) also use gravity models to compare the regionalism in trade flows of the United States and Japan, among other countries. These studies argue that regionalism abounds in trade and investment flows, even after models account for country tendencies and features. The United States is more tightly linked with Latin America, while Japan has "unexplained" deep ties to the rest of Asia.

In contrast to these studies, our empirical work is not directly concerned with whether excessive bilateral or regional linkages are observed in United States and Japanese transactions with Latin America or Southeast Asia. Instead, by examining the (time series) interactions between trade, FDI, and exchange rates, we provide stylized facts on the rich channels through which particular exchange rate movements strengthen or weaken international linkages.⁴

2.1 Inter-Regional Patterns of Trade

The Southeast Asian countries in our sample include Malaysia, the Philippines, Indonesia, and Thailand (sometimes described as the ASEAN4 nations). These countries are strong net recipients of private direct investment and long term capital flows, in contrast to the newly industrialized countries of Asia (NICs, i.e. Hong Kong, Korea, Singapore, and Taiwan)⁵ in which domestic savings now exceed domestic investment. The Latin American countries that we explore in detail are Chile, Brazil, and Argentina,⁶ each of which is a net importer of long term capital.

Perspective on the centrality of the United States and Japan for financial and real activities for these regions is suggested by trade and FDI data (Table 1). Data on partner shares on country trade, calculated as bilateral exports plus bilateral imports relative to total trade, show that the United States represents about 20 percent of the total (direct) export and import activities of the countries in both Latin America and Southeast Asia. The fraction of trade activity accounted for by Japan is very different across the two

regions: Japan accounts for closer to 25 percent of trade activities of Southeast Asian countries, but is a much smaller (although not trivial) partner in trade for Latin America. European countries together dominate the United States in absolute terms as a trade partner of Latin American countries, and are a more moderate partner for the Southeast Asian countries. China does not account for a large part of trade transactions for any of the countries of our sample, although there clearly is potential for this relationship to expand.

The dollar and yen play key roles in these trade flows. Country currencies either are formally tied to the United States dollar or give the dollar a high weight in basket pegs. The weight of the dollar in the currency baskets is generally about five times higher than the weights that would be suggested purely by volumes of direct trade with the United States. The historic phenomenon of dollar invoicing of trade may be an important component of explaining the “bias” toward the dollar in currency baskets. One reason is that the majority of resource-intensive transactions are invoiced in dollars. A second reason is that the majority of trade between Southeast Asian and Japanese countries is invoiced in dollars (Tavlas and Ozeki, 1992). Additionally, the Chinese Yuan is in practice closely valued against the dollar, and further reinforces the dominance of the dollar in the baskets of Southeast Asian countries (Frankel and Wei, 1994).

The United States and Japan are important source countries for foreign direct investment. Table 2 provides a one-year snapshot of FDI from the United States and Japan into the respective countries of Latin America and Southeast Asia. The United

States maintains a dominant position in FDI into Latin American countries. Japan maintains a dominant position in FDI into Southeast Asia. The apparent “regionalism” in investment by these sources is robust to adjustments for natural resource and factor endowments and distance (Eaton and Tamura, 1994).⁷ Europe is a significant investment presence in both regions, but still is smaller (in terms of flows) than the United States in the Latin American countries, and than both the United States and Japan in Southeast Asia. In recent years, the NICS also have been large-scale investors in Southeast Asia.

2.2 Sectoral Composition of Trade with United States and Japan.

In this section we provide a sectoral decomposition of the trade between each country and the United States and Japan. In section (c) we provide the sectoral decomposition of FDI inflows into the same group of developing countries from the respective source countries.

United States exports to the panel countries of Southeast Asia and Latin America have a very similar (two-digit SIC) sectoral decomposition. Machinery (electrical and non-electrical) and transportation equipment comprise roughly 65 percent of United States sales in each country. Chemicals and allied products further account for between 15 and 25 percent of United States exports to Latin America and between 5 and 17 percent of United States exports to Southeast Asia.⁸

Japanese exports to the Latin American countries also are heavily concentrated (roughly 80 percent) in machinery (including office equipment, electrical

apparatus and appliances, and other electronics) and transportation equipment. There is a different profile for Japanese exports to Southeast Asian countries. Electrical machinery and transportation equipment are important, but account for only about 35 percent of Southeast Asian purchases from Japan. The remaining significant export categories are the types of goods that are direct inputs into Southeast Asian production activities: iron and steel, power-generating and industrial machinery and equipment.

The imports of the United States and Japan from the respective panel countries are much more diffuse and differentiated by source country. United States imports from Latin America are heavily concentrated in food, leather, and primary metal products. By contrast, United States imports from Southeast Asian countries are concentrated in electrical and nonelectrical machinery (especially with regards to Malaysia) and apparel and textile products.

Japanese imports from Latin America primarily consist of raw materials and foodstuffs. Argentine exports are 70 percent foodstuffs, with residual exports mainly composed of nonferrous metals. Brazil and Chilean exports to Japan are mainly crude materials, foodstuffs, and metal products (ferrous and nonferrous). Japanese imports from Southeast Asia differ substantially across countries. Indonesia sells fuels, and cork and wood manufactures to Japan. Malaysia sells fuel and nonfuel crude materials, and some manufactured products to Japan. Both the Philippines and Thailand export some foodstuffs, non-fuel crude materials (together representing about 50% of sales), and manufactured products.

2.3 Sectoral Composition of FDI with United States and Japan.

The bulk of recent United States investments into Latin America (especially outside of Banking and Finance sectors) have targeted Brazil, although Argentina also receives significant quantities of direct investment from the United States. Inflows to Brazil have been concentrated in various manufacturing industries, and especially in the Transportation Equipment sector which represents an important part of Brazilian exports to the United States. Direct investment by the United States into Argentina is concentrated in Foodstuffs and various manufacturing industries, also paralleling the composition of Argentina exports to the United States.

United States direct investment into Southeast Asia has been significantly smaller than its flows into Latin America. For example, in 1993 these flows into Southeast Asia were less than a quarter of the flows to the three Latin American countries. More than half of the United States FDI into Southeast Asia went to the Indonesian Petroleum and Products sector, which currently does not export significant amounts to the United States. The remaining funds largely went to Electronics Manufacturing in Malaysia, in line with the bulk of United States purchases from that country.

Compared with the United States data, Japanese direct investment data are less complete in coverage and less detailed in their decomposition. Data on Japanese direct investment into Latin America and Southeast Asia are available as annual cumulative stocks disaggregated by industry and by area (North America, Latin America,

Asia, Middle and Near East, Europe, Africa, and Oceania).⁹ Direct investment into Latin America has mainly gone into the Banking and Insurance and Transportation components of non-manufacturing industries. Flows into manufacturing have been concentrated in Iron and Ferrous Metal and Transportation Equipment sectors. These investment patterns contrast significantly with those of the United States and with Japanese investment patterns into Southeast Asia.

Japanese FDI into Southeast Asia is three to four times larger than its FDI into Latin America, excluding banking and insurance. Moreover, Japanese FDI in Southeast Asia is dispersed among a range of manufacturing and nonmanufacturing industries. These industries are much broader than the Southeast Asian industries which account for the bulk of exports to Japan. In fact, the industries that received significant funds from Japan were those industries that most resembled the pattern of production in Japan in the 1980s.

The differences in the sectoral pattern of direct investment by Japan and the United States to the countries in our sample may be a source of differences in the linkages among direct investment, trade and the real exchange rate. In the empirical results that follow we are able to study differences in direct investment from Japan or the United States although the lack of sufficient sectoral data precludes us from drawing any inferences on the possibility that the source of these differences arises from a different sectoral mix.

3 Econometric Results: FDI, Trade and Real Exchange Rates

This section presents our empirical findings on the linkages among foreign direct investment, trade flows and the real exchange rate between the developing countries and the United States and Japan. First, we present regressions over a time-series panel of direct investment into each of the developing countries from either Japan or the United States. Real FDI is expressed as a function of bilateral real exchange rates and the real incomes of the source and host countries. Further regressions explore the determinants of the developing country exports to and imports from either the United States or Japan. The regressions express real exports and real imports as functions of real income, bilateral real exchange rates and real direct investment from both source countries.

Overall, the empirical results document the significance of regional linkages between the real exchange rate and direct investment, and between the real exchange rate and trade flows. These results also demonstrate that direct investment into these developing countries affects their trade flows with industrialized countries, even after holding constant the independent contribution to trade of the real exchange rate. There are significant differences between the strength of the linkages observed for the Latin American and for the Southeast Asian countries. Moreover, the source of FDI, that is Japan or the United States, has a strong influence on resulting effects of FDI on current and future trade patterns of the developing countries.

The data set used in these regressions consists of a cross-section time-series panel of annual observations. The countries in the panel are Argentina, Brazil, Chile, Indonesia, Malaysia, Thailand and the Philippines. We provide regression results for the full panel and for the subsets of the Latin American countries and the Southeast Asian countries. The time series runs from 1978 to 1993 or 1994, depending upon the country. All real exchange rates (RER^{us} , RER^j) are bilateral rates measured as prices in the panel countries relative to prices in either the United States or Japan: an increase in the real exchange rate index represents a real appreciation of the currency of the country in the panel with respect to the dollar or the yen, respectively. All estimation is done using a fixed-effects model which effectively has a dummy variable for all but one of the countries included in the regression. The variables enter the regressions in logarithmic form, so that estimated regression coefficients are interpreted as elasticities.

3.1 Direct Investment Regressions

There are several channels through which real exchange rates may affect direct investment. In the developing country context, the most important channel may be that a depreciation of the real exchange rate reduces the cost of domestic labor (and other productive inputs) relative to foreign production costs. The depreciation increases labor demand and employment, thereby raising the return on capital. Thus, greenfield foreign direct investment increases in response to a depreciation. This channel suggests that we should expect to find a negative coefficient on the real exchange rate in a direct

investment regression (where an increase in the real exchange rate represents a real appreciation of the domestic currency).

Exchange rates may also affect direct investment through an imperfect capital markets channel, as discussed in Froot and Stein (1991). In this case, a real depreciation of the domestic currency raises the wealth of foreign investors relative to that of domestic investors and thereby increases FDI.¹⁰ This channel also has the prediction that a real depreciation increases FDI.¹¹ The imperfect capital markets channel for real exchange rate effects may be more relevant in merger and acquisition bids than in the greenfield investments that prevail in many developing countries. The exception for developing and emerging markets pertains to privatization efforts.

In contrast to these arguments, other causal channels suggest a positive coefficient between real exchange rate appreciation and FDI. One causal channel may be associated with domestic efforts to mitigate some of the distributional and aggregate effects of a real appreciation. For example, an appreciation of the domestic currency may yield an increase in imports which, in turn, increases pressures for the implementation of protectionist policies. In this case direct investment may take place in anticipation of future tariff barriers that are precipitated by adverse exchange rate movements. The plausibility of this potential effect of exchange rates on FDI is supported by the considerable evidence that exists regarding the countercyclical nature of trade barriers.

Foreign direct investment regressions over the full panel of seven countries are presented in Tables 3. In Tables 4 and 5 we provide FDI regression results

when the Latin American countries are not pooled with the Southeast Asian countries. The dependent variable in these regressions is the logarithm of the annual real dollar value of direct investment from either the United States or Japan. The independent variables in these regressions include the logarithms of national income in the source country, lagged national income in the source country, lagged national income in the host country, and lagged bilateral real exchange rates with respect to both the yen and the dollar. Real exchange rates and host-country national income are lagged to avoid simultaneity. Contemporaneous source country national income is included since it is unlikely that simultaneity bias arises with respect to this variable. Some regressions include an interactive dummy “LA” on exchange rate terms: this dummy variable equals one for Latin America and is zero otherwise.

Results: In Table 3, column 4 observe that when the developing country currencies depreciate with respect to the yen (i.e. when RER^j falls), there is a corresponding increase in direct investment from Japan. However, regressions which include the dummy variable for Latin America (column 6) show that the real exchange rate and FDI linkage is statistically significant only for Southeast Asia and not significant for Latin America. The results in Table 4 further confirm the lack of significant linkages between the real exchange rate and foreign direct investment in the subsequent year for any of the Latin American countries in our sample.

The results in Table 3, column 6 indicate that a 1 percent depreciation with respect to the yen causes an increase in direct investment from Japan to the Southeast Asian countries of 3 percent. However, the effect is highly statistically significant only when one also controls for the exchange rate movements of the developing country currency relative to the U. S. dollar. The domestic currency depreciation therefore potentially raises the return to Japanese investment in Southeast Asia relative to investment in Japan. In Table 4, column 4, subtracting the coefficients on RER^J from RER^{US} , which yields the coefficient on a yen/dollar real exchange rate, the resulting net coefficient suggests that a 1 percent appreciation of the yen against the dollar raises FDI into these countries by 8.14 percent. This finding is consistent with more anecdotal claims about the potential hollowing out of Japanese industrial sectors with respect to a strong yen.

The results in Table 3 column 3 also suggest that an appreciation with respect to the dollar is associated with an increase in direct investment from the United States to Southeast Asia, but this result is not robust to the inclusion of the bilateral yen real exchange rate in the regression. Table 5 confirms these significant linkages between Southeast Asian bilateral exchange rates and direct investment from both Japan and the United States. From Table 5, column 4 observe that a 1 percent depreciation with respect to the yen increases direct investment from Japan by 2.62 percent and decreases direct investment from the United States by 1.46 percent. Also, column 4 shows that a 1 percent appreciation of the yen against the dollar increases direct investment from Japan

by 7.7 percent. Column 2 shows that this same appreciation of the yen against the dollar reduces United States investment in Southeast Asia by 1.6 percent.

The coefficients on the (third party) bilateral exchange rates in these regressions should be interpreted as showing the effects of real exchange rates holding constant the bilateral exchange rate between the host country and the source country. Thus, these coefficient reflect the effect of a change in the yen/dollar exchange rate on FDI to the countries in the panel. For example, an increase in the dollar/ringgit exchange rate, holding constant the yen/ringgit exchange rate, represents an increase in the dollar/yen exchange rate. Therefore, a positive coefficient on the dollar/ringgit real exchange rate in a regression of direct investment from Japan that also includes the yen/ringgit real exchange rate reflects the fact that an appreciation of the yen relative to the dollar, all else equal, increases direct investment from Japan to Malaysia.

3.2 Trade Regressions

In this section we examine the direct effect of real exchange rates on the relative prices of developing country (bilateral) exports and imports, and also explore the indirect real exchange rate linkage via foreign direct investment. Foreign direct investment may also increase imports of intermediate inputs purchased by the host country, if the direct investment supports or creates links in the chain of production of a multinational firm. Imports of final goods purchased by the host country may decline in the wake of direct investment if that investment supports or creates a domestic industry

that displaces purchases of final goods from the source country. Exports may also increase in the wake of direct investment as the producers in the source country use the host country as a platform for selling to third-country markets.¹²

Tables 6, 7, and 8 present the results of regressions that link the logarithms of direct investment and real exchange rates to the country's real bilateral imports (in millions of constant US dollars) from the United States and Japan. The tables present results for, respectively, the full developing country panel, the Latin American country panel, and the Southeast Asian panel. Analogous regressions for real bilateral exports to the United States and Japan are provided in Tables 9, 10, and 11. All regressions include the logarithms of both contemporaneous and lagged real exchange rates, national income in both countries and current and lagged foreign direct investment flows.¹³ The real exchange rate in a particular regression is the bilateral exchange rate relative to the trade partner.

For the full panel of countries, the real exchange rate appreciation has the expected positive effect on imports, and the sum of the current and lagged real exchange rates is significant in all four regressions of Table 6. Direct investment from Japan has a positive and significant impact on imports from Japan, a result consistent with a situation where direct investment is supported by subsequent trade in intermediate inputs from the source country.

In Latin American countries (Table 7), however, neither imports from the United States or Japan are responsive to FDI from either source. The significance of FDI

for imports in the full panel of countries was driven by the Southeast Asian results. As indicated in Table 8, direct investment from both the United States and Japan significantly affects goods imported by Southeast Asian countries. From column 3 observe that a 10 percent increase in direct investment from the United States *reduces* Southeast Asian country imports from the United States by about 3 percent over time. From column 6 observe that a 10 percent increase in direct investment from Japan *increases* imports from Japan by about 1.5 percent over time. Japanese direct investment is also shown to significantly increase Southeast Asian imports from the United States . This set of results could imply that United States FDI substitutes for United States trade with the region, while Japanese FDI leads to more externally oriented local production.

A confirmation that there are direct (relative price) and indirect (via FDI) effects of real exchange rates on Southeast Asian imports is provided by regressions that exclude the FDI terms. The resulting coefficients on real exchange rates in these regressions that exclude FDI are roughly 20 percent lower for imports from the United States and 50 percent higher for imports from Japan. These elasticity adjustments are consistent with the results concerning the effects of direct investment on trade and the results presented earlier on the effects of the real exchange rate on direct investment. An appreciation of a country's real exchange rate decreases FDI which, in turn, decreases Southeast Asian imports from Japan and increases Southeast Asian imports from the United States.

Tables 9, 10, and 11 present results for regressions of exports from the countries in the full panel, Latin American panel, and Southeast Asian panel, respectively, to either the United States or Japan. For the full panel of countries (Table 9) the real exchange rate coefficients in Table 9 indicate a J-curve effect with positive (albeit insignificant) coefficients on contemporaneous exchange rates and negative (and significant, in the case of Japan) coefficients on lagged exchange rates. The results (in Table 9, columns 3 and 6) indicate a positive effect of Japanese foreign investment on exports to both the United States and Japan. There is also a significant effect of direct investment from the United States on panel country exports to Japan. This finding is consistent with a situation where Japanese and American multinational firms' exports to the United States or Japan are increased by direct investment in countries in the panel.

The decomposition of the full panel into the Latin American and Southeast Asian country components reveals which relationships were driving the results of Table 9. Specifically, the evidence provided in Tables 10 and 11 is suggestive of which countries in the panel serve as significant platforms for exporting by multinationals to the United States or Japan. Exports from Latin America to the United States are significantly increased by direct investment from Japan (Table 10). However, United States FDI into Latin America does not appear to promote further Latin American sales to the United States. The trade-promoting effects of Japanese FDI also is observed in Southeast Asia. In Table 11 observe that Southeast Asian exports to the United States and to Japan are both significantly increased by direct investment from Japan. By contrast, for these

countries there is no significant increase in exports to either the United States or Japan associated with increased direct investment by the United States.

4 Conclusion

The empirical results provided in this paper document two types of linkages between Latin American and Southeast Asian countries with the United States and Japan, the link between the real exchange rate and direct investment and the link between the real exchange rate and trade. We show that direct investment into these developing countries affects their trade flows with industrialized countries, even after holding constant the contribution of the real exchange rate. There are significant differences in the linkages shown by regressions for the Latin American and for the Southeast Asian countries vis-a-vis the United States and Japan. In general, real exchange rates have the most significant effect on trade and FDI patterns for Southeast Asia. In this region the effects of FDI on subsequent trade also are strongest. Moreover, the source of FDI, that is, Japan or the United States, influences the degree and direction of the trade effects of FDI.

Our results provide evidence of a number of statistically significant linkages. A real depreciation of the currencies of the Southeast Asian countries with respect to the yen both increases foreign direct investment to these countries from Japan and decreases foreign direct investment to these countries from the United States. Foreign direct investment from Japan to the Southeast Asian countries increases imports from

Japan. These imports largely consist of inputs to production. Foreign direct investment from Japan to the Southeast Asian countries also is associated with an increase in exports from these countries to both the United States and Japan. These exports comprise both machinery and (for Japan) raw materials. We also show that foreign direct investment from Japan to Latin America is associated with an increase in the exports of these countries to the United States. These exports consist of machinery and transportation equipment, and some food, leather, primary metals and raw materials.

For Southeast Asian countries the real exchange rates that we examine are closely related to their nominal exchange rates. The nominal exchange rate regime therefore presents a relevant context for interpretation of our results. Most Southeast Asian countries have pursued basket pegs. Frenkel and Wei (1994) showed that, with the exception of high yen weights observed in the baskets during 1985-1986, the weight of the dollar in Southeast Asian currency baskets often was between ninety and one hundred percent.¹⁴ Thus, Southeast Asian (and Latin American) countries use the United States dollar as the main benchmark against which their own currencies are valued. An open question concerns the role of the performance of countries not included in the sample in diverting trade or investment from the countries we study here. For example, the real exchange rates of Korea, Singapore or Taiwan may have had an influence on investment in Indonesia, Malaysia, the Philippines or Thailand.

The existence of the peg arrangements in which the dollar has a dominant role, in conjunction with our findings about the direction and strength of empirical

linkages between exchange rates, trade, and FDI, provide support for a significant role of exchange rate movements in the rapid development of production and trade by manufacturing industries in Southeast Asia: the appreciation of the yen against the dollar since the mid 1980s was a crucial element in this expansion. Yen appreciation against the United States dollar since 1985 stimulated Japanese FDI into the dollar area of Southeast Asia (but not into Latin America). These investments furthered the trade linkages of Southeast Asian countries with respect to both Japan and the United States. By pegging to the dollar, Southeast Asian countries became extremely attractive targets for investment and trade when the yen appreciated. Analogously, yen depreciation against the dollar, under the dollar-denominated exchange rate regime of Southeast Asian countries, leaves these countries adversely exposed as a target for FDI and as a comparably attractive trade partner.

1. Goldberg and Kolstad (1995) show that exchange rate risk influences both trade and international investment flows, which in part substitute for trade. The pattern of effects of exchange rate risk on these flows depends on the correlations between shocks to exchange rates and shocks to demand and costs in respective home and foreign markets.
2. Goldberg (forthcoming, 1997) explores the effects of exchange rate movements on total investment in Latin American countries, but does not break out the effects on domestic versus foreign investors.
3. Kohsaka (1996) also discusses possible root causes of changing inter- and intra-regional capital flows, especially in Asia, but does not formally specify or test any hypotheses.
4. Our results can be contrasted with and complement Frankel and Wei's (1994) correlations between bilateral exchange rate variability and bilateral trade flows. The latter results show that variability per se slows trade mildly in some regions.
5. Sometimes these countries are called the ANIEs, i.e. the Asian Newly Industrialized Economies. The sum of the NICs and Southeast Asia and China are sometimes referred to as Pacific Asia.
6. Mexico is excluded due to its particular set of close ties to the United States. The Latin American countries selected are significant trade and investment partners of the United States and Japan.
7. Annual FDI flows are quite variable over time, so annual ratios are indicative of relative scales of activity but not representative of consistent patterns in country investment shares. For reference, we also report the amount of FDI from Europe and the total of all FDI into the country, calculated from the Balance of Payments Statistics of the country and reported in the IMF's *International Financial Statistics*. We do not present the source country FDI series as a percentage of the IFS total: these series from different sources are not compatible numbers. Unlike the trade data, the data on FDI flows into developing countries are less reliable and more volatile series. The FDI series that we utilize for the United States are flow data computed by the Bureau of Economic Analysis and reported in the *Survey of Current Business*. The shortcomings of these series have been extensively discussed elsewhere and will not be reiterated here (see DeWenter, 1995). Despite the criticisms of the United States FDI series, we still may be on much stronger grounds with this data, compared with our data on Japanese outward FDI, reported in Monthly Finance Review of the Japan Ministry of Finance. Matsuoka and Rose (1994) reports that MOF data exclude FDI resulting from retained earnings, the opening and expanding of branches, and the purchase of land. Also, the MOF data are calculated by summing up nominal dollar investments over time, without price index adjustments.

8. 1993 data from United States Bureau of Census database.
9. The flows are the difference between cumulative annual stocks.
10. Klein and Rosengren (1994) and Dewenter (1995) provide empirical support for this channel in inward FDI to the United States.
11. The imperfect capital market channel has the additional prediction that the ratio of domestic to foreign investors (and relative shares of different foreign investors) in financing domestic investment opportunities should fall when the domestic currency depreciates.
12. Goldberg and Kolstad (1995) also show that FDI can replace exports when the FDI is induced by the volatility of exchange rates.
13. The US PPI is used to convert the trade data into constant dollars. The bilateral real exchange rate data are expressed as price in panel country relative to the PPI in the United States or Japan. The specific price deflator varies across the panel countries due to data availability. The PPI is used for Chile; the WPI is used for Indonesia, Thailand, and the Philippines, and the CPI is used for Malaysia, Argentina, and Brazil.
14. Frenkel and Wei (1994) estimate the weights on various currencies in practice in the basket pegs pursued by Asian countries. These computations are done by regressing respective foreign currency values against the domestic currency, with all exchange rates expressed relative to a 'neutral' base, the Swiss Franc.

References

- Bohn, H. and L. Tesar (forthcoming) "U.S. Portfolio Investment in Asian Capital Markets," chapter 2 in Reuven Glick, editor, *Managing Capital Flows and Exchange Rates: Lessons from the Pacific Basin*, (Cambridge University Press).
- Calvo, G., L. Leiderman, and C. Reinhart (1993). "Capital Inflows to Latin America: The Role of External Factors," *IMF Staff Papers* 40(1):108-51.
- Dewenter, K. (1995). "Do Exchange Rate Changes Drive Foreign Direct Investment?" *Journal of Business* 68(3):405-433.
- Eaton, J. and A. Tamura (1994). "Bilateralism and Regionalism in Japanese and US Trade direct foreign investment patterns," *Journal of the Japanese and International Economies* 8:478-510.
- Eaton, J. and A. TAMURA (1996). "Japanese and U.S. Exports and Investment as Conduits of Growth." In T. Ito and A. Krueger, eds., *Financial Deregulation and Integration in East Asia*, NBER and University of Chicago Press.
- Frankel, J. (1993). "Is Japan Creating a Yen Bloc in East Asia and the Pacific?" In J. Frankel and M. Kahler, eds. *Regionalism and Rivalry: Japan and the U.S. in Pacific Asia* University of Chicago Press and NBER.
- Frankel, J. and S.J Wei (1993). "Trade Blocs and Currency Blocs" NBER working paper 4335, April.

- Frankel, J. and S.J Wei (1994). "Yen Bloc or Dollar Bloc? East Asian Exchange Rate Policies." In T. Ito and A. Krueger, eds. *Macroeconomic Linkage*, University of Chicago Press and NBER.
- Froot, K., editor (1993). *Foreign Direct Investment* (University of Chicago Press and NBER.
- Froot, K. and J. Stein (1991). "Exchange Rates and Foreign Direct Investment: An Imperfect Capital Markets Approach," *Quarterly Journal of Economics* 106(4):1191-1217.
- Goldberg, L. (1997). "Exchange Rates and Investment Response in Latin America." In B.J. Cohen, ed., *International Trade and Finance: New Frontiers for Research: Festschrift in Honor of Peter B. Kenen* Cambridge University Press.
- Goldberg, L. and C. Kolstad (1995). "Foreign Direct Investment, Exchange Rate Variability and Demand Uncertainty," *International Economic Review* 36(4).
- Ito, T. and A. Krueger (1996). *Financial Deregulation and Integration in East Asia* NBER and University of Chicago Press.
- Klein, M. and E. Rosengren (1994). "The Real Exchange Rate and Foreign Direct Investment in the United States: Relative Wealth vs. Relative Wage Effects," *Journal of International Economics* 36(3/4):373-389.
- Kletzer, K. and M. Spiegel (forthcoming) "Speculative Capital Inflows and Exchange Rate Targeting in the Pacific Basin: Theory and Evidence," chapter 13 in Reuven Glick, editor, *Managing Capital Flows and Exchange Rates: Lessons from the Pacific Basin*, (Cambridge University Press).

Kohsaka, A. (1996). "Interdependence through Capital Flows in Pacific Asia and the Role of Japan." In T. ITO and A. Krueger, eds., *Financial Deregulation and Integration in East Asia* NBER and University of Chicago Press.

Matsuoka, M. and B. Rose (1994). *The DIR Guide to Japanese Economic Statistics* New York, Oxford University Press.

Tavlas, G. and Y. Ozeki (1992). "The internationalization of currencies: an appraisal of the Japanese yen." Occasional Paper 90, Washington DC: International Monetary Fund (January).

Data Appendix

A. Japan. External Direct Investment by industry and area from *Monthly Finance Review*, Japan Ministry of Finance, August issues, annual series 1978/1980 to 1994.

Aggregate export and import data from IMF Direction of Trade Statistics, annual series, 1979 to 1995.

Disaggregated 1 and 2-Digit SITC bilateral exports and imports from United Nations Trade database.

Exchange rates (Real Effective and bilateral US dollar rate) from IMF *International Financial Statistics*, annual series (period average), 1979 to 1995.

Price indices from IMF *International Financial Statistics*, annual series, 1979 to 1995.

Gross Domestic Product and GDP Deflator from IMF *International Financial Statistics*, annual series, 1979 to 1995.

B. United States. Direct Investment from Bureau of Economic Analysis (BEA), annual series, 1978 to 1993.

Direct Investment by Industry from US Dept. Of Commerce, Survey of Current Business, annual series, 1983 and 1993.

Aggregate export and import data from IMF Direction of Trade Statistics, annual series, 1979 to 1995.

Disaggregated 1 and 2-Digit SIC bilateral exports and imports from Bureau of Census database, annual series 1983 to 1995.

Exchange rates (Real Effective and bi-lateral US dollar rate) from IMF *International Financial Statistics*, annual series (period average), 1979 to 1995.

Price indices from IMF *International Financial Statistics*, annual series, 1979 to 1995.

Gross Domestic Product and GDP Deflator from IMF *International Financial Statistics*, annual series, 1979 to 1995.

C. Latin America: Argentina, Brazil, Chile. Exchange rates (Real Effective and bi-lateral US dollar rate) from IMF *International Financial Statistics*, annual series (period average), 1979 to 1995.

Price indices from IMF *International Financial Statistics*, annual series, 1979 to 1995.

Gross Domestic Product and GDP Deflator from IMF *International Financial Statistics*, annual series, 1979 to 1995.

D. Southeast Asia: Indonesia, Malaysia, Philippines, Thailand. Exchange rates (Real Effective and bi-lateral US dollar rate) from IMF *International Financial Statistics*, annual series (period average), 1979 to 1995.

Price indices from IMF *International Financial Statistics*, annual series, 1979 to 1995.

Gross Domestic Product and GDP Deflator from IMF *International Financial Statistics*, annual series, 1979 to 1995.

Table 1 Regional Trade Shares into Latin American and Southeast Asian Countries, 1993 (in percent)				
	United States	Japan	Europe	China
Argentina	17.2	3.8	26.1	1.3
Brazil	21.2	6.5	26.2	1.5
Chile	21.4	12.3	23.5	2.0
Latin American Group	21.5	7.2	27.4	1.7
Indonesia	13.1	26.8	16.5	3.4
Malaysia	18.7	20.1	13.1	2.5
Philippines	26.4	19.6	12.6	1.2
Thailand	16.1	24.3	15.7	1.6
Southeast Asian Group	17.4	23.0	14.7	2.3

* Trade Share is calculated as the sum of bilateral exports plus bilateral imports relative to total exports plus imports of the developing country. Data Source: IMF *Direction of Trade Statistics Yearbook, 1995*.

Table 2 Regional FDI into Latin American and Southeast Asian Countries, 1993 (in millions of US\$)				
Destination\Source	United States	Japan	Europe*	World Total
Argentina	956	34	304	6305
Brazil	565	419	198	1292
Chile	214	3	130	841
Latin American Group	1735	456	632	8438
Indonesia	559	813	57	2004
Malaysia	330	800	587	5006
Philippines	298	207	116	1025
Thailand	46	578	245	1726
Southeast Asian Group	1233	2398	1005	9761

Data Sources: United States FDI data from the Bureau of Economic Analysis (BEA) and also published in the *Survey of Current Business*. Japanese FDI data from the Japanese Ministry of Finance *Monthly Finance Review*. Total FDI data from IMF, *International Financial Statistics*. *Europe includes Belgium, France, Germany, Italy, Netherlands, Portugal, Spain, Sweden and the United Kingdom. Data sources: *OECD Direct Investment Yearbook* provides FDI flow in source country currencies. Conversion to US \$ values done using IFS period average exchange rates.

Table 3 Determinants of FDI from the United States and Japan into the Developing Country Panel						
	United States as FDI Source			Japan as FDI Source		
RER^j_{t-1}	-0.127 (0.573)		1.782*** (0.630)	-2.01*** (0.740)	-0.916 (0.767)	-3.06*** (0.930)
RER^{us}_{t-1}	0.174 (0.576)	2.026** (0.798)	-0.117 (0.971)	2.326*** (0.731)		5.082*** (1.479)
$LA * RER^j_{t-1}$			-2.78*** (0.675)		1.149 (0.751)	2.047** (1.025)
$LA * RER^{us}_{t-1}$		-2.082** (0.812)	1.065 (1.077)			-3.783** (1.654)
GDP^i_{t-1}	1.845*** (0.507)	2.271*** (0.514)	2.671*** (0.485)	1.241* (0.717)	0.853 (0.821)	1.124 (0.778)
GDP^i_t	-3.651 (2.888)	-3.186 (2.715)	-3.946 (2.570)	10.012 (6.128)	9.143 (6.509)	11.736* (6.235)
GDP^j_{t-1}	3.479 (3.226)	2.709 (2.795)	3.336 (2.867)	-9.075 (5.938)	-6.834 (6.315)	-10.400* (6.051)
constant	-16.006 (9.972)	-12.65** (4.955)	-19.70** (8.897)	-9.702 (13.404)	-32.7*** (10.931)	-8.684 (13.236)
F-tests						
RER^j, RER^{us}	0.06			5.25***		
$RER^j + LA * RER^j$			2.76*		0.64	1.38
$RER^{us} + LA * RER^{us}$		0.09	2.51			2.34
$RER^j, LA * RER^j$ $RER^{us}, LA * RER^{us}$			6.25***			4.13***
adj.R2	0.720	0.739	0.778	0.776	0.783	0.784
#obs	98	98	98	105	105	105

*, **, *** indicate statistical significance at the 10, 5, and 1 percent levels, respectively, in all tables with regression results. Also, in all tables, standard errors in parentheses.

Table 4 Determinants of FDI from U.S. and Japan into Latin American Panel				
	United States as FDI Source		Japan as FDI Source	
RER_{t-1}^j		-0.246 (0.682)	0.300 (0.415)	-1.881 (1.439)
RER_{t-1}^{US}	-0.091 (0.165)	0.140 (0.663)		2.148 (1.360)
GDP_{t-1}^i	5.460*** (0.870)	5.425*** (0.885)	0.124 (1.850)	-0.707 (1.889)
$GDP_{t-1}^{fdi\ source}$	-6.826* (3.492)	-6.552* (3.617)	15.264 (13.003)	11.338 (12.994)
$GDP_{t-1}^{fdi\ source}$	5.466 (3.626)	4.876 (4.019)	-12.462 (12.447)	-10.024 (12.306)
constant	-40.821*** (6.461)	-36.968*** (12.516)	-34.359* (19.216)	0.535 (29.034)
F-tests				
RER^j, RER^{US}		0.21		1.52
adj.R2	0.899	0.897	0.667	0.680
#obs	42	42	45	45

Table 5 Determinants of FDI from U.S. and Japan into S.E. Asia Panel				
	United States as FDI Source		Japan as FDI Source	
RER_{t-1}^j		1.462** (0.695)	-0.761 (0.702)	-2.615*** (0.720)
RER_{t-1}^{us}	1.168 (0.768)	-0.138 (0.968)		4.948*** (1.077)
GDP_{t-1}^i	1.915*** (0.601)	1.811*** (0.583)	0.857 (0.862)	1.498** (0.745)
$GDP_{t-1}^{fdi\ source}$	0.038 (3.289)	-1.548 (3.266)	5.165 (6.596)	11.066* (5.748)
$GDP_{t-1}^{fdi\ source}$	-1.655 (3.399)	1.776 (3.667)	-2.658 (6.552)	-9.601* (5.767)
constant	0.535 (6.871)	-20.910 (12.167)	-33.632 (13.487)	-5.895 (12.949)
F-tests				
RER^j, RER^{us}		3.45*		11.36***
adj.R2	0.328	0.373	0.668	0.760
#obs	56	56	60	60

Table 6 Imports from U.S. or from Japan into Developing Country Panel (regressions use bilateral real exchange rates relative to import source)				
	Imports from United States		Imports from Japan	
RER_t	0.234*** (0.066)	0.266*** (0.074)	0.064 (0.101)	0.060 (0.101)
RER_{t-1}	0.341*** (0.067)	0.315*** (0.072)	0.254** (0.105)	0.262** (0.105)
GDP_t^i	1.785*** (0.506)	1.567*** (0.564)	2.921*** (0.717)	2.805*** (0.728)
GDP_{t-1}^i	-0.2216 (0.519)	-0.117 (0.545)	-1.230* (0.696)	-1.239* (0.714)
$GDP^{\text{import source}}_t$	-2.068** (0.947)	-1.752* (1.010)	-4.091** (2.081)	-3.495* (2.124)
$GDP^{\text{import source}}_{t-1}$	1.928** (0.971)	1.648 (1.046)	3.548* (2.017)	2.998 (2.053)
FDI^{us}_t	0.27 (0.076)	0.037 (0.080)		0.070 (0.055)
FDI^{us}_{t-1}	0.034 (0.078)	0.027 (0.082)		0.003 (0.056)
FDI^{japan}_t		-0.001 (0.024)	0.089*** (0.033)	0.088*** (0.034)
FDI^{japan}_{t-1}		0.028 (0.027)	0.069** (0.035)	0.067* (0.035)
constant	-4.297** (1.825)	-3.629* (2.155)	-2.938 (3.600)	-2.405 (3.615)
F-tests				
RER_t, RER_{t-1}	79.97***	62.99***	8.40***	8.57***
$FDI^{us}_t, FDI^{us}_{t-1}$	1.61	1.74		1.65
$FDI^{japan}_t, FDI^{japan}_{t-1}$		0.64	12.56***	11.75***
adj.R2	0.913	0.912	0.944	0.944
#obs	84	83	97	97

Table 7 Imports from U.S. or from Japan into Latin American Panel (regressions use bilateral real exchange rates relative to import source)				
	Imports from United States		Imports from Japan	
RER_t	0.272*** (0.086)	0.288*** (0.102)	0.137 0.130	0.125 0.132
RER_{t-1}	0.353*** (0.088)	0.339*** (0.098)	0.327** (0.139)	0.333** (0.148)
GDP_t^i	1.292 (0.889)	0.924 (1.033)	3.047*** (1.028)	2.308* (1.208)
GDP_{t-1}^i	-0.678 (0.875)	-0.093 (1.000)	0.447 (1.051)	0.674 (1.318)
$GDP_{import\ source\ t}^{import\ source}$	-0.986 (1.979)	-0.334 (2.230)	0.564 (4.005)	-0.171 (4.391)
$GDP_{import\ source\ t-1}^{import\ source}$	1.086 (1.901)	0.776 (2.149)	-1.545 (3.480)	-0.690 (4.136)
FDI_t^{us}	0.049 (0.118)	0.064 (0.123)		0.196 (0.164)
FDI_{t-1}^{us}	0.080 (0.108)	0.105 (0.117)		-0.135 (0.167)
FDI_t^{japan}		-0.026 (0.036)	0.037 (0.048)	0.039 (0.051)
FDI_{t-1}^{japan}		0.023 (0.041)	-0.001 (0.050)	0.002 (0.053)
constant	-4.359 (4.512)	-3.386 (4.728)	-16.172** (6.377)	-12.754* (7.398)
F-tests				
RER_t, RER_{t-1}	44.85***	39.42***	9.35***	8.41***
$FDI_t^{us}, FDI_{t-1}^{us}$	1.79	2.58		0.20
$FDI_t^{japan}, FDI_{t-1}^{japan}$		0.00	0.29	0.32
adj.R2	0.904	0.901	0.792	0.788
#obs	42	41	41	41

	Imports from United States			Imports from Japan		
RER _t	1.012*** 0.386	0.848** 0.368	0.742** 0.355	1.242*** 0.239	0.523** 0.215	0.590*** 0.222
RER _{t-1}	0.112 0.381	0.004 0.364	0.068 0.347	-0.278 0.264	0.008 0.205	0.051 0.229
GDP _t ⁱ	2.678*** 0.645	3.055*** 0.625	2.009*** 0.760	7.312*** 0.926	5.021*** 0.903	5.331*** 0.920
GDP _{t-1} ⁱ	-0.985 0.658	-0.882 0.617	-0.056 0.731	-6.025*** 0.942	-4.438*** 0.880	-4.650*** 0.3886
GDP _t ^{import source}	-1.783* 0.940	-1.107 0.939	-0.895 0.906	-5.388*** 1.826	-7.135*** 1.408	-7.456*** 1.414
GDP _{t-1} ^{import source}	1.364 0.998	0.310 1.033	-0.181 1.006	6.412*** 1.831	7.592*** 1.391	7.966*** 1.405
FDI _t ^{us}		-0.095 0.177	-0.037 0.175			-0.064 0.041
FDI _{t-1} ^{us}		-0.214 0.144	-0.265* 0.139			0.011 0.039
FDI _t ^{japan}			0.077* 0.041		0.082** 0.039	0.081** 0.039
FDI _{t-1} ^{japan}			0.024 0.035		0.179*** 0.037	0.172** 0.038
constant	-0.390 2.179	-1.888 2.133	1.779 2.584	-18.412*** 3.822	-5.220 3.636	-6.910* 3.791
F-tests						
RER _t , RER _{t-1}	12.01***	6.95***	6.78***	19.50***	8.82***	10.35***
FDI _t ^{us} , FDI _{t-1} ^{us}		5.43**	5.49**			0.84
FDI _t ^{japan} , FDI _{t-1} ^{japan}			5.04**		34.17***	31.70***
adj.R2	0.919	0.929	0.935	0.920	0.955	0.955
#obs	42	42	42	56	56	56

Table 9 Exports to U.S. or Japan from Full Developing Country Panel (regressions use bilateral real exchange rates relative to export destination)						
	Exports to United States			Exports to Japan		
RER_t	0.057 (0.101)	0.058 (0.102)	-0.001 (0.100)	0.110 (0.092)	0.068 (0.094)	0.066 (0.088)
RER_{t-1}	-0.031 (0.103)	-0.031 (0.104)	-0.079 (0.098)	-0.185* (0.101)	-0.237** (0.098)	-0.224** (0.091)
GDP_t^i	1.076 (0.724)	1.164 (0.745)	0.136 (0.710)	2.20*** (0.674)	1.431** (0.669)	1.311** (0.633)
GDP_{t-1}^i	0.181 (0.729)	0.119 (0.751)	0.739 (0.685)	-0.973 (0.686)	-0.556 (0.650)	-0.759 (0.620)
$GDP^{\text{export destination}}_t$	1.522 (1.326)	1.417 (1.353)	2.956** (1.264)	-0.414 (1.980)	-2.294 (1.944)	-0.836 (1.846)
$GDP^{\text{export destination}}_{t-1}$	-0.911 (1.360)	-0.808 (1.384)	-2.673** (1.298)	0.397 (1.926)	2.009 (1.885)	0.695 (1.784)
FDI_t^{us}		-0.035 (0.058)	-0.010 (0.052)			0.118** (0.048)
FDI_{t-1}^{us}		0.021 (0.058)	-0.015 (0.052)			0.073 (0.049)
FDI_t^{japan}			0.131** * (0.031)		0.072** (0.031)	0.064** (0.029)
FDI_{t-1}^{japan}			0.067* (0.034)		0.081** (0.032)	0.074** (0.030)
constant	-9.34*** (2.491)	-9.54*** (2.583)	-4.088 (2.565)	-3.945 (3.112)	2.391 (3.363)	3.505 (3.142)
F-tests						
RER_t, RER_{t-1}	0.07	0.07	0.65	0.56	2.73*	2.75*
$FDI_t^{us}, FDI_{t-1}^{us}$		0.05	0.22			14.57** *
$FDI_t^{\text{japan}}, FDI_{t-1}^{\text{japan}}$			21.34** *		13.45***	12.45** *
adj.R2	0.863	0.860	0.888	0.944	0.950	0.957
#obs	98	98	97	98	97	97

	Exports to United States			Exports to Japan		
RER_t	0.009 (0.065)	0.006 (0.066)	-0.028 (0.068)	0.064 (0.072)	0.060 (0.082)	0.038 (0.074)
RER_{t-1}	-0.069 (0.066)	-0.074 (0.068)	-0.967 (0.065)	-0.158* (0.083)	-0.196** (0.087)	-0.126 (0.082)
GDP_t^i	-0.257 (0.564)	0.090 (0.686)	-0.357 (0.686)	1.87*** (0.625)	1.714** (0.644)	1.284* (0.674)
GDP_{t-1}^i	0.693 (0.594)	0.519 (0.675)	1.011 (0.665)	0.117 (0.656)	0.294 (0.658)	-0.654 (0.735)
$GDP^{\text{export destination}}_t$	2.481* (1.329)	2.063 (1.526)	3.369** (1.481)	1.231 (2.214)	-0.038 (2.506)	1.781 (2.449)
$GDP^{\text{export destination}}_{t-1}$	-1.309 (1.349)	-0.938 (1.467)	-2.513* (1.428)	-1.018 (2.322)	-0.030 (2.403)	-1.261 (2.307)
FDI_t^{us}		-0.091 (0.091)	-0.055 (0.082)			0.143 (0.091)
FDI_{t-1}^{us}		0.064 (0.083)	-0.003 (0.078)			0.086 (0.093)
FDI_t^{japan}			0.074** * (0.024)		0.041 (0.030)	0.019 (0.028)
FDI_{t-1}^{japan}			0.036 (0.027)		0.033 (0.031)	0.012 (0.030)
constant	-6.71*** (2.318)	-7.993** (3.481)	-6.609** (3.141)	-15.4*** (3.615)	-12.06*** (3.991)	-6.359 (4.126)
F-tests						
RER_t, RER_{t-1}	0.75	0.90	3.56*	1.17	2.05	0.99
$FDI_t^{us}, FDI_{t-1}^{us}$		0.13	0.69			8.88***
$FDI_t^{\text{japan}}, FDI_{t-1}^{\text{japan}}$			9.48***		3.14*	0.58
adj.R2	0.966	0.965	0.973	0.942	0.944	0.954
#obs	42	42	41	42	41	41

	Exports to United States			Exports to Japan		
RER_t	1.723*** (0.480)	1.741*** (0.486)	1.37*** (0.493)	0.91*** (0.308)	0.279 (0.319)	0.266 (0.338)
RER_{t-1}	0.743 (0.497)	0.677 (0.511)	0.710 (0.489)	0.143 (0.340)	0.364 (0.304)	0.455 (0.348)
GDP_t^i	3.416*** (0.939)	3.397*** (0.952)	1.612 (1.153)	5.26*** (1.194)	2.053 (1.341)	2.188 (1.401)
GDP_{t-1}^i	-1.665* (0.950)	-1.767* (0.967)	-0.232 (1.137)	-3.56*** (1.214)	-0.952 (1.308)	-0.983 (1.350)
$GDP^{\text{export destination}}_t$	2.675** (1.282)	2.504 (1.309)	2.540* (1.273)	0.887 (2.355)	-1.031 (2.091)	-1.106 (2.154)
$GDP^{\text{export destination}}_{t-1}$	-1.979 (1.345)	-1.686 (1.393)	-2.079 (1.353)	-0.932 (2.361)	0.310 (2.067)	0.366 (2.140)
FDI^{us}_t		0.011 (0.056)	0.016 (0.054)			-0.026 (0.063)
FDI^{us}_{t-1}		0.051 (0.054)	0.038 (0.052)			-0.026 (0.063)
FDI^{japan}_t			0.135** (0.056)		0.167*** (2.898)	0.171*** (0.059)
FDI^{japan}_{t-1}			0.002 (0.051)		0.106* (0.056)	0.104* (0.057)
constant	-5.472* (2.758)	-5.561* (2.792)	-2.072 (3.050)	-8.991* (4.927)	4.580 (5.401)	3.735 (5.774)
F-tests						
RER_t, RER_{t-1}	66.17***	59.13***	34.97** *	13.9***	5.86**	5.64**
$FDI^{us}_t, FDI^{us}_{t-1}$		0.68	0.55			0.36
$FDI^{\text{japan}}_t, FDI^{\text{japan}}_{t-1}$			4.61**		17.04***	16.18***
adj.R2	0.863	0.860	0.872	0.927	0.945	0.943
#obs	56	56	56	56	56	56