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Determinants of U.S. Exports to China
by
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This paper empirically examines U.S. goods trade with China, focusing on the performance of exports. Throughout the analysis, we explore whether U.S. trade is unusual by contrasting it with trade from Japan and the EU-15. The issue is examined from three perspectives: the commodity composition of exports, the role of multinational firms and from the determinants of trade as specified in a formal "gravity model",. As an initial point of departure, we show that the commodity composition of U.S. exports to China is similar to the pattern of exports to the world as a whole, and that the operations of U.S. multinationals have only minor implication for trade with China. Consequently, we emphasize the estimation of a set of "gravity equations" that explore the role of market size and distance from the United States. Distance exerts a surprisingly large effect on trade. Finally, while exports to China may be a small share of U.S. GDP, they are relatively substantial compared to U.S. exports to other countries. In other words, the measure of U.S. trade performance in China is distorted by the low level of its exports to all countries. We present evidence that the United States underperforms as an exporter relative to a peer group of high-income European countries and Japan.

In recent years, growing conflict over issues related to international trade has led to a deterioration in the US-China relationship. While a substantial U.S. bilateral trade deficit with China is certainly not without precedent, the growing global surpluses of China alongside consistent U.S. global deficits have impacted both the tone and severity of the discussion. Within the United States, the public debate focuses almost exclusively on the unusually large size of imports from China and the perceived competitive threat to U.S. manufacturers. More recently, complaints of an undervalued Chinese exchange rate and inadequate safety regulations have led to various policy intervention proposals to curb Chinese imports. Throughout this debate, however, surprisingly little attention has been placed on the other side of this issue: why are US exports to China so small?

This paper expands on our previous study (2008) of U.S. goods trade with China. For comparative purposes, we use two other large industrial economies: Japan and the EU-15, to explore whether aspects of U.S. trade with China are unusual from a variety of

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perspectives. [2] We begin with a brief review of the trade flow patterns that motivate the study. This shows that, while there are many similarities in the behavior of imports from China to these countries, U.S. exports to China represent a surprisingly small share of U.S. GDP.

Thus, the body of the paper explores possible explanations for the seemingly small level of U.S. exports to China from three perspectives. In sections two and three, we review the results from our previous analysis of the export composition and role of U.S. multinational corporations in explaining the deficiency of U.S. exports to China. Perhaps U.S. exports to China are atypical compared with U.S. exports to the rest of the world or to its major competitors' exports to the Chinese market? Alternatively, the United States may simply lack the multinational corporate presence in China that enables the creation of production and distribution networks that help to facilitate trade.

Finally, the bulk of the analysis is devoted to a more structured analysis centered around the estimation of a set of simple "gravity equations." This enables us to examine trade with China in the context of bilateral trade patterns more generally and to control for a variety of country characteristics including the distance between trading partners. Perhaps the problem is simply that China is far away, though it would not seem to account for the asymmetric aspect of large imports combined with a low level of exports. Additionally, we explore the role of two other factors in this context: transportation costs and exchange rate effects, which also influence trade flows between the two countries.

Bilateral Trade with China

The unusual size of the trade imbalance between China and the United States is highlighted in table 1. For the three major high-income economies of the United States, Japan, and the EU-15, trade with China is shown as a share of their GDP for 2006. Imports represent a similar share of GDP in all three regions – ranging from 2.8 percent of GDP for Japan, 2.4 percent for the United States, and 1.8 percent for the EU-15.

[2] The EU-15 refers to the fifteen members of the European Union prior to its May 2004 expansion to 25 countries. For comparative purposes, the EU-15 group corresponds more closely in income levels to the United States and Japan. The expanded EU also includes a number of Eastern European states with significantly lower income levels and limited links to the global economy. The 15 are: Austria, Belgium, Denmark, Finland, France Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, and United Kingdom.

Exports, however, are strikingly different. Japan exports 3 percent of its GDP to China and typically records a small bilateral trade surplus. In contrast, the U.S. exports only 0.6 percent of GDP to China, and even that represented a significant improvement from 2000 when exports were just 0.3 percent of GDP. Compared with the United States, the EU-15 has consistently exported a larger share of its GDP to China, and combined with its lower share for imports, has a significantly smaller trade imbalance.

The precise size of the bilateral trade imbalance between the United States and China – and to a lesser extent, China's global trade balance – has been a subject of some dispute. Issues involving differences in the measurement of the bilateral trade flows have been extensively explored in a series of prior papers.[3] Most of the confusion is caused by the transshipment of goods through Hong Kong. Not only do exporters often not know the true destination of such products, there is also a significant change in value due to the additional margins added by the Hong Kong traders. Both the United States and China alter the source of imports that pass through Hong Kong if they judge that greater value was added prior to arrival in Hong Kong. However, both report Hong Kong as the destination for much of their own exports. Fung and others (2006) obtain an estimate of the U.S. bilateral trade deficit with China of $172 billion in 2005 compared with official estimates of $202 billion published by the United States and $114 billion published by China. We avoid some of the problems that they identify by focusing on trade with the combination of China, Hong Kong, and Macao.

The discussion of China's role in the global trading system has also been complicated in recent years by a sharp shift in its global trade balance. As shown in figure 1, mainland China typically generated small trade surpluses averaging about two percent of GDP over the period of 1990-2004, and exceeding 3 percent only briefly in 1997-1998. The inclusion of Hong Kong and Macao yields a higher overall trade share, but a smaller trade surplus, averaging less than one percent over the same period. All of this changed after 2004 when the trade surplus began to grow at a rapid pace. The

[3] The issues were clarified in a series of papers by Feenstra and others (1999), Fung and Lau (1996, 2003), Fung and others (2006), and Shindler and Beckett (2005). A recent paper by Wang and others (2007) uses a highly flexible algorithm to reconcile China's trade data with all of its major trading partners.

balance for mainland China increased from $32 billion in 2004 to $102 billion and $178 billion in 2005 and 2006 respectively. The preliminary estimate for 2007 is $262 billion.

The emergence of a large trade surplus has been a considerable surprise since many countries believed that they had extracted major concessions from China as part of the negotiations leading up to its admission to the WTO at the end of 2001. As shown in figure 1, the break in the prior pattern of trade, measured as a share of GDP, appears to be on the import side. Throughout the 1990s, China's external trade was a stable share of GDP, as exports and imports averaged about 19 and 18 percent of GDP respectively.[4] After admission to the WTO, both exports and imports grew rapidly, reaching 31 percent on the export side and 29 percent for imports in 2004. Since 2004, in contrast, while exports continued their rapid growth, the import share has flattened out.

The weak performance of U.S. exports to China is a long-standing phenomenon that is highlighted by the comparison of the United States' and Japan's trade with China in figure 2. The analysis is based on trade in goods as reported in the IMF's Direction of Trade Statistics.[5] The upper panel shows U.S. export and import trade with China, expressed as a percent of U.S. GDP, for the period of 1980-2006. A comparable chart for Japan-China trade is shown in the lower panel. The pattern of steady growth in the share of GDP accounted for by imports from China is remarkably similar for the United States and Japan. Beginning from less than 0.5 percent of GDP in 1980, the import shares have grown steadily over the past quarter century to 2.4 percent for the United States in 2006 and 2.75 percent for Japan. Both countries report matching shares of GDP for imports from China in both 1990 and 2000, but the penetration of the Japanese market has been somewhat more rapid in recent years.[6]

The performance of the two countries' exports to China, however, offers a sharp contrast. Japan has long had a much larger presence in the Chinese market. Scaled by its

[4] The stable trade share is itself a notable contrast to frequent assertions that China's rapid growth has been driven by export-promotion policies.

[5] Services trade is an important and growing proportion of U.S. exports. However, information on bilateral trade in services is very incomplete at the global level and information on bilateral services trade remains limited.

[6] The measures of market penetration as a percent of GDP may also be influenced by the slower growth of the Japanese economy over the past decade and a substantial appreciation of the Yen in 2006.

own GDP, Japan's exports to China were three times larger than those of the United States throughout the 1980s and 1990s. Japan has also reported a consistent, though declining, surplus in its bilateral trade with China. For the United States, China has been a relatively unimportant market and its exports to China did not expand in line with imports from China in the 1980s and 1990s. The situation has changed somewhat in the current decade since U.S. exports have increased at a more rapid pace and the share of exports to GDP has doubled from 0.26 percent of GDP in 1999 to 0.55 in 2006. At the same time, however, Japan's exports to China have tripled as a percent of its own GDP, from 1 to 3 percent.[7]

Export performance data can also be scaled against China's GDP, yielding a measure of each country's share of the Chinese market. On that basis, U.S. exports have basically matched the growth of China's economy: trade represents the same share of GDP, 2.8 percent, in 2006 as the average of the 1990s.[8] Similarly, Japan's exports were 4.9 percent in 2006 compared to 5.1 percent of Chinese GDP in the 1990s. Thus, measured against the growth in the market, neither Japanese nor U.S. exporters have achieved increased market penetration; but the penetration rate for Japanese exports is nearly twice that of the United States, even though it is a substantially smaller economy.[9] It may be surprising that Japan has done so much better than the United States in the Chinese market, but the differences have existed since the early 1980s.

Composition of Exports

Perhaps the low level of U.S. exports to China reflects differences in the types of goods the U.S. exports to China relative to the types of goods it exports to the world as a

[7] The data for the EU shows a pattern very similar to that for the United States and both imports and the trade balance have steadily grown as a share of GDP.

[8] All of the comparisons are based on the conversion of countries' GDP and trade to U.S. dollars using commercial exchange rates. Thus, in 2006, U.S. GDP equaled $13.2 trillion, Japan's GDP is $4.3, and China's GDP is $2.6 trillion.

[9] In the 1980s and early 1990s, when the United States showed a similar weakness in its exports to Japan, many U.S. commentators alleged that Japan engaged in unfair trade practices that discriminated against U.S. products. It is more difficult to make a similar argument in the case of China, however. Given the region's history, it is unlikely that China would discriminate against U.S. products at the same time it appears to welcome imports from Japan.

whole. We explored this issue in a prior paper (Bosworth and Collins (2008). Using two-digit SITC codes, we ranked exports for 2005 in ascending order for 68 commodity groupings. Some summary results are reported in table 2. First, it is notable that the composition of U.S. exports to China is very similar to the composition of U.S. global exports. The rank correlation coefficient between exports to China and exports to the world is 0.85. The strong rank correlation between exports to China and exports to the world is even more evident for Japan (a correlation coefficient of 0.96) and the EU-15 (0.86). The strong correlation is also apparent in columns (1) and (2) of table 3, which compare the top 10 commodity exports to China with their ranking for U.S. global exports. Seven of the ten commodity categories are also among the top ten in global exports. The exceptions are in the export of scrap metal, artificial resins, and oilseeds. As judged by the composition of the trade, the Chinese market appears to be as open to U.S. exporters as world markets are more generally.[10]

Second, the United States, Japan, and Europe appear to be strong competitors in the Chinese market with very similar commodity compositions. We note that the rank correlation of exports to China is stronger between Japan and Europe than between either of these countries and the United States, largely because they do not export significant amounts of agricultural products and other raw materials. However, all of the rank correlations in table 2 exceed 0.8. Four of the top 10 U.S. export groupings appear at the top of the Japanese ranking, and five do for the EU-15 (columns 3 and 4 of table 3). The dominant role played by capital goods is also evident in that all of the commodity groupings -- except for oilseeds and scrap metal -- have substantial capital goods elements. Electrical machinery is the dominant export commodity group for all three economies, accounting for about 20 percent of U.S. and Japanese exports and about 10 percent for the EU-15. The top 10 U.S. exports represent 62 percent of total U.S. trade with China, 49 percent of Japan's trade, and 45 percent for Europe, Expanding the list to account for the top ten exports from each of the three economies results in only16 categories that represent more that 70 percent of each country's trade.

[10] We also performed the analysis at the level of 3-digit SITC codes with no significant change in the conclusions.

Overall, we find little that is unusual about U.S. exports to China, other than that they are small in comparison to those of Japan and the EU-15. The commodity composition is remarkably similar to that for U.S trade with the world as a whole. There is also a strong overlap with the composition of the exports of Japan and the EU-15 to China. Finally, it is evident that these countries are competitors in the Chinese market – particularly as suppliers of capital goods and electronics -- and that Japan has a considerably larger presence.

The Role of Multinational Corporations

The foreign direct investment (FDI) of multinational companies (MNCs) in emerging markets is believed to be important because it provides a beachhead from which to promote bilateral trade. From this perspective, it is notable that although the U.S. imports a large volume of goods from China, its does not have extensive investments within the country. Over the period 2000-06, U.S. firms invested an average of $5 billion per year, split equally between Hong Kong and Mainland China, or only about three percent of U.S. global FDI over the period.[11] While U.S. retailers, such as Walmart and Mattel, have large imports from China, they do not deal with American multinationals in China. Instead, a large portion of their purchases are from foreign invested enterprises (FIEs) that originate from other countries in Asia, or from Chinese contract manufacturers.

A summary of the activities of U.S. affiliates in China and East Asia as a whole is shown in table 4. The data are drawn from the benchmark surveys of U.S. multinational corporations that are conducted at 5-year intervals. First, although affiliate sales started from a very low level, they have grown at a rapid pace. Total affiliate sales expanded at a 14 percent annual rate between 1989 and 2004, and the growth has been concentrated among affiliates on the mainland. Second, affiliate sales are focused on the domestic market, which accounts for 60 percent of total sales in 2004. Approximately 30 percent

[11] As with trade, there are significant differences in the data on FDI reported by China and the United States. Because of the substantial use of intermediaries for joint ventures, there are discrepancies in the reported country source of the FDI. In addition, the Chinese estimates of the volume of FDI include financing that is obtained within China, whereas the U.S. data refer only to the transfer of funds out of the United States.

of sales are directed to other countries – largely in Asia -- and only 12 percent are sales back to the United States. Furthermore, as shown at the bottom of the table, only 10 percent of U.S. exports to China pass through the affiliates, and only 5 percent of imports originate with affiliates. Clearly U.S. multinationals operate in China with minimal trading links to their U.S. operations. They are not promoting exports nor are they directly utilizing China's low labor costs for exports back to the U.S. market.

Similar data for the rest of the East Asia region is reported in the bottom panel of table 4. Again, trade with affiliates is surprisingly small, but they do account for about 20 percent of U.S. exports and 16 percent of imports from the region. In their focus on local production and the local market U.S. affiliates in China are similar to those in the rest of Asia, but they are a bit of an extreme case. The East Asian economies also exhibit a substantial bilateral trade surplus with the United States. The pattern of affiliate operations is consistent with the results of Branstetter and Foley (2007) who conclude that affiliate activity in China is very much in line with U.S. operations in other countries. Their empirical analysis shows that the export orientation of U.S. affiliates abroad tends to increase with size of the domestic market, proximity to the U.S. and favorable tax treatment.

Finally, comparable data on Japanese affiliate operations in China are presented in table 5. Japanese affiliate sales are considerably smaller than those of the United States, but they are expanding even more rapidly. They are less focused on the local market (about 45 percent of sales), and export a larger percent of sales back to Japan. Like U.S. firms, the affiliates are not used as vehicles to promote exports from Japan -- sales to affiliates are less than 10 percent of exports to China.

The Role of Distance

The simplest explanation for a low level of exports between the United States and the Asian economies is that they are far away. However, distance does not provide an obvious explanation for the asymmetry of the U.S. trade with China, small exports but large imports. In this section, we use econometrics to explore its role more formally.

The use of gravity equations to explain the pattern of bilateral trade flows dates back to the work of Jan Tinbergen in the early 1960s. In their simplest form, the volume of trade between any two countries is modeled as proportionate to their economic size and various measures of "trade resistance." Measures of trade resistance have included distance between the two trade partners, the presence of a common language or membership in preferential trade associations.[12] We use the gravity model framework to examine the extent to which such a model can account for the differential importance of China trade for the United States, Japan and the EU-15.

The empirical analysis is based on a very simple formulation in which economic size is measured by the combination of a country's population and its income per capita. The base regression is:

$$(1)\ \ln T_{ij} = \alpha + \beta_1 \ln POP_j + \beta_2 \ln Y_j + \beta_3 \ln D_j + \beta_4 \ln X_{i,j}\ .$$

Where T_{ij} = trade (imports or exports) between country i to country j,

POP_j = population of country j,

Y_j = GDP per capita of country j,

D_{ij} = distance between country i and country j, and

X_{ij} = other measures of "trade resistance".

Normally, the relationship would also include the population and income per capita of country i, but in our analysis the relationship is estimated separately for each of the three base economies (the United States, Japan, and the EU-15).

Goods Trade: The annual trade data are taken from the Direction of Trade Statistics of the International Monetary Fund and cover the period 1980-2005. GDP and population are from the World Development Indicators of the World Bank. The trade data are scaled by the nominal dollar GDP of each of the base economies and the GDP per capita of the trading partners is measured in 2000 U.S. dollars. The measures of distance and the other bilateral pairing variables used to proxy "trade resistance" – such as language, contiguity and colonial link – were obtained from the French Institute for Research on the International Economy (CEPII).[13]

[12] A useful review is provided by Deardorff (1998). Helpful recent discussions of linkages between the theoretical formulations and the empirical analyses are those of Anderson and van Wincoop (2004), Feenstra (2002), and Helpman, Melitz, and Rubenstein (2007). For a recent application and discussion of the estimation issues see Coe and others (2007).

[13] The distance measure is the weighted distance measure of CEPII, which reflects the bilateral distance between the major cities of each country. The definition of a common language that we

The basic results are reported in table 6 and cover 162 countries over 26 years. All of the equations are estimated with a fixed-effects formulation to allow for shifts in the constant term over each of the 26 years.[14] The number of observations varies slightly across the individual regressions because the few countries in each sample for which no trade is recorded have been dropped. Also, while the individual countries of the EU-15 are included in the regressions for the United States and Japan, the regressions for the EU-15 exclude intra-group trade. The results are very consistent with similar estimates in the literature: the elasticity of trade with respect to the two measures of economic size is very close to unity and there is a strong role for distance.

There are also significant econometric issues that we have not directly addressed (see Helpman and others (2007) for a discussion). However, in our data set, which is limited to the trade of three large economies, we do not have a significant problem with zero bilateral trade entries, which have to be excluded in a logarithmic estimation. In addition, the distinction between intensive and extensive trade should be important for us only on the import side, and we do not yet have an effective method of measuring this distinction for economies that export to the United States.

Of greatest relevance in the current context, the distance coefficients are very large and significant in all of the regressions. Unexpectedly, there is evidence of an asymmetric effect on U.S. trade: the distance coefficient for U.S. exports is markedly greater than that for imports. A similar, though smaller, asymmetry also exists for the EU-15; but the asymmetry is reversed for Japan where the coefficient on distance is largest in the import equation. The coefficient on distance is interpreted by some researchers as a measure of global integration. From that perspective, importers to the United States appear to have been considerably more successful than U.S. exporters in overcoming trade barriers associated with distance from the U.S. market. Furthermore, the reversal of the relationship for Japan implies that Japan has been more successful in

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use states that a language is shared if it is spoken by at least 9 percent of the population in both countries. A country shares a language with the EU15 if this is true for any of the 15 countries.

[14] The use of fixed-effects estimation had no significant influence on the estimated coefficients, but it does reduce the evident autocorrelation of the error term. These year dummies adjust for a variety of factors that may be changing over time, such as overall openness and degree of exchange rate overvaluation.

overcoming barriers to its exports than others have been in overcoming barriers to their exports to Japan. It is also notable that the effects of distance on exports from and especially imports to Japan are significantly larger in magnitude than for either the U.S. or the EU-15.

Thus, the results from the gravity equations do have a major effect on our conclusions about the magnitude of U.S. trade with Asia. This is particularly true for trade with China, which is far away from the United States (11,000 kilometers), but close to Japan (2,000 kilometers). An elasticity of distance near unity implies that the U.S. export share in GDP would be very similar to that for Japan if the two countries' distance from China were equalized. Thus, distance can fully account for the differences in the importance of exports to China. However, if the distance were equalized, the hypothetical level of U.S. imports from China would also increase by a proportionate amount.[15]

In testing the robustness of the results, we examined a wide range of alternative formulations. For example, we included categorical variables for each of the three major economies in the trade relationships of the others. Canada and Mexico were also included directly in the U.S. equations. While those variables were all significant, they had no substantial effect on the size of the other coefficients in the regressions, such as distance. Furthermore, we found a more general pattern in which all of the East Asian economies had positive residuals, implying a larger volume of trade than indicated by the simple distance variable.

The results with the categorical variable for East Asia are shown in a second set of regressions in table 6. The East Asia coefficient is large and positive in the U.S. regressions, raising the predictions for both exports and imports; but surprisingly, there is no significant change in the coefficients for the other variables including distance. Also, the magnitude of the regional effect seems to be similar for both imports and exports. There is some decline, however, in the magnitude of the asymmetry of the coefficient on distance between the export and import equations. A similar result is evident for the EU-15, although the coefficient on the Asia variable is only half as large. The regression

[15] The distance elasticity for imports from China is less than for exports, but the level of imports is much larger.

results for Japan are quite different, however, because the coefficient on the East Asia region is extremely large, twice the magnitude shown for the United States; and the coefficients on distance decline dramatically. It is evident that an important regional trading pattern has emerged within East Asia that is not well-represented in a simple focus on distance. This formulation did not work, however, when we tried to expand the definition of the categorical variable to include South Asia, nor could we detect any comparable effect for other regions, such as Latin America.

Several commentators have raised questions about the consistency of the results over time and the possibility that the effect of distance in particular may have declined. As a partial test of the hypothesis, we refit the regression estimates to 5-year sub-periods. While we do not report all of the results, the regression estimates were remarkably stable across the subperiods. For the United States, the coefficients on population and GDP per capita had standard deviations of 5 percent or less across the five subperiods. The coefficients on distance did vary over a wider range of 10 percent, but the coefficient in the export relationship became more negative over time, contrary to our expectations, and the magnitude of the asymmetry between exports and imports increased.[16] The magnitude of coefficient changes for the EU-15 and Japan were very similar to the results for the United States, except there was no uniform pattern of change over time.

The actual and predicted results for U.S. exports and imports in 2005, based on the regressions with the East Asia variable, are shown in figure 3. Because exports to Canada and Mexico are so dominant, they are excluded from the figure to focus on exports to the other countries. The figure highlights two important results of the analysis. First, within a gravity equation framework, both exports to and imports from China are larger than expected. In 2005, the export relationship, shown in the top panel, produces a 50 percent underestimate of exports to China that is markedly less than the large over-estimate of trade with countries like the United Kingdom and Japan. In contrast, imports from China, shown in the lower panel, exceed the predicted values by about 70 percent.

[16] To explore whether changes in the distance coefficient over time were statistically significant, we ran full sample regressions that interacted distance with dummies for each five-year time period. The changes were highly significant (1% level) for U.S. exports, but again becoming more negative in the later sub-periods. The interactions were not significant for imports.

Second, the figure brings out the point that, while exports to China may be a small share of U.S. GDP, they are relatively substantial compared to U.S. exports to other countries. The basic problem is that, except for Canada and Mexico, the United States has a low level of exports to all countries. Within that framework, exports to China are actually comparable to those to Germany and the United Kingdom. In other words, while U.S. exports to China are small in comparison to the exports of the EU-15 and Japan, they are not small within the context of U.S. exports to other countries more broadly.

Services Trade. Traditionally, gravity equations have been applied to bilateral trade in goods. In recent years, however, the OECD has begun to publish data on the bilateral services trade flows of its members. We obtained data covering the seven years from 1999-2005 for exports and imports of total services for the EU-15 and Japan.[17] The data for the United States were obtained from the Bureau of Economic Analysis and cover the years 1992-2006. We applied the same gravity model, outlined in equation (1), to the services trade of the United States, Japan, and the EU-15 (excluding intra-EU trade). Those regressions are reported in table 7.

The results are very similar to those reported for goods trade in that distance, size, and income per capita again have large and highly significant elasticities, and the regressions fit the data very well. The coefficients on distance, however, are generally smaller and show more variability. In part, that is due to the smaller sample sizes; but we also estimated a set of parallel regressions for goods trade that was restricted to the same countries and years for which we had data on services trade. For the United States and Japan, the distance coefficients for services trade are smaller than for goods trade, but they were larger for the EU. It is notable that there is again a special positive effect for the East Asian economies of equal magnitude in both the export and import regressions. That is, the United States' services trade with East Asia is substantially greater than would be predicted by the standard gravity equation.

As with goods, we are surprised by the magnitude of the distance variable. We re-estimated the U.S. regressions excluding travel and transportation, the components one

[17] The data on trade in services by partner country is available at: http://stats.oecd.org/wbos/default.aspx. At present, disaggregated partner country data below the level of total services is not available.

would expect to be most sensitive to distance related transport costs, but it had no significant effect on the parameters. Figure 4 shows the distribution of U.S. trade in services by partner country. The largest errors for both exports and imports are an under-prediction of services trade with the United Kingdom and an over-prediction for Japan. The high level of trade with the United Kingdom is related to financial services because both countries are important global finance centers. Services trade with China and India are both very close to their predicted values.

Transportation costs. It is apparent that distance has an extremely large influence on trade flows and that it can substantially alter our perception of the performance of U.S. exporters in the Chinese market. To us, the puzzle is why is distance so important? With major improvements in global communications and transportation, it seems surprising that distance still matters so much. For the United States, we have comprehensive measures of the cost of customs, insurance and freight (cif) in 2004 that we can use to explore the question of whether distance is simply a proxy for transportation costs.[18] David Hummels (2007) undertook such a study at the most detailed commodity level and incorporated more years. He found a highly significant correlation between distance and transport costs -- an elasticity of ocean freight costs to distance of 0.15 and air freight to distance of 0.27.

We attempted a simplified version of Hummels' analysis for U.S. imports in 2004. We estimated a fixed effects model of the relationship between the cif measure of transport cost and distance separately for air and ocean freight shipments. With the fixed effects, we differentiated among about 5,000 product groups and included a measure of the weight to value ratio for each product group. The results of that estimation are shown in table 8.   We found a significant correlation between the cif cost percentage and distance, but the estimated elasticity for air freight – about 0.2 – is lower than reported by Hummels.

In addition, we used the cif data to construct an index of freight costs for ocean transportation. For each of the 5, 183 product groupings we computed the ratio of cif costs to import value for the countries reported with trade within the group, and adjusted

[18] The data on cif charges, value, and weight by mode of transportation are produced by the U.S. Census Bureau.

the ratio for variations in weight to value using the coefficient from the regression in table 8. Each country value was converted to an index by subtracting the log of the group mean. Next, we took this index and aggregated across all of the product groups, using import values as weights, to estimate each country's mean freight cost. The resulting aggregate index displays the same correlation with distance as shown in the fixed-effects equation of table 8. However, there is no significant role for transportation costs when this measure is added to the U.S. trade equations of table 6. We conclude from this experiment that distance is not a proxy for transportation costs.

Alternative Explanations.

One interesting issue, shown in figure 3, is that U.S. exports to China are not small if the comparison is limited to U.S. trade alone. This issue can be developed more clearly with the ranking of U.S. trade with partner countries shown in table 9. While China is the second largest source of U.S. imports behind Canada, it is also the fourth largest export destination. In the comparison with Japan and the EU-15 shown in the lower part of the table, the striking feature is the small share of total U.S. exports as a share of GDP. Total exports are only 7.3 percent of U.S. GDP in 2005, compared to 13.1 and 11.4 for Japan and the EU-15 respectively. In contrast, the United States actually imports a slightly larger share of its GDP than either Japan or the EU-15. The table shows the extent to which the comparison of the relative importance of exports to China is distorted by the large overall trade deficit of the United States. Given that the overall trade deficit of the United States is equal to 90 percent of total exports, the comparison of U.S. trade with most partner countries is bound to appear unfavorable.

It is sometimes alleged that U.S. firms, provided with access to a large domestic market, are insufficiently interested in the development of export opportunities.[19] In addition, the U.S. government was criticized in past years for restricting the exports of those technology products for which the United States has a comparative advantage. As

[19] Admittedly, this is a more popular argument outside of the United States, but American multinational firms have also been willing to use foreign affiliates as an alternative to exports from the United States. The sales of foreign affiliates less their purchases from U.S. parents, $3.9 trillion in 2005, far exceed the comparable measures of net sales of foreign firms in the United States, $2.3 trillion (Lowe, 2008).

a simple exploration of this idea, we combined the data for the EU-15, Japan, and the United States, and fit a common gravity equation. The basic result is shown in columns (1) and (4) of table 10. As would be expected from the regressions in table 6, the imposition of common coefficient values for all three industrialized regions has little effect. In columns (2) and (5), we added a categorical variable for the United States. In essence, the U.S. performance is evaluated against a peer group composed of an average of the EU-15 and Japan. The coefficient is negative and highly significant in the export equation but zero in the import equation. The results are at least suggestive of the view that the United States is a weak exporter relative to other high-income economies, but that its imports are quite normal.[20]

We also sought to determine if we could explain some of the variations in U.S. performance as related to exchange rate effects. We do not have effective exchange rate measures covering all of the trading partners, and in particular, we do not have a means of accounting for competitor effects in third markets. However, as a partial measure of changes in competitive conditions over time, we included the multilateral real exchange rate for each of the respondent countries. Since there is no variation across the partner countries, the exchange rate has to substitute for the fixed-effect estimation.

The results are presented in columns (3) and (6). The exchange rate elasticity is a negative -1.1 for exports and a positive 0.6 for imports. This smaller effect on the nominal value of imports is expected, since a rise (appreciation) in the real exchange rate promotes a rise in the quantity of imports that is partially offset by a decline in price. No such offset exists on the export side.[21] Strikingly, the inclusion of the exchange rate does not alter the size of the coefficient on the U.S. categorical variable however. Evidence of relatively poor U.S. export performance persists even after adjustment for the exchange rate.

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[20] A similar point about the weakness of exports accounting for the deterioration of the U.S. trade balance is advanced by Baily and Lawrence (2006, pp 228-36). Using a different methodology, they demonstrate that the weakness cannot be attributed to lack of growth in U.S. export markets or the commodity composition of trade.

[21] In reality, the adjustment process would be more complex, in part because of the need to take account of possible limits of the pass through of exchange rate changes into export and import prices. See Cline (2005) and Mann (1999) for more detailed discussions.

As shown in table 9, the U.S. trade deficit is roughly equal to total exports; and if we projected a future adjustment that restored a trade balance, the export share would roughly double as a share of GDP. If we also adopted the reasonable assumption that the adjustment would spread in proportionate terms across all trading partners, the Chinese market would be much more important to the United States.

Conclusion

The large U.S. trade imbalance with China is a frequent topic of concern in the U.S. media and policy discussion. There is a perception that the imbalance is somehow the result of unfair trade practices. In this paper, we have argued that it is the low level of U.S. exports to China, not the magnitude of imports that appears puzzling. U.S. imports from China, for example, scaled by U.S. GDP, are similar to those of Japan and EU-15 imports from China as a share of their own GDPs. In contrast, the U.S. exports a much smaller share of its GDP to China than either the EU-15 or – especially – Japan. Indeed, U.S. exports to China are still less than a quarter of its imports, while Japan exports more to China than it imports. Even though U.S. exports to China have been growing rapidly since 2002, this growth is from such a small base that it would take a long time to have much effect on the bilateral balance. Our analysis also highlights the importance of trade in services with China, which appears to significantly exceed the more publicized services trade with India.

Our main findings are as follows. First, the poor performance of U.S. exports of goods does not reflect an unusual export composition. Like Japan and the EU-15, the distribution of commodities that the U.S. exports to China is quite similar to the basket it exports to the rest of the world. Furthermore, with the exception of agricultural goods and raw materials, the mix of commodities that the U.S. exports to China is very similar to the exports from Japan and Europe. Thus, the U.S. is clearly competing with these countries, especially in the Chinese markets for capital goods and electronics. We find no evidence that the composition of U.S. trade with China is distorted.

Second, small U.S. exports to China may be due in part to the relatively small presence of U.S. multinationals. Operations of these affiliates to date have largely focused on serving the domestic market with relatively little trading links to their operations in the U.S. In any case, U.S. FDI is now growing rapidly, though from a very small base.

Third, our more formal econometric analysis using gravity equations highlights both expected and unexpected dimensions of the importance of distance. Like the large prior literature that uses the gravity framework to explain trade flows, we find distance always to be a very important and significant determinant. Since China is far away from the U.S., one would expect that controlling for distance would help explain the relatively small U.S. exports to China, with the large imports emerging as an outlier instead. Quite surprisingly however, we find that U.S. exports to East Asia and imports from the region are both unexpectedly large. Even after adjustment for the East Asia region, U.S. exports to and imports from China are both larger than expected.

Finally, our most important finding is that the low level of U.S. exports is not one limited to trade with the Asian economies. At present, the United States has a trade deficit with nearly every country of the world, and the imbalance with the Asian economies stands out primarily because they account for a large proportion of total trade. Furthermore, the relatively poor U.S. export performance is only partly related to uncompetitive real exchange rates. The poor U.S. export performance is a global phenomenon extending well beyond its relationship with China.

References

Anderson, James E. and Eric van Wincoop. 2004. "Trade Costs," NBER Working Paper No. 10480.

Baily, Martin Neil and Robert Z. Lawrence. 2006. "Competitiveness and the Assessment of Trade Performance," in Michael Mussa ed., *C. Fred Bergsten and the World Economy*, Peterson Institute for International Economics, Washington DC: 215-242.

Bosworth, Barry and Susan M. Collins. 2008. "United States-China Trade: Where are the Exports?," *Journal of Chinese Economic and Business Studies*, Vol. 6, No. 1, February 2008, 1–21.

Branstetter, Lee, and C. Fritz Foley. 2007. "Facts and Fallacies About U.S. FDI in China," presented at NBER conference on China's Growing Role in World Trade, available at: http://www.nber.org/books/china07/index.html

Cline, William. 2005. *The United States as a Debtor Nation.* Institute for International Economics, Washington D.C.

Coe, David T., Arvind Subramanian, and Natalia T. Tamirisa. 2007. "The Missing Globalization Puzzle: Evidence of the Declining Importance of Distance," *IMF Staff Papers*, Vol. 54, No. 1: 34-58.

Deardorff, Alan V. 1998. Determinants of Bilateral Trade: Does Gravity Work in a Neoclassical World? In Jeffrey A. Frankel, ed., *The Regionalization of the World Economy*. Chicago: University of Chicago Press.

Feenstra, Robert C. 2002. "Border Effects and the Gravity Equation: Consistent Methods for Estimation," *Scottish Journal of Political Economy*, Vol. 49, pp. 491-506.

Feenstra, Robert C., Wen Hai, Wing-Thye Woo, and Schunli Yao. 1999. "Discrepancies in International Data: An Application to China-Hong Kong Entrepot Trade," *American Economic Review Papers and Proceedings*, 89, 338-343.

Fung, K.C. and Lawrence J. Lau, 1996, "The China-United States Bilateral Trade Balances: How Big Is It Really?" *Occasional Paper, Asia/Pacific Research Center*, April, Institute for International Studies, Stanford University.

______, 2003, "Adjusted Estimates of United States-China Bilateral Trade Balances: 1995-2002," *Journal of Asian Economics* 14, 489-496.

Fung, K.C., Lawrence .J. Lau, , and Yanyan Xiong. 2006 "Adjusted Estimates of United States-China Bilateral Trade Balances: An Update," Stanford Center for International Development, Working Paper No. 278 (June).

Gagnon, Joseph. 2003. "Long-Run Supply Effects and the Elasticities Approach to Trade," International Finance Discussion Ppaers No. 692. Washington: Board of Governors of the Federal Reserve.

Geng, Xiao. 2004. "People's Republic of China's Round-Tripping FDI: Scale, Causes and Implications," ADB Institute Discussion Paper No. 7l

Helpman, Elhanan, Marc Melitz, and Yona Rubenstein. 2007. "Estimating Trade Flows: Trading Partners and Trading Volumes," NBER working paper No.12927 (February).

Hummels, David. 2007. "Transportation Costs and International Trade Over Time," *Journal of Economic Perspectives*, vol. 21(3) Summer, pages 131-154

Lardy, Nicholas. 1994, *China in the World Economy*, Washington, D.C.: Institute for International Economics

Mann, Katherine. 1999. *Is the .S. Trade Deficit Sustainable?* Institute for International Economics, Washington D.C.

Schindler, John, and Dustin Beckett, 2005, "Adjusting Chinese Bilateral Trade Data: How Big is China's Trade Surplus?" *International Journal of Applied Economics*, 2, 27-55.

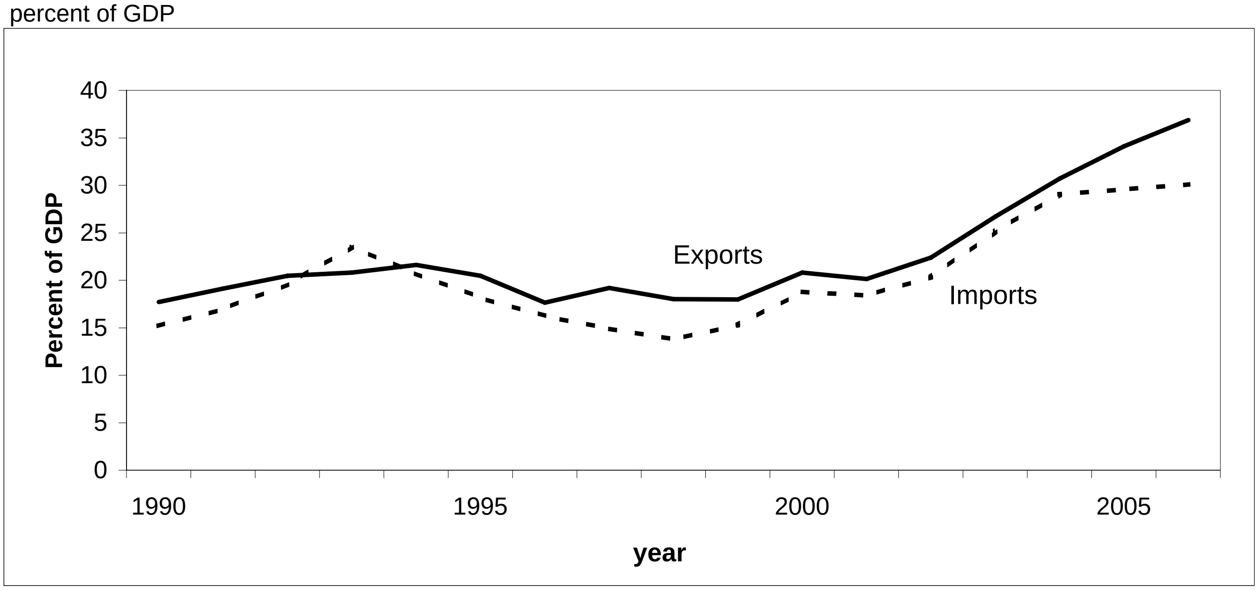
Wang, Z., Gehlhar, M. and S. Yao, 2007, "Reconciling Bilateral Trade Statistics in the Presence of Re-exports via Third Countries: The Case of China, Hong Kong and Their Major Trading Partners" unpublished manuscript, United States International Trade Commission, Washington, D.C. Available at: https://www.gtap.agecon.purdue.edu/resources/res_display.asp?RecordID=2415

Table 1. Trade Balance with China as a Percent of GDP, 2006
percent of GDP

	United States	Japan	EU-15
Exports to China	0.55	2.96	0.76
Imports from China	-2.38	-2.75	-1.78
Balance	-1.83	0.21	-1.02

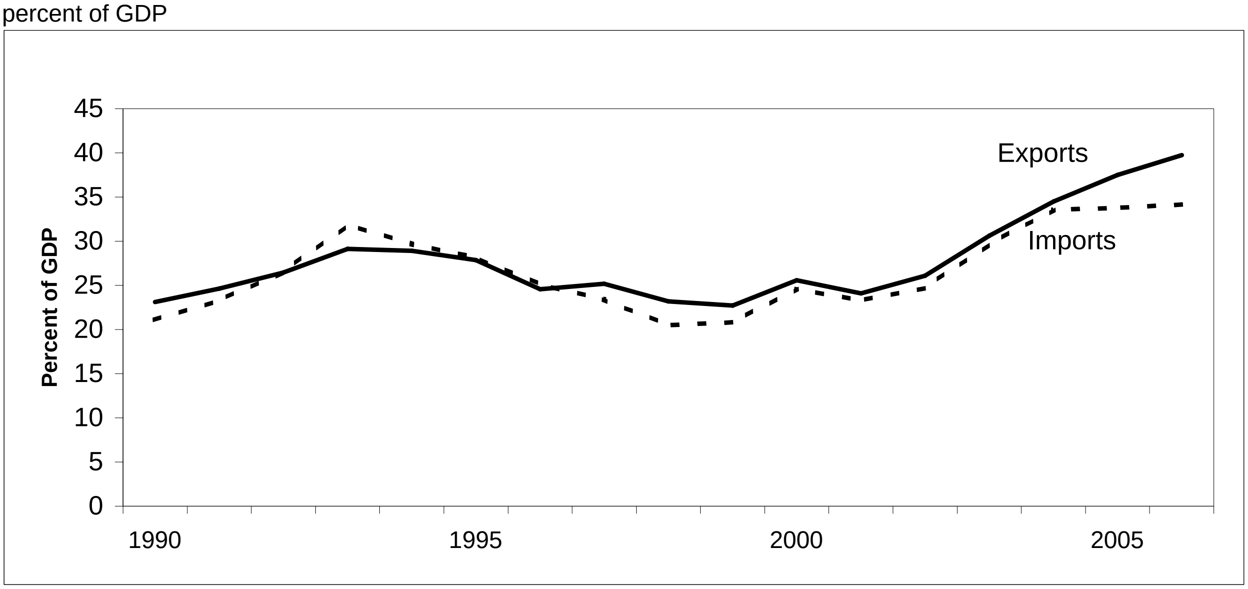
Source: IMF Directions of Trade Database and World Economic Outlook. Trade data are for mainland China plus Hong Kong and Macao.

Figure 1a. Mainland China's Exports and Imports to World, 1990-2006
percent of GDP



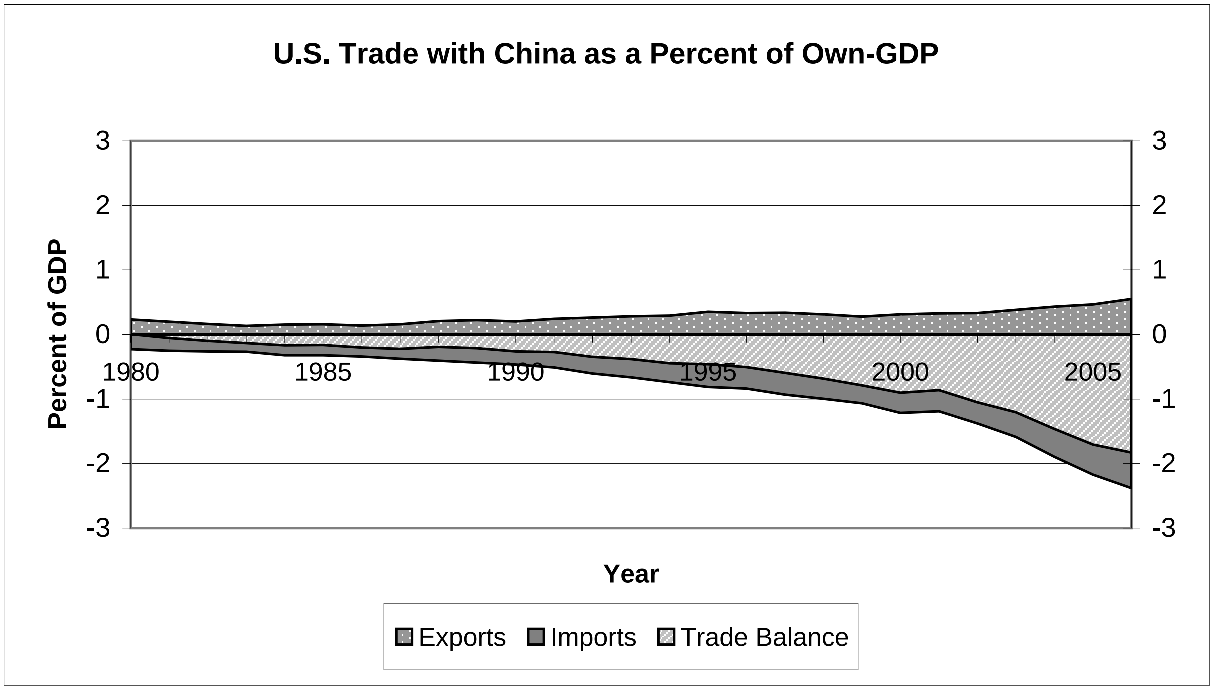
Source: IMF Direction of Trade Statistics. Data are Mainland China only.

Figure 1b. Greater China's Exports and Imports to World, 1990-2006
percent of GDP



Source: IMF Direction of Trade Statistics. Data Include Hong Kong and Macao, but exclude intra-group trade.

Figure 2. Trade With China as a Percent of Own-GDP, United States and Japan



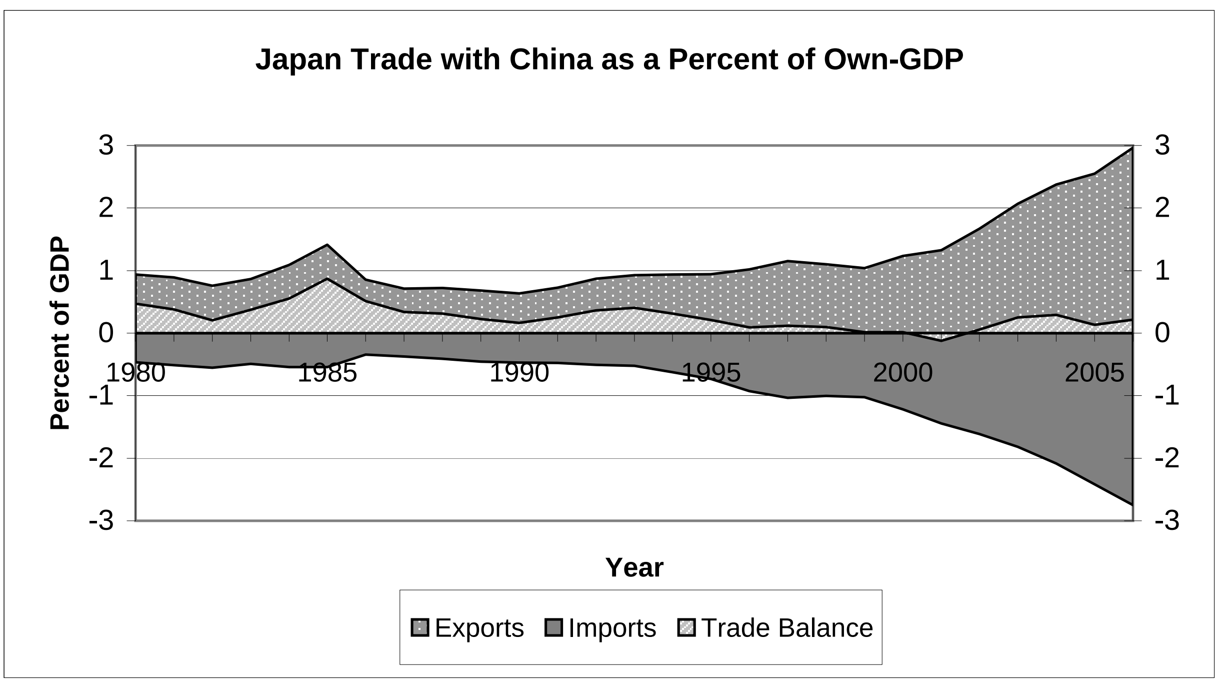


Table 2. Correlation of Trade by Commodity, 2005

	Commodity Ranking
US World / US China	0.85
Japan World / Japan China	0.96
EU-15 World / EU-15 China	0.86
US China / Japan China	0.82
US China / EU-15 China	0.82
Japan China / EU-15 China	0.90

Source: United Nations Comtrade database. Rankings based on two-digit SITC commodity codes, with a total of 68 codes. Correlation computed as Spearman's rank correlation coefficient.

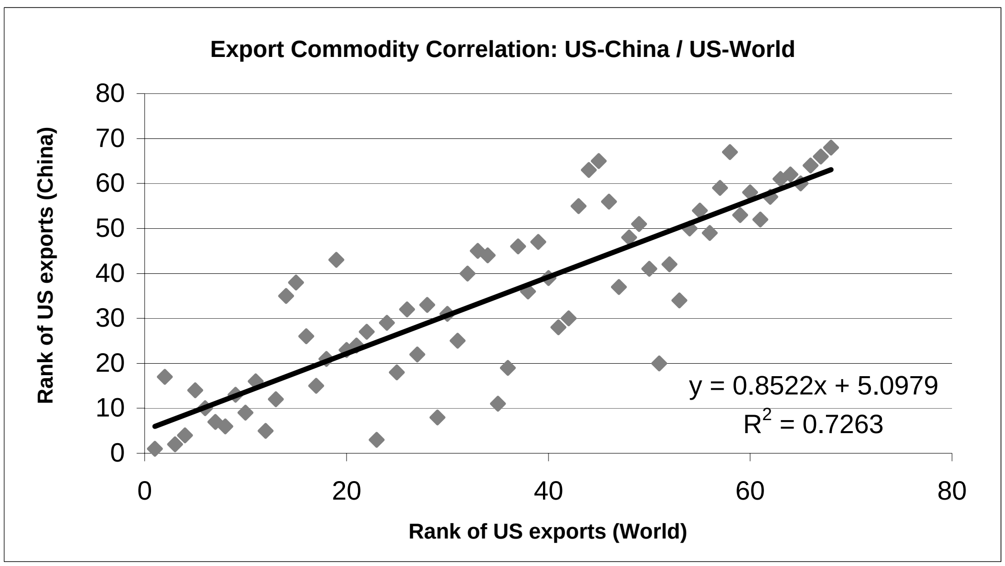


Table 3. Top Ten US Exports to China, Compared to Japan and EU-15, 2005

Code	Description	US-China Rank	US- World Rank	Japan-China Rank	EU15-China Rank
77	Electric machinery, apparatus and appliances…	1	1	1	1
79	Other transport equipment (excl. road trans.)	2	3	23	4
28	Metalliferous ores and metal scrap	3	23	20	15
75	Office machines and data processing equip…	4	4	11	16
58	Artificial resins and plastic materials…	5	12	6	9
87	Professional, scientific, controlling instruments…	6	8	10	11
74	General industrial machinery and equipment…	7	7	7	2
22	Oil seeds and oleaginous fruit	8	29	62	65
76	Telecommunications, sound recording equip…	9	10	4	7
89	Miscellaneous manufactured articles…	10	6	14	13

Source: United Nations Comtrade database

Notes: The values are the rank of exports to China/World out of a possible 68 commodity codes.

Table 4. U.S. Affiliate Activities in China and East Asia, 1989-2004
millions of U.S. dollars

	1989	1994	1999	2004
China*				
U.S. Multinational Affiliate Sales				
Total Sales	16,664	32,954	67,635	123,531
Sales to the U.S.	3,554	4,638	10,405	14,297
Local Sales	7,438	19,289	42,565	73,602
Sales to other foreign countries	5,672	9,027	14,665	35,632
U.S. Exports of Goods to Affiliates	2,261	5,719	7,533	5,402
U.S. Imports of Goods from Affiliates	3,071	4,021	8,500	9,719
Total US Trade with China				
Exports	12,111	20,732	25,670	50,530
Imports	23,139	51,504	97,499	220,308
Other East Asia**				
U.S. Multinational Affiliate Sales				
Total Sales	44,238	100,761	162,640	264,355
Sales to the U.S.	11,507	18,023	30,124	29,344
Local Sales	21,786	54,007	85,364	136,382
Sales to other foreign countries	10,945	28,731	47,152	98,629
U.S. Exports of Goods to Affiliates	4,865	11,425	16,250	16,826
U.S. Imports of Goods from Affiliates	10,517	17,801	22,354	22,229
Total US Trade with East Asia*				
Exports	29,460	49,575	61,429	72,935
Imports	46,466	74,294	110,082	132,367

Source: Bureau of Economic Analysis, *Operations of U.S. Multinational Companies*, various years; and International Monetary Fund, *Direction of Trade Statistics*. Sales are those of majority-owned companies.
*Data for China include Hong Kong.
** East Asian countries include: Indonesia, Korea, Malaysia, Philippines, Singapore, Taiwan, and Thailand.
*** Due to data constraints, total US trade excludes trade with Taiwan

Table 5. Japanese Affiliate Sales by Destination and Trade Activity, 2002-2005

	2002	2003	2004	2005
Japan Multinational Affiliate Sales				
Total Sales	27,515	43,524	60,329	74,998
Sales to Japan	9,506	13,062	18,012	22,750
Local Sales	9,665	18,497	26,263	33,450
Sales to other foreign countries	8,349	11,772	16,055	18,797
Japan Exports of Goods to Affiliates	6,270	8,305		
Japan Imports of Goods from Affiliates	3,685	5,077		
Total Japan Trade with China				
Exports	65,390	87,398	109,444	116,146
Imports	63,211	76,907	95,987	110,040

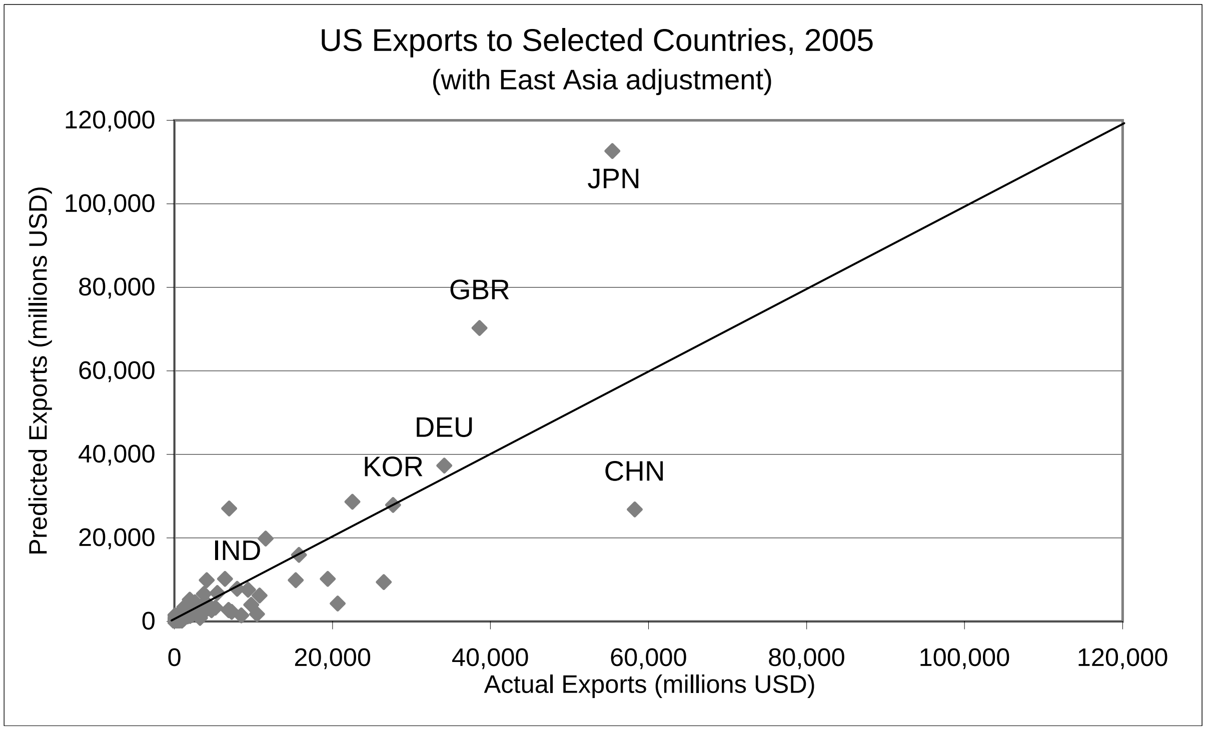
Source: Japanese Ministry of Economy, Trade, and Industry, "Quarterly Survey of Overseas Subsidiaries;" and International Monetary Fund, Directions of Trade Database.

Table 6. Gravity Equations for Global Merchandize Trade: United States, Japan, and EU-15

	United States				Japan				European Union (15)			
	Log Exports/GDP (1)	Log Imports/GDP (1)	Log Exports/GDP (2)	Log Imports/GDP (2)	Log Exports/GDP (1)	Log Imports/GDP (1)	Log Exports/GDP (2)	Log Imports/GDP (2)	Log Exports/GDP (1)	Log Imports/GDP (1)	Log Exports/GDP (2)	Log Imports/GDP (2)
Weighted Distance	-1.02	-0.60	-1.16	-0.71	-1.11	-1.55	-0.61	-0.65	-1.06	-0.74	-1.15	-0.79
	(-29.2)	(-11.3)	(-31.9)	(-13.0)	(-26.0)	(-24.0)	(-10.7)	(-7.7)	(-48.7)	(-26.3)	(-43.9)	(-23.3)
Log Population	0.90	1.05	0.90	1.05	0.82	0.93	0.86	1.00	0.79	0.90	0.79	0.90
	(106.0)	(81.8)	(108.2)	(82.5)	(88.6)	(64.0)	(90.8)	(68.0)	(124.4)	(110.6)	(125.1)	(110.7)
Log GDP per Capita	1.06	1.15	1.05	1.14	0.98	1.13	1.01	1.18	0.87	0.90	0.87	0.90
	(98.2)	(70.6)	(98.7)	(70.2)	(83.0)	(63.2)	(85.9)	(67.2)	(97.6)	(78.3)	(97.2)	(77.8)
Common Language	0.70	0.71	0.67	0.69					0.26	0.26	0.30	0.29
	(20.1)	(13.6)	(19.6)	(13.2)					(8.0)	(6.4)	(9.2)	(6.9)
Colony									0.32	0.24	0.38	0.28
									(7.0)	(4.2)	(8.2)	(4.7)
East Asia Region			0.56	0.51			0.89	1.61			0.25	0.15
			(11.8)	(7.0)			(13.1)	(15.8)			(6.1)	(2.8)
Constant	-37.17	-44.12	-35.97	-43.06	-33.90	-33.46	-39.39	-43.36	-32.98	-37.83	-32.28	-37.41
	(-100.1)	(-78.9)	(-95.1)	(-74.7)	(-72.8)	(-47.1)	(-63.7)	(-46.6)	(-139.6)	(-124.5)	(-123.4)	(-110.8)
adj_R2	0.858	0.760	0.863	0.763	0.812	0.714	0.820	0.733	0.886	0.841	0.887	0.841
Observations	3577	3532	3577	3532	3626	3534	3626	3534	3367	3367	3367	3367

Source: Estimated by authors as described in text. All of the regressions are estimated within a fixed effects model allowing for shifts over years.

Figure 3. Actual and Predicted Trade, 2005



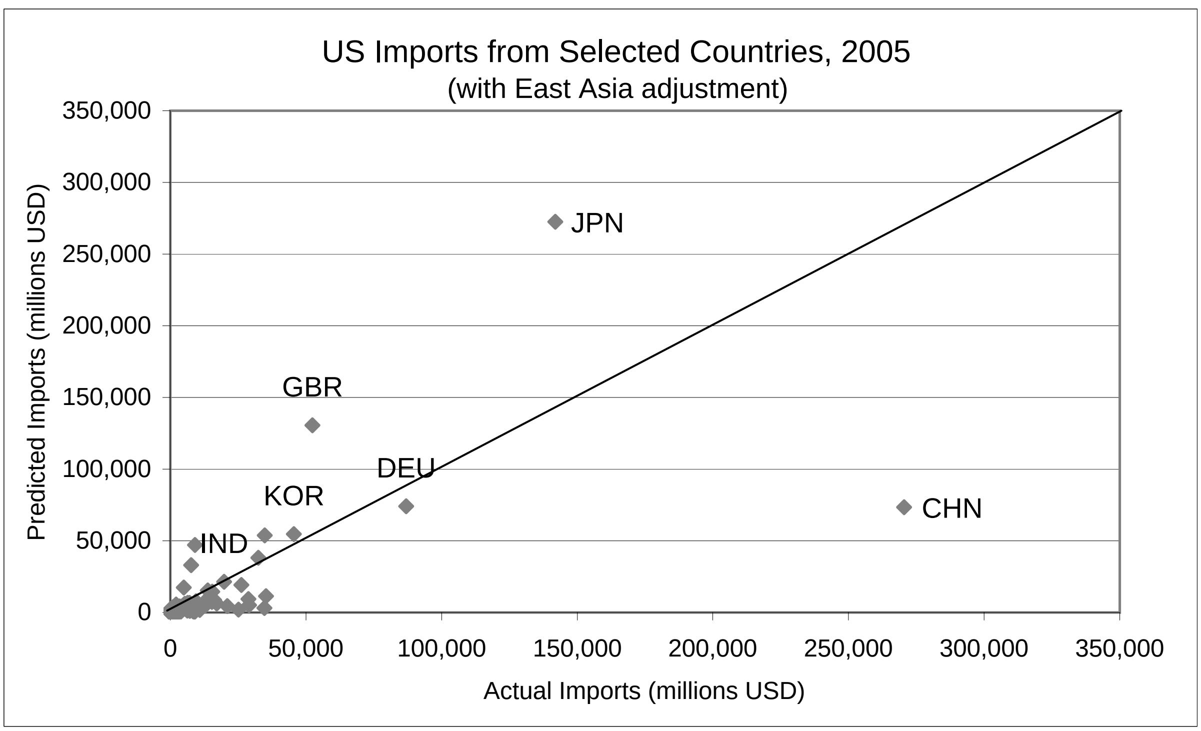


Table 7. Gravity Equations for Services Trade: United States, Japan, and EU-15, 1999-2005

	United States		Japan		European Union (15)	
	Exports / GDP	Imports / GDP	Exports / GDP	Imports / GDP	Exports / GDP	Imports / GDP
	(1)	(2)	(3)	(4)	(5)	(6)
Weighted Distance	-0.56	-0.57	-0.25	-0.32	-1.08	-0.87
	(-14.7)	(-10.0)	(-1.9)	(-3.3)	(-20.9)	(-13.5)
Population	0.71	0.78	0.84	0.79	0.74	0.81
	(40.1)	(29.2)	(15.5)	(20.2)	(40.5)	(35.2)
GDP per Capita	0.90	1.01	1.11	1.19	0.77	0.78
	(41.6)	(31.2)	(18.0)	(26.0)	(31.1)	(25.0)
Common Language	0.30	0.40			0.13	-0.23
	(8.0)	(7.1)			(1.8)	(-2.6)
Colony					0.29	0.23
					(3.8)	(2.4)
East Asia Region	0.49	0.57	1.68	1.71	0.73	0.92
	(11.2)	(8.7)	(9.5)	(13.2)	(8.4)	(8.4)
Constant	-37.37	-40.11	-45.36	-44.34	-31.19	-34.02
	(-55.6)	(-39.7)	(-22.5)	(-30.1)	(-62.4)	(-54.0)
adj_R^2	0.879	0.794	0.681	0.805	0.882	0.850
Observations	420	420	187	196	265	265

Source: Estimated by authors as described in text. All of the regressions are estimated within a fixed effects model allowing for shifts over years. All variables are measured in logarithms except for the categorical variables of common language, colony and the East Asia region. The data are from the OECD and cover 31 trading partners for the United States, 28 for Japan and 38 for the EU-15.

Table 8. Regressions of Freight Charges and Distance, 2004

	Ocean vessel	Air
Log Weighted Distance	0.25	0.19
	(34.0)	(31.1)
Log Weight to Value	0.48	0.48
	(133.9)	(163.6)
Constant	-4.43	-2.61
	(-66.6)	(-45.4)
adj_R^2	0.14	0.21
Observations	87,412	90,972

Source: Authors' estimates based on U.S. Census Bureau data on merchandize imports. Data are reported on the harmonized commodity classification and distinguish mode of transportation. Freight costs are measured as the ratio of cif to fob value. The weight to value ratio is computed as shipping weight divided by fob value.

Table 9. United States Top Trading Partners, 2005

Country	Exports	Percent	Rank	Country	Imports	Percent
EU-15	181,797	20.1		EU-15	307,517	17.7
Canada	211,420	23.4	1	Canada	291,944	16.9
Mexico	120,049	13.3	2	China	270,461	15.6
China	58,261	6.4	3	Mexico	172,485	10.0
Japan	55,410	6.1	4	Japan	141,950	8.2
United Kingdom	38,629	4.3	5	Germany	86,938	5.0
Germany	34,149	3.8	6	United Kingdom	52,380	3.0
Korea	27,670	3.1	7	Korea	45,523	2.6
Netherlands	26,496	2.9	8	Venezuela, Rep. E	35,292	2.0
France	22,538	2.5	9	France	34,774	2.0
Singapore	20,647	2.3	10	Malaysia	34,676	2.0
India	7957.9	0.9	20, 17	India	19875.1	1.1
Total	904,257			Total	1,732,510	
Trade Deficit	-828,253					

Country	Exports	Percent of GDP	Country	Imports	Percent of GDP
US	904,257	7.3	US	1,732,510	14.0
Japan	594,887	13.1	Japan	515,194	11.4
EU15	1,459,213	11.4	EU15	1,581,698	12.4
incl. intraEU	3,687,761	28.9	incl. intraEU	3,810,246	29.9

Source: IMF Direction of Trade Statistics and authors' calculations.

Table 10. Combined Gravity Model for US, Japan, and EU-15

	Exports / GDP (1)	Exports / GDP (2)	Exports / GDP (3)	Imports / GDP (1)	Imports / GDP (2)	Imports / GDP (3)
Weighted Distance	-1.102	-1.098	-1.123	-1.020	-1.020	-1.007
	(-61.2)	(-62.6)	(-63.4)	(-39.7)	(-39.7)	(-38.6)
Population	0.831	0.837	0.838	0.976	0.976	0.975
	(172.3)	(178.0)	(178.8)	(139.5)	(139.4)	(139.4)
GDP per Capita	0.973	0.974	0.972	1.062	1.062	1.063
	(153.1)	(157.4)	(157.5)	(116.6)	(116.6)	(116.6)
Common Language	0.258	0.529	0.544	0.562	0.562	0.554
	(10.9)	(20.7)	(21.3)	(16.7)	(15.0)	(14.7)
Colony	0.556	0.156	0.326	0.698	0.699	0.610
	(21.9)	(5.2)	(9.2)	(19.3)	(16.0)	(11.6)
East Asia Region	0.400	0.407	0.414	0.755	0.755	0.751
	(15.1)	(15.8)	(16.1)	(19.9)	(19.9)	(19.8)
United States		-0.586	-0.609		0.000	0.012
		(-24.2)	(-25.1)		(0.0)	(0.3)
Log Average Exchange Rate*			-1.119			0.586
			(-8.7)			(3.1)
Constant	-34.325	-34.249	-28.940	-38.490	-38.490	-41.276
	(-170.8)	(-175.1)	(-45.1)	(-133.9)	(-133.8)	(-43.6)
adj_R2	0.840	0.848	0.849	0.762	0.762	0.762
Observations	10570	10570	10570	10433	10433	10433

Source: Estimated by authors as described in text. All of the regressions are estimated within a fixed effects model allowing for shifts over years. All variables are measured as logarithms except for the categorical variables of common language, colony, the U.S., and the East Asia region.

*Computed as the trade-weighted real exchange rates of the United States, Japan, and the EU-15, averaged over the prior 5 years. Data provided by JPMorgan.