China's Trade Response to Exchange Rate

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November 2011

Abstract

Using detailed China's multi-lateral trade data over 1997-2005, this paper accesses how exchange rate affects trade with respect to different trade regime. Since processing trade involves significant global sourcing and accounts for an important share of China's total trade, we argue that it is less sensitive to China's exchange rate compared with ordinary trade. We provide a thorough analysis by: 1) using the highly disaggregated bilateral imports and exports between China and all its partners; 2) decouple trade quantity and value in a rigorous way; and 3) distinguish processing trade from ordinary trade. We find that China's import and export respond to exchange rate and relative income movements in our anticipated manner. The elasticity of exports to the real exchange rate is close to unity (0.9), whereas the responsiveness of imports is much smaller (0.2). Furthermore, processing trade is less responsive to exchange rate than ordinary exports. Exports with larger domestic content are found to display significantly higher sensitivity to the exchange rate.

I. Introduction

How would a real appreciation of the Yuan affect China's trade balance? Conventional wisdom is that a real appreciation should depress exports as they become more expensive in foreign markets. In addition, it would increase imports as foreign goods become cheaper in China. However, some have argued that conventional wisdom does not apply in the case of China for three reasons. First, profit margins are so large that Chinese producers can and would absorb any real appreciation that may occur. Second, a large share of China's exports and imports are in processing trade, which involves assembling imported inputs into a final good for exportation, and hence both exports and imports are less dependent on the Yuan exchange rate then would be the case in other countries. Third, more than half of trade is controlled by multinationals, which like processing exports tend to involve significant global sourcing, and may also be less sensitive to China's exchange rate.

The evidence from previous studies about the effect of movements in China's real exchange rate on the trade balance is based on aggregate trade and results are mixed and sometimes confusing with signs on key coefficients that are contrary to basic economics. One issue is that up to mid-1980s, international trade was conducted exclusively by a small number state-owned trading companies and were subject to government targets, leaving little role for the exchange rate to affect trade (Lardy 2002). A second is that in the more recent period, China's real effective exchange rate has been fairly constant, making it difficult to identify exchange rate effects using aggregate data. Finally, there is a lack of data on China's export prices, meaning that the choice of deflator can significantly alter results. Still, a few studies have attempted to estimate exchange rate elasticities using aggregate trade data. One of the most recent attempt by Cheung, Chinn, and Fujii (2007) examines both aggregate exports to the world and aggregate exports to the United States. Using a variety of deflators, they find that the real exchange rate does not impact aggregate exports to the world in the expected way, though they do find strong effects of the Yuan/dollar real rate on U.S. imports from China using data from 1993-2006. Marquez and Schindler (2007) estimate the effect of the real exchange rate on China's share of world trade—not a standard exchange-rate elasticity—and find that a real appreciation would lower China's export share. Both studies, however, find an unexpected sign on China's imports—an appreciation leads to less imports. Thorbecke (2006) finds significant effects of exchange rates on exports and imports between China and the United States, both on average close to unity, using quarterly data from 1987-2005. However, there is large amount of variation in the exchange rate elasticities depending on how many lags are included in the regression analysis. Mann and Pluck(2007) used error correction model to study China-US trade over 1980-2004 period. Disaggregate bilateral trade into 4 broad sectors: capital goods, consumer goods, autos and parts, and industrial supplies and materials. Price elasticity estimates are not statistically significant. They find extremely high income elasticities (around 10) over all. Income elasticities for capital goods and consumers are 10 and 4 respectively. Aziz and Li (2007) find the trade elasticities estimated using aggregate data highly unstable. Aggregate import demand and price elasticities have remained relatively stable, but export elasticities have increased over time. The instability is caused by the changes in the composition of China's trade, the increasing sophistication of exports and the rising domestic content of processing trade.

Trade elasticities obtained in existing studies vary widely. Such variations reflect data and methodological issues in the estimation, but also a gradual structural shift in China's production structures. By using highly disaggregated bilateral data, this paper has several novelties. First, with the bilateral data, and given that China's currency has been pegged to the dollar, movements of the Chinese Yuan vis-à-vis its trade partners are effectively exogenous to trade. Second, as our data includes both trade quantity and trade value, we can decouple volume from value effects in a more rigorous way. Finally, the disaggregate data includes information on processing trade, allowing us to explore whether and the extent to which processing trade and foreign ownership distort the relationship between exchange rates and trade.

The paper is divided into 7 sections. The next section details the importance of processing trade in China's trade and discusses how this will affect elasticities. Section III describes the methodology. Section IV details the data, Section V reports results for exchange rate effects on exports. Section VI reports results incorporating processing trade. Section VII presents the impact of exchange rate on imports, and Section VIII concludes.

II. Processing and Foreign Ownership in China's Trade

Chinese trade data is separated into ordinary and processing regimes. Ordinary imports and exports are the traditional type of trade close to arms-length transactions. In contrast, "processing" exports are goods that import inputs and process them into final goods which are then exported. The imported inputs enter duty free provided they are used exclusively for producing exports. So China provides value-added for the processing part. There are furthermore two types of export processing regimes in China: *pure assembly* and *import and assembly*. The distinction between the two is that in the assembly regime a local Chinese firm assembles imported inputs into final goods under a contract with a foreign firm — but does not take ownership of either the imported inputs or the final goods, and hence plays a fairly passive role. The value added it creates is only the processing service fee. The imported inputs must be used for a foreign client who dictates the process and owns the materials during production. The second involves a more active role for the local Chinese producer as it plays a larger role in sourcing materials and deciding what to produce. It processes imported intermediates into final goods that it decides upon and potentially sells to many clients.[1] For the processing trade using imported inputs, the share of imported inputs can vary according to the extent of domestic outsourcing. In general, the import and assembly regime involves a more active role for the local Chinese firms. Through self control and material selection, it involves higher domestic content than pure assembly.

Table 1a and 1b show a simple decomposition of different types of exports and imports as a percentage of total trade. As Table 1a indicates, processing trade and foreign owned firms have dominated China's trade and both are increasing in importance. Processing export plays a major role, accounting for over 54 percent of China's total exports over our sample period from 1997 to 2005. For the subcategories, *import and assembly* accounts for 41 percent of total exports on average, which is nearly 80 percent of China's processing exports. Meanwhile, its share is on the rise. Overall, there is a trend of substitution away from pure assembly based processing trade to more domestic sourcing Import and Assembly. The Chinese trade data also categorize the ownership of importing and exporting firms as domestic, joint venture or foreign. For trade in different ownerships, the share of foreign firms[2] in exports increases drastically from around 40 percent in 1997 to

[1] See Feenstra and Hanson (2005) for more details on implications of the different regimes for outsourcing by foreign firms

[2] Two types of foreign firms are recognized by the Chinese government: wholly foreign-owned enterprises and equity joint ventures in which a foreign interest has at least a 25 percent ownership stake. We include both thse categories in the measure of foreign firms' exports.

about 60 percent of the total value of exports in 2005. These firms are especially important in processing trade *import and assembly*, as shown in column (8). From Table 1b import share analysis, we can get similar conclusions.

Hypotheses

The important distinction from our perspective is how the exchange rate can affect trade differently depending on the regime. To see this, assume that price changes are directly passed on (or, equivalently, are proportionately passed on) to the consumer in the final country and that inputs are fixed—either Chinese or foreign inputs are used for production and there are no substitutions (we relax this below)—then the price of a good in the importing country is

$$P = E_{MC} * l + E_{MI} i \tag{1}$$

Where E_{MC} is the exchange rate of the foreign importer versus China, l is the unit value of labor, E_{MI} is the exchange rate of the foreign importer versus the currency of the producer of inputs used in production (which in the case of processing trade is not China), i is the unit value of inputs. If the good is made entirely in China then the exchange rate between the foreign country and Renminbi (RMB) will affect both inputs *and* labor. However, if inputs are imported then the foreign price will only partially reflect the foreign currency-Renminbi exchange rate; it will also reflect the foreign currency of the importer of the final good versus the foreign currency of the exporter of inputs. This implies that exchange rate fluctuations between the importing country and China should have smaller effects on prices and hence on trade values of processed trade than of China's domestic exports. Thus, we expect the elasticity of exports to the exchange rate to be lower for processed exports. In general, the total cost of exports consists of two parts: value added incurred in China, and input costs from overseas. Basically exchange rate elasticity depends on the domestic content in China's exports. When the domestic content of Chinese products is low, there is a large offsetting impact from imported inputs, and a RMB appreciation would have a limited impact on exports of these products. As a summary, for trade with different regimes, ordinary trade will be more sensitive to exchange rate relative to processing trade. Between *pure assembly* and *import and assembly*, the latter will be more responsive with its higher domestic content.

What about imports to China when RMB appreciates? In general, Chinese imports will be more sensitive the larger the foreign value-added. Ordinary imports will be more responsive to RMB appreciation than processing imports. For intermediate material, given an exchange rate appreciation, the Chinese firms will switch from local sourcing to use more overseas manufactured intermediate materials. So with a RMB appreciation, *pure assembly* regime will be more popular and hence more responsive than *import and assembly*.

III. Methodology

Our method for examining the effect of the exchange rate relies on bilateral annual variation in exchange rate movements. The trade balance is expected to depend on the real exchange rate and a measure of domestic and foreign income respectively, i.e. on the main determinants of import and export. The standard reduced form partial equilibrium trade model is used as the basic analytical framework. Using data on Chinese trade, we estimate the basic workhorse model in the first difference form

$$\Delta \ln X_{jkt} = \gamma_j + \gamma_k + \gamma_t + \beta_1 \Delta \ln ER_{jt} + \beta_2 \Delta \ln imports_{jkt} + \varepsilon_{jkt} \tag{2}$$

Where X_{jkt} is the value or quantity of China's exports to market j in product k at time t. γ_j, γ_k, γ_t are importer, product, and year fixed effects, respectively. $\Delta \ln imports_{jkt}$ is import growth in country j from the rest of the world in product k. We use foreign country imports to represent the foreign import demand. $\Delta lnER_j$ is real appreciation of the Chinese Yuan versus foreign currency j (an increase of ER indicates an appreciation of the RMB), and ε is an error term. Product k is defined as a 4-digit Harmonized System (HS) product code. We expect β_1 to be negative indicating that a real appreciation raises the price of China's exports in country j, reducing exports to j. β_2 is expected to be positive, meaning China's exports increases with foreign demand. We also estimate with two lags of the demand variable and exchange rates to allow for the possibility of gradual adjustment of imports to exchange rate. The short run relation between exchange rate and exports is given by the estimated coefficient β_1. The long run elasticity is given by the sum of the coefficient on the contemporaneous exchange rate and two lags of exchange rate terms.

The fixed effect structure implies that our estimates of exchange rate effects are coming from differences in bilateral real exchange rate movements over time. The importer fixed effects will pick up average export growth from China to country j that might be a result of demand growth, trade agreements, or other reasons. The product fixed effect will pick up average differences in export growth across products. The year fixed effect will capture average export growth from China in a given year and will also serve as a deflator — to the extent that part of the increase in the nominal value of trade is due to inflation in the United States (the data are in U.S. dollars), the year fixed effect will pick this up. Hence the regressions are effectively real trade.

The import equation we use is symmetric

$$\Delta \ln M_{jkt} = \gamma_j + \gamma_k + \gamma_t + \beta_1 \Delta \ln ER_{jt} + \beta_2 \Delta \ln exports_{jkt} + \varepsilon_{jkt}, \qquad (3)$$

where M_{jkt} is the value or quantity China's imports from country j in product k at time t, $\Delta \ln exports_{jkt}$ is the value or quantity of exports supply from country j to the rest of the world (excluding China) in product *k*, and the rest of the variables are as defined above. In this case, we expect both β_1 *and* β_2 to be positive, indicating that a real appreciation lowers the price of imports, leading to greater imports.

To estimate the workhorse model of trade, real exports and real imports are needed (see for example, Bahmani-Oskooee and Goswani, 2004, and Marquez and Schindler 2011). Typically price deflators are needed to deflate the nominal trade value (Mann and Pluck 2007 and Cheung, Chinn and Fujji 2010). The price indices for imports and exports are not available and typically the proxies for Chinese trade prices are used such as trade price data from Hong Kong. Since our trade data includes unit value and quantities of trade, we bypass this difficulty by relying on import and export quantities in the regressions.

To pin down the different effects of China's exchange rate on various trade regimes, we distinguish the annual Chinese trade into three regimes: Ordinary, Pure Assembly, and Import and Assembly by each HS 4-digit category. Then we pool down all the observations to run just one multiple regression.

$$\Delta \ln X_{jkt} = \beta_1 \Delta \ln ER_{jt} + \beta_2 \Delta \ln imports_{jkt} + \beta_3 \Delta \ln ER_{jt} * Pure\_Assembly_k \qquad (4)$$

$$+ \beta_4 \Delta \ln ER_{jt} * \mathrm{Im}\, p\_Assembly_k + \beta_5 \Delta \ln imports_{jkt} * Pure\_Assembly_k$$

$$+ \beta_6 \Delta \ln imports_{jkt} * \mathrm{Im}\, p\_Assembly_k + \beta_7 Pure\_Assembly_k + \beta_8\, \mathrm{Im}\, p\_Assembly_k + \varepsilon_{jkt}$$

and

$$\Delta \ln M_{jkt} = \beta_1 \Delta \ln ER_{jt} + \beta_2 \Delta \ln \exp orts_{jkt} + \beta_3 \Delta \ln ER_{jt} * Pure\_Assembly_k \qquad (5)$$

$$+ \beta_4 \Delta \ln ER_{jt} * \mathrm{Im}\, p\_Assembly_k + \beta_5 \Delta \ln \exp orts_{jkt} * Pure\_Assembly_k$$

$$+ \beta_6 \Delta \ln \exp orts_{jkt} * \mathrm{Im}\, p\_Assembly_k + \beta_7 Pure\_Assembly_k + \beta_7\, \mathrm{Im}\, p\_Assembly_k + \varepsilon_{jkt}$$

where $Pure\_Assembly_k$ =1 if trade in product *k* is in *Pure Assembly* regime, 0 otherwise

$Im\ p\_Assembly_k = 1$ if trade in product k is *Import & Assembly* regime, 0 otherwise

So we have

Exchange rate elasticity for	**Income activity for**
Ordinary trade regime = β_1	Ordinary trade regime = β_2
Processing trade regime = $\beta_1+\beta_3+\beta_4$	Processing trade regime = $\beta_2+\beta_5+\beta_6$
Pure Assembly trade regime = $\beta_1+\beta_3$	Pure Assembly trade regime = $\beta_2+\beta_5$
Import & Assembly trade regime = $\beta_1+\beta_4$	Import & Assembly trade regime = $\beta_2+\beta_6$

If the effect of exchange rates on processing trade is muted then we expect β_3 to be positive in the import equation and negative in the export equation. The intuition is that processing exports will be less influenced by the exchange rate because a large share of value added is from outside. Similarly, processing imports will be less influenced by an appreciation since final consumption is done outside of China.

IV. Data

Our empirical exercise needs disaggregated bilateral trade between China and each of its trading partners. Data for Chinese exports and imports over the period of 1997-2005 are available at the detailed commodity level, broken down by destination, city of origin, customs regime (including both ordinary and processing trade).[3] Besides the trade value, they also report the quantity of trade and different units of quantity.[4] They are classified in an 8-digit HS system for 1997-2005. To match the partner country reported imports and exports, the data on trade flows is aggregated to HS 4-digit level.

3 Data source: China Customs General Administration, Statistics Department. See Feenstra et al. (1999) and Feenstra and Hanson (2005) for more detail.

4 The units reported in the Chinese trade data include: Metric carat, Number, Cubic Metre, Thousand, Litre, Pair, Kilolitre, Set, Megalitre, Packet, Metre, Kilmetre, Gram, Kilogram, Square Metre, Tonne, Gigawatt hour

Country and commodity-specific imports and exports data over the matching period of 1997-2005 are from the UNCOMTRADE database. We also aggregated to HS 4-digit industry level. All together there are 147 trading partners for China. Both the Chinese trade and UNCOMTRADE data report not only trade value, but also quantity and units of trade. Table 2a and 2b provide an overview of the quantity units reported in the data. About 78% of the partner country import data and 65% of Chinese exports data are reported with the unit "weight in KG kilogram", so we keep the trade data with units KG for the quantity regression.[5]

There are several ways of measuring exchange rates, including nominal exchange rate (NER), real bilateral exchange rate (RER), nominal effective exchange rate (NEER), and real effective exchange rate (REER). We use purchasing power parity (PPP) method to obtain the bilateral real exchange rate for China and its trading partners, which is defined as:

$$RER_{j/RMB} = \frac{NER_{j/\$}}{NER_{RMB/\$}} \cdot \frac{P_{RMB}}{P_j} \tag{6}$$

where P_{RMB} is China's price level, P_j is foreign country price level, and NER is the nominal exchange rate of each country against US$. So $RER_{j/RMB}$ is the bilateral real exchange rate of foreign country per RMB, and an increase in RER represents an appreciation of Chinese yuan. Since over 60 percent of China's trade are final goods, consumer price index (CPI) is more relevant than the producer price index (PPI) for trade, CPI based real exchange rate is used in our estimation. Both nominal exchange rate and CPI data are obtained from the IMF's Internal Financial Statistics (IFS) database.

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[5] Besides unit "KG", we also match all the UNCOMTRADE and Chinese trade quantity data with the same units. The quantity regression results don't vary much from those only include units "KG".

V. Effect of the Exchange Rate on China's Exports

We present the results for Chinese aggregate exports in Table 3. Columns (1) and (2) report the export value regression, and columns (3) and (4) are the results of quantity regression, which is similar to real income regression. For each regression we add year, partner country, and HS 2-digit industry fixed effect. There are two uniformly consistent findings. First, the real exchange rate enters in with a strongly negative sign – a stronger RMB induces fewer exports, which is exactly what we expect. Second, the income elasticity enters in with a statistically significant positive number. So when foreign country import demand increases, Chinese exports increases correspondingly.

For aggregate export flows, the short run exchange rate elasticity is -0.911, which is highly responsive. But the long run elasticity is only half the size (-0.497). That is, as exchange rate appreciates by 1 percent, Chinese exports on average decrease by about 0.75 percent in the year of appreciation, but then increase by 0.165 percent in the next year, and by yet another 0.9 percent in the following year. Most of the export reduction impact of RMB appreciation is felt immediately. There is a J-curve effect. The income elasticity is much smaller. As foreign countries' import demand increase by 1 percent, Chinese exports increases by 0.078 percent in the short run. In the long-run, the income elasticity is 0.17. About 70 percent of the total impact of demand increase is felt immediately (0.116/0.17), 20 percent after one year, and 10 percent by the end of the second year.

Compare the results of value regression and quantity regression in Table 3, the coefficients estimates are quite close. Income elasticity is smaller for quantity regression than value regression.

VI. Exchange Rate Effects on Export, Accounting for Processing Trade

Then we run our basic regressions again, but now account for different trade regimes. The results for exports are presented in Table 4, with Panel A for Ordinary exports, Panel B for Processing flows, and Panels C and D further differ processing trade into Pure Assembly and Import and Assembly respectively. For each flow, we present the regressions with and without lags. Similar to the aggregate export flows, exchange rate elasticities are highly significant with the expected negative sign, and income elasticites are all significantly positive for all different trade regimes. Our expected relation between trade regimes and exchange rate also finds support in Table 4: ordinary export has a larger exchange rate elasticity than processing exports. The magnitude of exchange rate effect is much smaller for pure assembly than import and assembly. The short run exchange rate elasticity for Ordinary exports is -0.97, much larger than processing exports (-0.63) in magnitude. The magnitude of exchange rate elasticity is also larger for Import and Assembly than Pure Assembly, because the former has more domestic content. Over the long run, the magnitude of Ordinary export elasticity drops to half of the immediate response (-0.57), but is still larger than that of the Processing exports (-0.453). So a larger domestic content tends to increase the trade responsiveness to exchange rate. The income elasticity for ordinary exports is 0.075, but 0.164 for processing exports. The magnitude of income elasticity is similar for Pure Assembly (0.177) and Import and Assembly (0.164). So as foreign demand increases, China's processing exports will increase more than Ordinary exports.

Table 5 repeats the regression in Table 4, but based on trade quantity instead of trade value. Exchange rate elasticity for different regimes are -0.86 for ordinary exports, -0.329 for pure assembly, and -0.73~-.74 for import and assembly. So ordinary export is significantly more responsive to exchange rate than processing export. Over all, the results are consistent with those in Table 4.

Table 6 is estimated using a simple interaction of dummies of various modes of processing trade with exchange rate and foreign demand. Columns 1 through 3 reports the results using trade value, and columns 4 to 6 are the results of trade quantity. For our baseline case ordinary export, price elasticity ranges from -0.85 to -0.93. Relative to ordinary trade, pure assembly regime have a significant effect in reducing exchange rate elasticity by 0.5 ~0.57. For import and assembly trade, it will significantly reduce exchange rate elasticity by 0.14 to 0.22. An F-test on the coefficients of pure assembly and import assembly dummies also indicate significant difference at 1 percent.

Income elasticity for ordinary trade is around 0.08, but that for pure assembly and import assembly are 0.14 and 0.16 respectively. In quantity regression, foreign demand elasticity is further much smaller. Overall, we confirm that ordinary export is more price sensitive than processing export, with the difference being statistically significant. So our hypotheses on exchange rate elasticity hold strongly.

VII. Effect of the Exchange Rate on China's Imports

Table 7 presents the trade elasticities of Chinese aggregate imports. Both exchange rate and income elasticities are statistically significant and enter in the anticipated direction. Compare with exports, the short run exchange rate elasticity is much smaller for Chinese imports (0.14). So the Marshall-Learner condition holds. But in the long run, the imports are highly price sensitive (1.258): a one percent RMB appreciation will increase Chinese imports by 1.25 percent, where about 30 percent of the total impact be felt immediately with the exchange rate change, another 50 percent in the second year, and yet still 23 percent in the following year. When foreign countries strengthen their supply ability, Chinese imports is not that sensitive. In response to a unity percent increase of foreign activity, Chinese imports increase by 0.07 percent in the short run, and 0.125 percent as a whole in the long run. The income elasticity is small for both imports and exports, which confirms the finding by Aziz and Li (2007).

Table 8 presents the response for imports with different modes. Overall, exchange rate elasticity is larger for processing trade (0.225) than ordinary trade (0.19). Pure assembly is also more price sensitive than import and assembly. This again confirms our hypotheses. Long run elasticity is around unity, much larger than the short-run estimates. For import response to income change, the income elasticities in the short run are rather stable for different regimes, around 0.05. Long run income elasticity is 0.1, again very small.

[Table 9: The Effect of the Exchange Rate on Ordinary vs. Processing Imports (Quantity)]

[Table 10]: For the pooled regression on the import side, we find that exchange rate elasticity for ordinary import is 0.193. But the coefficients on the exchange rate-dummy interactions are not statistically different. So there is no significant difference on exchange rate elasticities for different regimes of China's imports such as pure assembly and import and assembly. Same thing for the demand elasticity.

VIII. Conclusion

Our main analysis incorporates the various modes of exports. In addition to ordinary trade, we distinguish two types of processing trade: pure-assembly in which a foreign firm controls (and owns) the materials supplied to the factory in China and import and assembly in which the factory in China controls the purchase of materials from abroad.

Aggregate export is very responsive to changes in exchange rate in the short-run (-0.91). In the long run the sensitivity drops (-0.497). Among various trade regimes, ordinary exports is more sensitive to price than processing trade. Import and assembly has a larger elasticity than pure assembly. Results on the export side confirm our hypotheses that export with higher domestic content will be more sensitive to exchange rate fluctuations.

On the imports side, our hypotheses did not find strong support. Aggregate import flow is not very sensitive to exchange rate shocks (0.14-0.2), but in the long run highly elastic (1.2). There is no significant difference on price sensitivity across different trade regimes.

Income elasticity for imports and exports are both very small.

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Table 1a: Share of China Export Value / Total Export (%): 1997~2005

year	(1) Ordinary	(2) Processing	(3) Processing: Pure Assembly	(4) Processing: Import & Assembly	(5) Foreign-owned	(6) ordinary-foreign	(7) foreign-pure_assembly	(8) foreign-I&P	(9) Total Export ($)
1997	45.5	54.5	16	38	41	6.1	3.4	31.6	1.83E+11
1998	43.2	56.8	17	40	44	6.5	3.9	33.7	1.84E+11
1999	43.2	56.8	18	39	45	7.2	5.3	32.9	1.95E+11
2000	44.8	55.2	16	39	48	8.9	5.3	33.7	2.49E+11
2001	44.6	55.4	16	39	50	10.0	5.4	34.6	2.66E+11
2002	44.7	55.3	15	41	52	10.9	5.1	36.2	3.26E+11
2003	44.8	55.2	12	43	55	11.4	4.8	38.7	4.37E+11
2004	44.7	55.3	12	44	57	12.2	5.0	39.9	5.92E+11
2005	45.3	54.7	11	44	58	12.8	5.7	39.8	7.60E+11
Period Average	44.5	55.5	15	41	50	9.6	4.9	35.7	3.55E+11

Table 1b: Share of China Import Value / Total Import: 1997~2005

year	(1) Ordinary	(2) Processing	(3) Processing: Pure Assembly	(4) Processing: Import & Assembly	(5) Foreign-owned	(6) ordinary-foreign	(7) foreign-pure_assembly	(8) foreign-I&P	(9) Total Import ($)
1997	50.6	49.4	14.7	34.7	54.6	21.0	3.4	30.2	1.42E+11
1998	51.1	48.9	14.2	34.7	54.8	20.4	3.6	30.8	1.40E+11
1999	55.6	44.4	14.2	30.2	51.8	20.0	4.5	27.3	1.66E+11
2000	58.9	41.1	12.4	28.7	52.1	21.6	4.3	26.2	2.25E+11
2001	61.4	38.6	11.9	26.7	51.6	22.8	4.4	24.5	2.44E+11
2002	58.6	41.4	11.6	29.8	54.3	22.4	4.3	27.6	2.95E+11
2003	60.6	39.4	9.3	30.1	56.2	24.3	3.8	28.1	4.12E+11
2004	60.6	39.4	9.4	30.0	57.8	25.2	4.7	28.0	5.60E+11
2005	58.6	41.4	10.0	31.4	58.7	23.7	5.7	29.3	6.58E+11
Period Average	57.3	42.7	12.0	30.7	54.7	22.4	4.3	28.0	3.16E+11

Table 2a: Distribution of Quantity Units for Partner Country Imports, 1997~2005

Unit Description	of Total Observation	Frequency
Area in square metres	0.80	17,635
Electrical energy in thousands of kilowa	0.01	131
Length in metres	0.09	1,933
No Quantity	10.15	224,310
Number of items	9.26	204,594
Number of packages	0.00	44
Number of pairs	0.29	6,417
Thousands of items	0.01	167
Volume in cubic meters	0.06	1,396
Volume in litres	1.51	33,315
Weight in carats	0.02	335
Weight in kilograms	77.82	1720181

Table 2b: Distribution of Quantity Units for Chinese Exports data 1997~2005, HS 4-dig

Unit Description	of Total Observation	Freq.
no quantity unit	0	36
number	28.39	218,743
pair	1.74	13,397
metre	2.59	19,937
SM square metre	1.3	10,025
CM cubic metre	0.21	1,627
L litre	0.4	3,116
KG kilogram	64.79	499,245
HD in hundred	0.08	592
TH in thousands	0.11	846
KL kilowatt	0.01	45
CAR Carat	0.03	244
KWH kilowatt-hour	0	38
G gram	0.34	2,658

Table 3: The Effect of the Exchange Rate on China Aggregate Exports

Dependant Variable: Aggregate Exports	Value (1)	Value (2)	Quantity (3)	Quantity (4)
ln(RER) Growth	-0.911**	-0.752**	-0.931**	-0.785**
	(0.030)	(0.038)	(0.023)	(0.029)
ln(RER) Growth (1-Lag)		0.165**		0.236**
		(0.034)		(0.026)
ln(RER) Growth (2-Lag)		0.090**		0.084**
		(0.026)		(0.020)
Partner Country Import Growth	0.078**	0.116**	0.031**	0.040**
	(0.005)	(0.007)	(0.003)	(0.003)
Partner Import Growth (1-Lag)		0.032**		0.018**
		(0.007)		(0.004)
Partner Import Growth (2-Lag)		0.022**		0.002
		(0.007)		(0.003)
Constant	-0.169	-0.177	0.049	-0.463**
	(0.117)	(0.151)	(0.057)	(0.090)
Observations	356049	210402	232520	131453
R-squared	0.02	0.03	0.01	0.02
Partner FE	Y	Y	Y	Y
HS 2-dig FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y

Robust standard errors in parentheses
* significant at 5; ** significant at 1

Table 4: The Effect of the Exchange Rate on Ordinary vs. Processing Exports (Value Regression)

	Panel A		Panel B		Panel C		Panel D	
	Ordinary		Processing		Pure Assembly		Import & Assembly	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ln(RER) Growth	-0.970**	-0.795**	-0.631**	-0.449**	-0.318**	-0.185	-0.577**	-0.420**
	(0.031)	(0.040)	(0.053)	(0.073)	(0.105)	(0.143)	(0.055)	(0.075)
ln(RER) Growth		0.134**		0.041		-0.041		0.018
(1-Lag)		(0.035)		(0.063)		(0.120)		(0.065)
ln(RER) Growth		0.091**		-0.045		-0.302**		-0.063
(2-Lag)		(0.027)		(0.051)		(0.098)		(0.054)
Partner Country Import Growth	0.075**	0.113**	0.164**	0.197**	0.177**	0.220**	0.164**	0.188**
	(0.006)	(0.007)	(0.013)	(0.018)	(0.025)	(0.032)	(0.014)	(0.018)
Partner Import Growth		0.035**		0.054**		0.106**		0.045**
(1-Lag)		(0.007)		(0.017)		(0.031)		(0.017)
Partner Import Growth		0.022**		0.029		-0.027		0.034*
(2-Lag)		(0.007)		(0.015)		(0.028)		(0.017)
Constant	-0.164	-0.137	-0.295	-0.206	-1.233	-1.009	-1.330**	-1.487**
	(0.120)	(0.154)	(0.512)	(0.761)	(0.916)	(0.551)	(0.084)	(0.155)
Observations	345911	207213	123167	90394	49984	39719	112089	82607
R-squared	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02
Partner FE	Y	Y	Y	Y	Y	Y	Y	Y
HS 2-dig FE	Y	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y	Y

Robust standard errors in parentheses
* significant at 5%; ** significant at 1%

Table 5: The Effect of the Exchange Rate on Ordinary vs. Processing Exports, Quantity Regression (KG)

	Panel A Ordinary		Panel B Processing		Panel C Pure Assembly		Panel D Import & Assembly	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ln(RER) Growth	-0.992**	-0.813**	-0.606**	-0.599**	-0.068	-0.059	-0.560**	-0.573**
	(0.029)	(0.037)	(0.044)	(0.063)	(0.105)	(0.144)	(0.056)	(0.082)
ln(RER) Growth (1-Lag)		0.202**		0.068		-0.034		0.082
		(0.033)		(0.052)		(0.119)		(0.067)
ln(RER) Growth (2-Lag)		0.084**		-0.048		-0.078		-0.108
		(0.026)		(0.043)		(0.100)		(0.056)
Partner Country Import	0.028**	0.040**	0.054**	0.055**	0.035*	0.040*	0.058**	0.059**
Growth	(0.003)	(0.004)	(0.006)	(0.007)	(0.014)	(0.017)	(0.008)	(0.010)
Partner Import Growth		0.021**		-0.001		0.011		-0.019
(1-Lag)		(0.004)		(0.008)		(0.017)		(0.010)
Partner Import Growth		0.003		0.006		-0.013		0.014
(2-Lag)		(0.004)		(0.007)		(0.015)		(0.010)
Constant	0.067	-0.357**	-0.190	-0.993**	-0.196	-1.330**	-0.218	-0.940**
	(0.072)	(0.112)	(0.151)	(0.203)	(0.311)	(0.365)	(0.190)	(0.256)
Observations	226537	129683	66879	48147	24141	18822	60481	43740
R-squared	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01
Partner FE	Y	Y	Y	Y	Y	Y	Y	Y
HS 2-dig FE	Y	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y	Y

Robust standard errors in parentheses
* significant at 5; ** significant at 1

Table 6: The Effect of the Exchange Rate on Different Export Regimes

Dependant Variable: Chinese Exports	Value			Quantity		
	(1)	(2)	(3)	(4)	(5)	(6)
ln(RER) Growth	-0.853**	-0.924**	-0.935**	-0.866**	-0.942**	-0.944**
	(0.026)	(0.030)	(0.030)	(0.035)	(0.039)	(0.039)
Partner Country Import Growth	0.088**	0.088**	0.076**	0.032**	0.032**	0.028**
	(0.005)	(0.005)	(0.006)	(0.004)	(0.004)	(0.005)
RER*Assembly Dum		0.506**	0.572**		0.613**	0.615**
		(0.084)	(0.087)		(0.123)	(0.123)
RER*Imp&Assembly Dum		0.139**	0.221**		0.200**	0.216**
		(0.051)	(0.053)		(0.075)	(0.075)
Imp* Assembly Dum			0.066**			0.003
			(0.025)			(0.020)
Imp* Imp&Assembly Dum			0.090**			0.028*
			(0.015)			(0.012)
Assembly Dummy		-0.119**	-0.121**		-0.126**	-0.126**
		(0.008)	(0.008)		(0.012)	(0.012)
Imp&Assembly Dum		-0.097**	-0.100**		-0.094**	-0.095**
		(0.005)	(0.005)		(0.008)	(0.008)
Constant	-0.189	-0.214	-0.212	0.060	0.049	0.049
	(0.119)	(0.118)	(0.119)	(0.094)	(0.094)	(0.094)
Observations	507984	507984	507984	311159	311159	311159
R-squared	0.01	0.02	0.02	0.01	0.01	0.01
Partner FE	Y	Y	Y	Y	Y	Y
HS 2-dig FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y

Robust standard errors in parentheses
* significant at 5; ** significant at 1

Table 7: The Effect of the Exchange Rate on China Aggregate Imports

Dependant Variable: Aggregate Imports	Value		Quantity	
	(1)	(2)	(3)	(4)
ln(RER) Growth	0.140*	0.363**	0.210*	0.399**
	(0.066)	(0.101)	(0.083)	(0.133)
ln(RER) Growth (1-Lag)		0.603**		0.519**
		(0.085)		(0.105)
ln(RER) Growth (2-Lag)		0.293**		0.165
		(0.067)		(0.086)
Partner Country Export Growth	0.067**	0.058**	0.043**	0.038**
	(0.011)	(0.015)	(0.010)	(0.014)
Partner Country Export Growth (1-Lag)		0.051**		0.045**
		(0.014)		(0.013)
Partner Country Export Growth (2-Lag)		0.016		0.006
		(0.015)		(0.014)
Constant	0.148	0.292	-0.106	0.337
	(0.487)	(0.678)	(0.329)	(0.782)
Observations	156866	95619	111776	66641
R-squared	0.01	0.02	0.01	0.01
Partner FE	Y	Y	Y	Y
HS 2-dig FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y

Robust standard errors in parentheses
* significant at 5%; ** significant at 1%

Table 8: The Effect of the Exchange Rate on Ordinary vs. Processing Imports (Value Regression)

	Panel A		Panel B		Panel C		Panel D	
	Ordinary		Processing		Pure Assembly		Import & Assembly	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ln(RER) Growth	0.196**	0.250*	0.225**	0.513**	0.277*	1.136**	0.157	0.316*
	(0.074)	(0.114)	(0.081)	(0.135)	(0.121)	(0.211)	(0.084)	(0.145)
ln(RER) Growth (1-Lag)		0.576**		0.509**		1.078**		0.441**
		(0.095)		(0.112)		(0.173)		(0.119)
ln(RER) Growth (2-Lag)		0.267**		0.327**		0.634**		0.244**
		(0.077)		(0.081)		(0.121)		(0.088)
Partner Country Export	0.049**	0.034*	0.049**	0.071**	0.045	0.045	0.055**	0.074**
Growth	(0.013)	(0.017)	(0.015)	(0.020)	(0.024)	(0.032)	(0.016)	(0.021)
Partner Country Export		0.056**		0.061**		0.033		0.090**
Growth (1-Lag)		(0.017)		(0.022)		(0.035)		(0.023)
Partner Country Export		0.032		-0.002		0.034		-0.006
Growth (2-Lag)		(0.017)		(0.021)		(0.033)		(0.021)
Constant	-0.404	0.522	0.390	0.089	1.840	1.482	-0.558	0.721
	(0.402)	(0.669)	(1.101)	(0.762)	(1.206)	(0.829)	(1.373)	(1.175)
Observations	142861	90196	72933	50623	35201	25605	64718	45807
R-squared	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02
Partner FE	Y	Y	Y	Y	Y	Y	Y	Y
HS 2-dig FE	Y	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y	Y

Robust standard errors in parentheses
* significant at 5%; ** significant at 1%

Table 9: The Effect of the Exchange Rate on Ordinary vs. Processing Imports, Quantity Regression (KG)

	Panel A		Panel B		Panel C		Panel D	
	Ordinary		Processing		Pure Assembly		Import & Assembly	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ln(RER) Growth	0.291**	0.248	0.348**	0.632**	0.522**	1.296**	0.329**	0.503**
	(0.095)	(0.157)	(0.097)	(0.167)	(0.143)	(0.246)	(0.103)	(0.179)
ln(RER) Growth (1-Lag)		0.468**		0.365**		0.594**		0.382**
		(0.125)		(0.133)		(0.198)		(0.144)
ln(RER) Growth (2-Lag)		0.125		0.167		0.599**		0.048
		(0.103)		(0.099)		(0.139)		(0.108)
Partner Country Export Growth	0.035**	0.036*	0.023*	0.039*	0.039*	0.023	0.022	0.042*
	(0.012)	(0.016)	(0.012)	(0.016)	(0.018)	(0.026)	(0.013)	(0.018)
Partner Country Export Growth		0.045**		0.038*		-0.013		0.073**
(1-Lag)		(0.016)		(0.019)		(0.029)		(0.021)
Partner Country Export Growth		0.019		0.015		-0.002		0.015
(2-Lag)		(0.016)		(0.018)		(0.029)		(0.019)
Constant	0.172	0.807	-0.674*	-0.699	1.521	3.385**	-0.519	-0.639
	(0.366)	(0.686)	(0.322)	(0.688)	(1.938)	(0.281)	(0.340)	(0.710)
Observations	100962	62693	56276	38201	26199	18729	50612	34983
R-squared	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Partner FE	Y	Y	Y	Y	Y	Y	Y	Y
HS 2-dig FE	Y	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y	Y

Table 10: The Effect of the Exchange Rate on Different Import Regimes

Dependant Variable: Chinese Imports	Value (1)	(2)	(3)	Quantity (4)	(5)	(6)
ln(RER) Growth	0.193**	0.233**	0.229**	0.318**	0.343**	0.343**
	(0.052)	(0.067)	(0.067)	(0.064)	(0.085)	(0.085)
Foreign Export Supply Growth	0.051**	0.051**	0.044**	0.032**	0.032**	0.033**
	(0.009)	(0.009)	(0.012)	(0.009)	(0.009)	(0.012)
RER* Pure Assembly Dummy		0.004	0.006		0.016	0.017
		(0.113)	(0.114)		(0.136)	(0.136)
RER* Imp&Assembly Dummy		-0.149	-0.136		-0.090	-0.091
		(0.089)	(0.089)		(0.111)	(0.111)
Foreign Export * Pure Assembly Dummy			0.005			0.005
			(0.027)			(0.022)
Foreign Export * Imp&Assembly Dummy			0.025			-0.006
			(0.020)			(0.018)
Pure Assembly Dummy		-0.159**	-0.159**		-0.171**	-0.171**
		(0.012)	(0.012)		(0.015)	(0.015)
Imp&Assembly Dummy		-0.113**	-0.114**		-0.124**	-0.123**
		(0.009)	(0.009)		(0.012)	(0.012)
Constant	-0.129	-0.135	-0.136	0.084	0.111	0.111
	(0.314)	(0.316)	(0.316)	(0.304)	(0.304)	(0.304)
Observations	242780	242780	242780	177773	177773	177773
R-squared	0.01	0.01	0.01	0.01	0.01	0.01
Partner FE	Y	Y	Y	Y	Y	Y
HS 2-dig FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y

Robust standard errors in parentheses
* significant at 5; ** significant at 1