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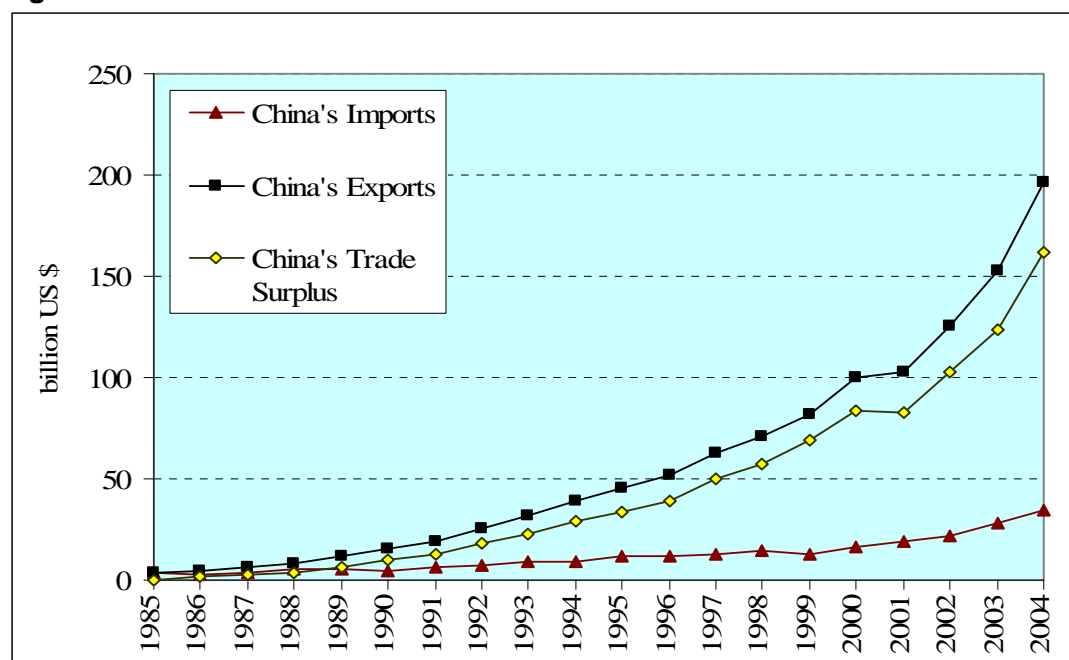
China's Trade Surplus with the United States: The Role of Exchange Rates

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Introduction

Bilateral trade between the United States and China has increased dramatically over the past two decades. In particular, China's trade surplus with the United States has increased steadily with the growing trade volume between the two countries. According to the U.S. Census Bureau, China's trade surplus with the United States rose from \$0.01 billion in 1985 to \$33.79 billion in 1995, and it jumped to \$161.94 billion in 2004 (Figure 1). China's imports from the United States have increased only slightly, while its exports to the United States have increased sharply since the mid 1990s.

Figure 1. Bilateral trade value between China and the United States.



Source: U.S. Census Bureau.

China's recent trade surplus with the United States has led some economists to claim that the Yuan is undervalued (e.g., Goldstein 2003; Chang and Shao 2004; Coudert and Couharde 2004). However, this opinion is countered by the fact that China's overall trade surplus (about \$30 billion at the end of 2004) has not been as large as the surplus with the United States, which implies that China has trade deficits with other countries.

China pegged its currency (Yuan or Renminbi) to the U.S. currency at 8.27 Yuan per dollar from 1994 to July 20, 2005. From July 21, 2005, China has adopted a managed floating exchange rate system based on a basket of currencies. The principal currencies in the basket include the U.S. dollar, euro,

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Japanese yen, and Korean won. Before 1994, China had used a fixed exchange rate system and a double-track exchange rate system in succession.

The objectives of this paper are: (1) to identify characteristics of bilateral trade between the United States and China, (2) to examine the effects of exchange rates (exchange rate between the United States and China and exchange rates between the United States and other Asian countries) on trade flows between the two countries, and (3) to evaluate the roles of other factors (including bilateral trade value, market openness in the two countries, and the U.S. foreign exchange reserve) in bilateral trade between the countries.

Characteristics of Sino-U.S. Bilateral Trade

The characteristics of bilateral trade between the United States and China have changed over time. Prior to the early 1990s, the pattern was inter-industry trade on the basis of differences in resource endowments. The United States exported technology and capital intensive goods (e.g., machinery, equipment, and pharmaceutical products) to China and imported labor intensive goods (e.g., apparel, clothing, footwear, and furniture) from that country. However, intra-industry trade between the two countries has increased significantly since the mid-1990s. A major increase in China's exports of high-technology products demonstrates a surge in bilateral intra-industry trade based on product differentiation.

In order to gain insight on the bilateral trade patterns, we examine Sino-U.S. bilateral trade in three sectors: agricultural commodities (AGR), middle-technology manufacturing commodities (MID), and high-technology manufacturing goods (HIGH). The sectors are established on the basis of standard international trade classification (SITC) code. The AGR sector includes foods, live animals, beverages, and tobacco. The MID sector includes fertilizers, chemical materials, essential oils, and nonferrous metals. The HIGH sector includes metalworking machinery, transport equipment, medicinal and pharmaceutical products, and motor vehicles.

As shown in Table 1, Chinese exports to the United States have increased for all three sectors over time. However, the country's export value in the HIGH sector has grown at an increasing rate from \$4.73 billion in 1989 to \$121.12 billion in 2004. The share of China's exports to the United States in the HIGH sector (percentage of China's export value in the HIGH sector over China's total export value) increased from 39% in 1989 to 62% in 2004. In contrast, the share of Chinese exports in the MID sector decreased from 56% in 1989 to 37% in 2004. The export share of the AGR sector decreased from 4% in 1989 to 1% in 2004. The changes in China's exports indicate that the country's increased trade surplus with the United States is due mainly to its rapid increase in HIGH sector exports.

While U.S. exports to China in both the MID and HIGH sectors have increased over time, they have grown at a much slower pace as compared to the corresponding imports from China. The share of U.S. exports to China in the HIGH sector (percentage ratio of U.S. export value in the HIGH sector over its total export value) increased from 38% in 1989 to 51% in 2004. The share of U.S. exports in the MID sector increased slightly from 42% in 1989 to 45% in 2004. The export share of the AGR sector decreased from 20% in 1989 to 4% in 2004. The HIGH sector has taken the largest share in bilateral trade value between the two countries.

Figure 2 shows that the U.S. trade balances with Japan and South Korea have deteriorated, due mainly to the appreciation of the U.S. dollar relative to the Japanese Yen and South Korea Won since the Asian financial crisis starting in 1997. This is because goods produced in Japan and South Korea became relatively cheap in terms of the U.S. dollar, while goods produced in the United States became relatively expensive in these countries. China's trade balances with Japan and South Korea have also deteriorated, since the Chinese Yuan was pegged to the U.S. dollar and appreciated against the Yen and Won. China has imported technology intensive inputs and/or processing technology from its neighboring countries and used them to produce final products which are exported to the United States

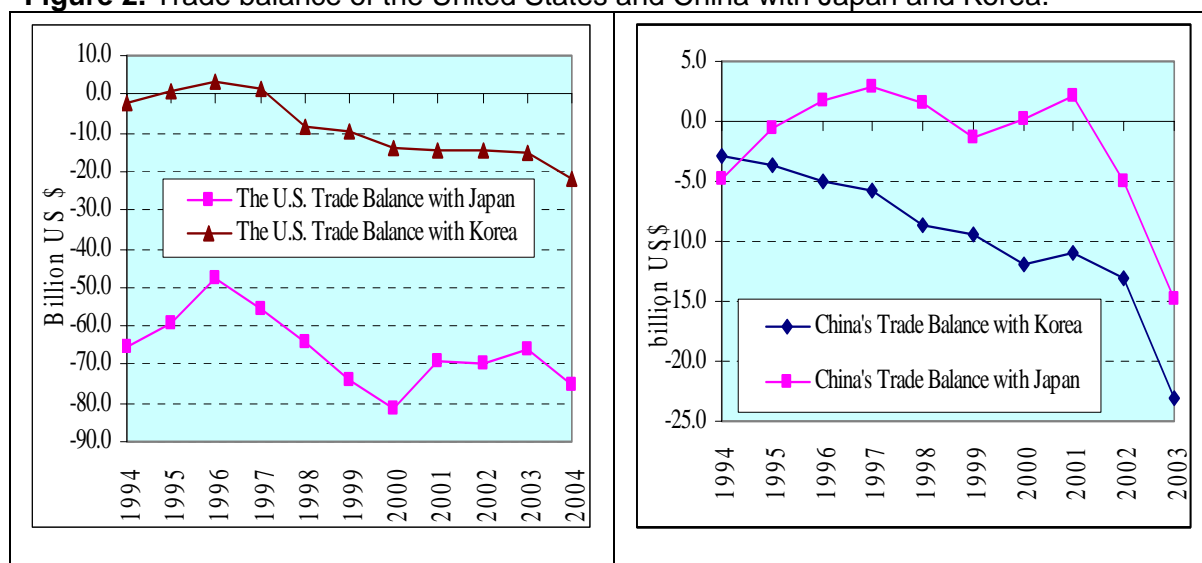
(called the third country effect). This explains why China's trade surplus with the U.S. in the HIGH sector has increased much faster than in other sectors.

Table 1. Sino - U.S. bilateral trade value by sectors (in billion US\$).

Year	China's Exports to the U.S.			U.S. Exports to China		
	AGR	MID	HIGH	AGR	MID	HIGH
1989	0.50	6.76	4.73	1.19	2.42	2.20
1990	0.55	8.69	5.98	0.54	2.08	2.19
1991	0.49	10.68	7.81	0.41	3.02	2.85
1992	0.67	13.97	11.02	0.34	2.64	4.48
1993	0.61	16.86	14.06	0.37	2.08	6.32
1994	0.54	19.36	18.87	0.42	3.29	5.58
1995	0.61	21.10	23.80	1.71	4.60	5.44
1996	0.68	23.21	27.65	0.89	4.71	6.37
1997	0.76	27.94	33.87	0.58	4.83	7.40
1998	0.76	30.46	39.89	0.82	4.28	9.15
1999	0.89	34.38	46.54	0.41	4.57	8.14
2000	1.06	41.09	57.86	0.50	6.52	9.25
2001	1.19	42.96	58.20	0.53	6.86	11.84
2002	1.56	50.37	73.36	0.59	7.92	13.54
2003	2.04	59.10	91.21	0.93	12.89	14.59
2004	2.40	73.17	121.12	1.39	15.63	17.68

Source: U.S. Department of Commerce.

Figure 2. Trade balance of the United States and China with Japan and Korea.



Source: U.S. Department of Commerce and various issues of China Statistical Yearbook (Web site: <http://www.stats.gov.cn/tjsj/ndsj/>).

Empirical Model and Estimation

Empirically, we specify China's export share in a sector as a function of price differences for goods in the sector between the two countries, U.S.-China exchange rate, weighted average exchange rates between the United States and other Asian countries, the reserves of U.S. foreign exchange, and factors indicating market openness in the United States and in China. Since the annual time series data for prices of goods in individual sectors are not available, we use the bilateral trade value in each sector to represent the difference in prices between the two countries. We use the weighted average

exchange rate between the United States and other Asian countries to examine the effects of these countries on U.S.-China bilateral trade (third country effect). Moreover, we use the lagged dependent variable to capture dynamics in bilateral trade. The model is in semi-log functional form with all the independent variables in natural logarithm form.

Bilateral trade data reclassified according to Standard International Trade Classification (SITC) are obtained from the U.S. Department of Commerce online database (Web site: <http://tse.export.gov>) for the AGR, MID, and HIGH sectors. In order to obtain an appropriate number of observations for regression analysis, following a suggestion by Feenstra, Markusen, and Rose (2001), we have classified the sectors into SITC two digit industries: 14 industries for the AGR sector, 28 industries for the MID sector, and 13 industries for the HIGH sector. The weighted average real exchange rate between the United States and the Asian countries is calculated by aggregating the real bilateral exchange rates with bilateral trade values as weights for the countries (Web site: <http://www.ers.usda.gov/Data/exchangerates>). Data for gross domestic products, GDP deflators, consumer price indices, and reserves of foreign exchange are obtained from the International Financial Statistics online database (Web site: <http://ifs.apdi.net/imf/about.asp>).

The specification of our model has a potential endogeneity problem because the independent bilateral trade value variable could be correlated with the error term. To solve this problem, we use the error component two-stage least squares estimator (EC2SLS) developed by Baltagi (1981; 2001). Three instrumental variables are chosen. The first is the natural logarithm of the sum of real gross domestic products of the United States and China. According to studies using gravity type models (e.g., Glick and Rose 2001; Rose and Wincoop 2001), the sum of income between two trading countries is strongly correlated with trade volume between the countries, but tends to have no effect on the export share of a specific country. The second and the third instrumental variables are the natural logarithms of U.S. and China consumer price indices.

Results and Discussion

The estimation results are summarized in Table 2. All of the estimated coefficients have their expected signs and most of them are significantly different from zero, indicating that most of the independent variables are important factors in explaining increases in China's export share.

Table 2. EC2SLS estimation results (dependent variable is China's export share).

Independent Variables	Estimated Coefficient	Z-value
U.S.-China exchange rate	0.125 ^b	2.29
U.S. - Asian countries exchange rate	0.102 ^b	2.27
Bilateral trade value	0.035	1.25
Market openness in China	-0.072	-1.46
Market openness in the U.S.	0.316 ^a	2.82
U.S. foreign exchange	0.093 ^b	2.48
Lagged China's export share	0.453 ^a	11.49
Intercept	-0.048	-0.12
R^2	0.764	
Number of observations	825	

Note: a, b, and c represent significance levels of 1%, 5%, and 10%, respectively.

The estimated coefficient for the U.S.-China real exchange rate variable ($\ln RE_t^{us, ch}$) is 0.123, implying that a 1% increase of the real value of the U.S. dollar against Chinese Yuan would lead to an increase of at least 0.123% in China's export share.

The estimated coefficient for the weighted average exchange rate between the United States and other Asian countries is 0.102, implying that a 1% increase in the real value of the U.S. dollar against currencies in other Asian countries would lead to an increase of at least 0.102% in China's export share. Appreciation of the Chinese Yuan against currencies of other Asian countries means goods produced in the Asian countries will be relatively cheaper in China. As a result, China would increase its imports of technology intensive intermediate goods and/or processing technology from Asian countries and use them to produce final goods which the country exports to the United States, resulting in an increase of China's export share. U.S. market openness and the U.S. foreign exchange reserve are other important variables affecting China's trade surplus with the United States.

Conclusion

Our study suggests that the pegged exchange rate system has contributed to China's increased trade surplus with the United States. China has imported intermediate goods and/or processing technology from the Asian countries, produced final goods using its cheap labor, and exported those goods to the United States. This implies that the new Chinese exchange rate system, in which the Chinese Yuan is pegged to a basket of currencies, including the U.S. dollar, may reduce the effects of other Asian countries on U.S.-China bilateral trade (the third country effect), and thus may improve the U.S. bilateral trade balance with China. Our study also reveals that the U.S. bilateral trade balance could improve if the Chinese Yuan appreciates against the U.S. dollar. In addition, U.S. market openness and the U.S. foreign exchange are important factors in explaining increases in China's trade surplus with the United States.

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