How Effective Is The Renminbi Devaluation On China's Trade Balance

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Abstract: The rapid rise of the Chinese economy is creating opportunities for many but also causing increasingly trade disputes with its major trading partners. During the recent years, the Renminbi (RMB) exchange rate issue has been at the centre of ongoing debate over the source of global current account imbalance, especially with the United States. The United States and other countries have expressed, with considerable concern, the view that China's national currency was seriously undervalued. Critics say that, by undervaluing its currency, China gains unfair trade advantage and has seriously injured the manufacturing sector in the United States. Moreover, some even attribute the recent East Asian financial crisis to the 50% devaluation of the Chinese currency in 1994. By far not many OECD countries have recognized China's market economy status after its 27-year market-oriented economic reforms.

The objective of this study is to contribute to the current discussion on the Renminbi (RMB) exchange rate by providing new evidence on China's exchange rate policy and the impacts of RMB devaluation/revaluation on China's output and trade balance. For a rigorous empirical examination, this research constructs a vector autoregression (VAR) model and employs the most recent econometric techniques to identify if the Chinese economic system has become responsive to the changes in the exchange rate after about three decades reform. More specifically, we use a structural VAR technique to estimate impulse response functions and variance decompositions for China's output and trade balance, and to determine how the fundamental macroeconomic shocks contribute to the fluctuations in the real exchange rate, and how output and trade account respond to the identified various shocks.

The results from the VAR estimations indicate that the coefficients relating China's trade balance to the once lagged changes in the real exchange rate are negative and not statistically significant in all cases, while these with two lags for the whole sample and prior-unification period show positive but insignificant. The response of China's trade balance to the once lagged US and world output is positive, even though not statistically significant, and to the once lagged change in the trade balance is positive and also statistically significant, taking on values from 0.67 to 0.97. These results inspire one's expectation that the dynamic effect of exchange rate on China's trade balance is still very limited, and China's balance of trade is mainly determined by the world demand and its trade performance, with the latter being a result of its successfully maintained comparative advantage. These are supported by the results from the impulse analysis, and the variance decomposition analysis. The movement of the US output is attributed largely to its own shocks during the entire sample period, while China's trade balance and the exchange rate are found to be the predominant shocks accounting for the variability of the US output during the period 1994-2007. The movement of the world output is attributed largely to the world output shocks, but China's exchange rate shock is found to be increasingly effective on the fluctuation of the world output. The findings seems to suggest that, after about three-decade reform, the Chinese economic system has been gradually transformed towards a market-originated system under which economic agents have become responsive to market signals to allow changes in exchange rates to influence the trade balance. However, the exchange rate effect on China's balance of trade is still limited. This has important policy implications for the economies concerned.

Keywords: Chinese Exchange Rate Policy; Trade Balance; Structural Vector Autoregression; Variance Decompositions; East Asia

JEL classification: F14; F31; P21

1. INTRODUCTION

China's path-breaking initiatives of reforms have successfully transformed itself from a poor, closed nation to an important trading nation and manufacturing centre in the world (see Lardy, 1998; Naughton, 1996). The rapid rise of the Chinese economy is creating opportunities for many but also causing increasingly trade disputes with its major trading partners. During the recent years, the Renminbi (RMB) exchange rate issue has been at the centre of ongoing debate over the source of global current account imbalance, especially with the United States. The United States and other countries have expressed, with considerable concern, the view that China's national currency was seriously undervalued. The US Treasury Department has urged China strongly in recent years to adopt procedures that would allow the RMB to rise in value. US Congress has even been considering legislation that would place a 27.5% tariff on Chinese imports to the United States if the RMB is not revalued. Some analysts also indicate that the RMB needs to rise by as much as 40% in order to reflect its true value (see Zhang and Pan, 2004 and Chang and Shao, 2004) and others argue that further revaluation of the RMB will serve China's own interest (see Tung and Baker, 2004). Critics say that, by undervaluing its currency, China gains unfair trade advantage and has seriously injured the manufacturing sector in the United States. Moreover, some even attribute the recent East Asian financial crisis to the 50% devaluation of the Chinese currency in 1994. By far not many OECD countries have recognized China's market economy status after its 27-year market-oriented economic reforms.

Since it became a national currency in 1949, the Chinese renminbi has been fixed and inconvertible. It could neither respond flexibly to the change of price parities between China and the rest of the world, nor make prompt adjustment according to the changing supply and demand of foreign exchange. To accommodate reforms in the foreign trade sector since the late 1970s, China has conducted several experiments in reforming its foreign exchange system, including the dual exchange rate system and foreign exchange earning retention system, to make it more market oriented and convertible (see Zhang, 1997, 1999, and Lardy, 1992),. With the unification of the dual exchange rates in 1994, the official exchange rate of the renminbi experienced a 50% devaluation to RMB 8.7 yuan to the US dollar. Since then, the exchange value of the RMB has been remained relatively stable. On July 21, 2005, with the intensified pressures from the USA, Japan and Europe on the revaluation of the RMB, the Chinese authority announced that it will allow the RMB to trade within a band of 0.3% per business day for the first time, and also the RMB is linked to a basket of internationally traded currencies according to their importance in China's external transactions including the USD, the Euro, the Japanese Yen and the Korean Won. Over the past two years, the RMB has appreciated by 9.4% against the U.S. dollar, and the real effective exchange rate of the RMB has appreciated by 6.3%.

Given China's "socialist market economy", how to determine if the Chinese currency has been undervalued or overvalued? To what extent has the Chinese economy been transformed to a market economy? How is the current foreign exchange system evolved and managed? How sensitive is the economic system to the market signals and how is China's balance of payments related to the exchange values of the RMB? And how would the changes in the exchange rates affect the economy and what implications to the other countries, especially the East Asian countries, should the Chinese government revalue its currency? These remain important issues but are not yet resolved satisfactorily.

The objective of this study is to construct a vector autoregression (VAR) model and employ the most recent econometric techniques to identify if the Chinese economic system has become responsive to the changes in the exchange rate after about three decades reform. In particular, we construct a structural VAR model to estimate impulse response functions and variance decompositions for China's output and trade balance, and to determine how the fundamental macroeconomic shocks contribute to the fluctuations in the real exchange rate, and how output and trade account respond to the identified various shocks. Thus, this study will contribute to the current discussion on the RMB exchange rate by providing new evidence on China's exchange rate policy and the impacts of RMB devaluation/revaluation on China's output and trade balance. This would also help explain why China was immune to the recent financial crisis in 1997 and how China could keep its currency value unchanged during the crisis. Apparently this would have important policy implications for the rest of the East Asian economies. This project implies three major contributions. First, it applies a VAR model to the transition economy of China to determine the exchange value of the RMB and how the system responds to changes in the market signals. It contributes to our better understanding of how far and how fast China's reforms have transformed the economy to a market-oriented. It also contributes to the

recent discussion on China's exchange rate policy. Then, it provides policy-makers both within and outside China with robust empirical evidence towards how effective the RMB devaluation/revaluation would be on the economy and its trade balance, and what policy implications to others. Finally, it helps explain why China could be immune to the recent East Asian financial crisis in 1997 and if China's RMB devaluation in 1994 is one of the causes to the crisis in 1997.

The remainder of this paper is organized as follows. In section 2, we briefly review the unique reform process of China's foreign exchange rate system, and discuss the rationale and motivations behind each run of the reform. Section 3 deals with the analytical framework and methodology employed in the paper. Section 4 discusses the data issue and presents the results of empirical estimation. Section 5 provides some concluding remarks.

2. METHODOLOGY AND MODEL

To study if the Chinese economic system has become responsive to the changes in the exchange rate since reform, we construct a structural VAR model to estimate impulse response functions and variance decompositions for China's output, real (effective) exchange rate, and trade balance, and to determine how the fundamental macroeconomic shocks contribute to the fluctuations in the real exchange rate, and how output and trade account respond to the identified various shocks.

We extend the Lee and Chinn (2006) and Blanchard and Quah (1989) models to construct a 3-variable VAR model, including real output, real exchange rates, and trade balance. We use the US GDP and world GDP respectively to proxy for the income effect of the rest of the world that will possibly affect the trade balance. The structural model can be specified as follows:

$$X_t = \left(\Delta y_t^*, \Delta rer_t, (TB/y)_t\right)',$$

$$\varepsilon_t = \left(\varepsilon_{y,t}, \varepsilon_{e,t}, \varepsilon_{b,t}\right)', \quad \text{and}$$

$$X_t = A(L)\cdot\varepsilon_t = \begin{pmatrix} A_{11}(L) & A_{12}(L) & A_{13}(L) \\ A_{21}(L) & A_{22}(L) & A_{23}(L) \\ A_{31}(L) & A_{32}(L) & A_{33}(L) \end{pmatrix}\cdot\varepsilon_t, \qquad (1)$$

where $A_{ij}(L) = a_{ij}^0 + a_{ij}^1 L + a_{ij}^2 L^2 + \cdots$, and it is assumed that the structural shocks, ε_t, are serially uncorrelated and the covariance matrix are normalized to the identity matrix. y^* denotes US or world real GDP; *rer* the bilateral real exchange rate of Chinese yuan vis-à-vis the US dollar or the yuan's real effective exchange rate; *TB* the (nominal) trade balance against the United States or the world; and *y* the China's nominal GDP. Δ is the first-difference operator. ε_y is the US or world output shock, ε_e the real (effective) exchange rate shock, and ε_b the transitory (trade balance) shock.

In order to identify the structural A_i matrices, we follow the method developed by Blanchard and Quah (1989) and impose the following long-run restrictions. First, we assume that Δy^* is affected by only the US or world output shock (ε_y) in the long-run. Second, Δrer is affected by both the US or world output shocks and the real (effective) exchange rate shock (ε_e) in the long-run, but not affected by the transitory (trade balance) shock (ε_b). Finally, (TB/y) is influenced by all three shocks in the long-run. Thus, the long-run restrictions require $A_{12}(1) = A_{13}(1) = A_{23}(1) = 0$ that is sufficient to identify the structural A_i matrices and the time series of structural shocks, $\varepsilon_t = \left(\varepsilon_{y,t}, \varepsilon_{e,t}, \varepsilon_{b,t}\right)'$. We estimate a reduced-form VAR as:

$$\Delta x_t = B(L)\Delta x_{t-1} + u_t, \qquad (2)$$

where u_t is a vector reduced form disturbance and $B(L)$ is a 3×3 matrix of lag polynomials. An MA representation of equation (2) is given as:

$$\Delta x_t = C(L)u_t, \qquad (3)$$

where $C(L) = (1 - B(L)L)^{-1}$ and the lead matrix of $C(L)$ is, by construction, $C_0 = I$. By comparing equations (1) and (3), we obtain the relationship between the structural and reduced form disturbances: $u_t = A_0\varepsilon_t$. As the shocks are mutually orthogonal and each shock has unit variance, $C(1)\Sigma C(1)' = A(1)A(1)'$ where $\Sigma = Eu_t u_t' = EA_0\varepsilon_t\varepsilon_t' A_0' = A_0 A_0'$. Letting H denote the lower triangular Choleski decomposition of $C(1)\Sigma C(1)'$, we obtain $A(1) = H$ since our long-run restrictions imply that $A(1)$ is also lower triangular. Consequently, we obtain $A_0 = C(1)^{-1}A(1) = C(1)^{-1}H$. Given an estimate of A_0, we can recover the time series of structural shocks.

3. EMPIRICAL ANALYSIS

3.1 Data Description

We use the quarterly series of data spanning from 1987Q1 to 2007Q3 except for the real GDP series of OECD countries that ranges from 1995Q1 to 2007Q1. To assess the changing sensitivity of the economic system to the market signal during the reform period, we divide the whole sample period into three in our estimations. The first period covers the prior-exchange rate unification years, the second spans from 1994 through 2007, and finally the whole sample period. The purpose is to reflect the dynamics and comparatively investigates if the Chinese economic system has become more sensitive to market signal changes over the entire reform period. As China's dual exchange rate system was abandoned in January 1994, we chose the sample starting from 1994Q2. In addition, as China's trade surplus began to grow in the late half of 1990s, our sample period will reasonably catch the most recent trend and to determine the effect of the exchange rate policy change on China's trade balance.

As a proxy for the world real GDP variable, we use the real GDP series of either the US or OECD countries. The bilateral real exchange rate of Chinese yuan vis-à-vis the US dollar and the real effective exchange rate (REER) of the yuan are used in this study. Bilateral real exchange rate is constructed based on relative consumer price index (CPI) between China and the US. China's bilateral trade surplus with both the United States and the world is denominated in US dollars. China's nominal GDP is constructed using the real GDP and CPI and also converted into US dollar terms. All data are obtained from the Chinese State Bureau of Statistics, IMF, International Financial Statistics, CD-ROM; CEIC Global Database; and the NUS Databank. We choose to use the first-difference model to ensure the stationarity of endogenous variables. We have checked the time-series properties of the endogenous variables and the results of unit-root test show that both y^* and rer are non-stationary in level but stationary in first-differences, while there is a conflict in the results of stationarity in (TB/y). To be consistent with the existing studies as well as due to the low power problem of unit-root tests, we chose to include the level of (TB/y) in a VAR model. As we attempt to analyse the result for sub-samples where the sample size is small, we do not conduct cointegration tests.

3.2 Empirical Results

The estimation results of our VAR model are reported in Table 1. We use two lags in each estimation based on Schwartz information criterion (SIC) and Akaike information criterion (AIC). In general the model estimation performs fairly well. The adjusted R^2 values for China's trade balance respectively with the rest of the world and the US vary from 0.53 to 0.99 with different sample periods, while those for the output and exchange rate equations take on values from 0.01 to 0.27. In particular, the adjusted R^2 values for the trade balance with the US ranges from 0.81 for the prior-unification period to 0.986 for the post-unification period. It is interesting to note that first differences of the real exchange rate

exhibit some serial correlation with the highest coefficient exceeding 0.40 in the cases of real exchange rate with the US dollar prior-unification and REER. All the coefficients are statistically significant. Similar pattern can be observed for the output. As we are interested of how China's trade balance responds to shocks, we will focus our discussion on the results of trade balance equations only.

Table 1: Results of Vector Autoregression

	Bilateral Trade with US 1987Q2-2007Q3			Bilateral Trade with US 1987Q2-1993Q4			Bilateral Trade with US 1994Q2-2007Q3			Trade with World 1995Q2-2007Q1		
	DY	DEXR	TB	DY	DEXR	TB	DY	DEXR	TB	DY	DEXR	TB
DY(-1)	0.15	-0.14	0.15	0.22	-1.81	0.29	0.09	-0.22	0.17	0.52	0.72	1.21
	0.11	1.14	0.16	0.26	2.02	0.39	0.14	0.51	0.16	0.16	1.08	1.65
DY(-2)	0.31	-1.43	0.18	0.14	-0.34	0.13	0.30	0.03	0.12	0.01	-1.84	-1.49
	0.11	1.15	0.16	0.26	2.02	0.39	0.14	0.50	0.16	0.16	1.07	1.63
DEXR(-1)	0.00	0.18	0.00	-0.01	0.47	-0.01	0.01	0.06	-0.01	0.01	0.40	-0.14
	0.01	0.12	0.02	0.03	0.21	0.04	0.02	0.06	0.02	0.02	0.14	0.21
DEXR(-2)	-0.02	-0.07	0.01	-0.02	-0.06	0.04	-0.01	-0.09	0.00	0.00	-0.06	-0.02
	0.01	0.11	0.02	0.03	0.21	0.04	0.01	0.05	0.02	0.02	0.14	0.22
TB(-1)	-0.01	1.81	0.88	0.08	2.49	0.74	-0.05	1.05	0.97	0.01	0.14	0.67
	0.09	0.88	0.12	0.16	1.23	0.24	0.13	0.45	0.14	0.02	0.11	0.16
TB(-2)	0.01	-1.86	0.12	-0.09	-2.41	0.19	0.04	-0.99	0.03	-0.02	-0.21	0.18
	0.09	0.90	0.12	0.16	1.24	0.24	0.13	0.46	0.15	0.02	0.13	0.19
C	0.42	1.37	-0.09	0.45	0.64	0.31	0.56	-1.23	0.03	0.33	0.87	1.14
	0.17	1.75	0.24	0.49	3.80	0.74	0.27	0.95	0.31	0.12	0.83	1.26
Adj.R^2	0.10	0.01	0.98	0.01	0.27	0.81	0.04	0.10	0.99	0.18	0.14	0.53

Note: DY denotes either 1st-difference of log of US real GDP or world (OECD) real GDP; DEXR refers to either 1st-differnce of log of bilateral real exchange rate of Chinese yuan vis-à-vis the US dollar or real effective exchange rate of Chinese yuan; TB either the ratio of China's bilateral trade surplus against the United States to China's nominal GDP or the corresponding ratio of China's total trade surplus against world. Standard errors (in red font) are reported just below the estimates (in black font).

As it can be seen from Table 1, the coefficients relating China's trade balance to the once lagged changes in the real exchange rate are negative and not statistically significant in all cases. The coefficients relating the bilateral trade balance against the US to changes in the real exchange rate with two lags for the entire sample period and prior-unification period show positive but insignificant, taking on values from 0.0088 to 0.0383. Hence, one might speculate upon the dynamic effect of exchange rate on China's trade balance. The results seem not lend much support to the view that the Chinese economic system has become responsive to changes in the exchange rate after about three decades reform.

The response of China's trade balance to the once lagged US and world output is positive, taking on values from 0.15 to 1.21, even though not statistically significant. The coefficient relating the trade balance to the once lagged change in the trade balance is positive and also statistically significant, taking on values from 0.67 to 0.97. These results inspire one's expectation that China's balance of trade is mainly determined by the world demand and its trade performance, with the latter being a result of its successfully maintained comparative advantage.

We have conducted an impulse responses analysis of each endogenous variable to structural shocks and the results are not reported but available upon request. We use the 16 percent and 84 percent fractiles that correspond to one standard deviation if symmetrical error bands were set based on estimates of the variance. It is interesting to note that in general China's balance of trade situation is affected largely by the world demand shock and trade balance shock, and exchange rate shock affects the trade balance with an undetermined pattern. When exchange rate shock occurs, the effect on the trade balance becomes either positive or negative. It is not conclusively clear if the depreciation of the RMB will firmly improve China's balance of trade. However, the result does indicate the trend of increasing sensitivity of the trade balance to the exchange rate shock since the dual rate unification. Moreover, the response of the exchange rate to all the three structural shocks is short-lived, mostly lasting for only one quarter and then immediately back to a zero-level effect. One may interpret this response pattern as the rigidity of China's exchange rate regime even though efforts have been given in the recent years to let the market play a bigger role in determining the RMB exchange rate.

We conducted Variance Decomposition (VD) analysis to decompose variation in the percentage change of the forecast error variance of changes in the world output, exchange rates and trade balance that are due to each shock at the 1 through 20 quarter horizons. We report the forecast error variances of each

endogenous variable to respective shocks only during the sample period 1987-2007 in Table 2. It is noted that the movement of the US output is attributed largely to its own shocks during the entire sample period, while China's trade balance and the exchange rate are found to be the predominant shocks accounting for the variability of the US output during the period 1994-2007. The movement of the world output is attributed largely to the world output shocks, but China's exchange rate shock is found to be increasingly effective on the fluctuation of the world output. The finding is consistent with our casual observation that the emerging Chinese economy as the world's manufacturing centre will inevitably generate increasing effects on the rest of the world through the channels of international trade and direct investment.

Table 2: Results of the Variance Decomposition Test (VAR Model of Bilateral Trade with US)

(a) 1987Q2-2007Q3 (Lag order is 2)

Horizon	Std Error	DYUS	DRER	TB_US
Decomposition of Variance for Series DYUS				
1	0.46	89.83	0.05	10.12
4	0.50	89.36	1.45	9.19
8	0.50	89.32	1.66	9.02
12	0.50	89.31	1.67	9.02
16	0.50	89.30	1.67	9.03
20	0.50	89.30	1.67	9.03
Decomposition of Variance for Series DRER				
1	4.74	5.55	40.61	53.85
4	4.94	6.07	43.22	50.71
8	4.95	6.22	43.16	50.63
12	4.95	6.23	43.15	50.62
16	4.95	6.23	43.15	50.62
20	4.95	6.23	43.15	50.62
Decomposition of Variance for Series TB				
1	0.66	1.76	29.80	68.44
4	1.21	9.72	29.98	60.29
8	1.72	17.16	28.03	54.82
12	2.14	20.85	26.73	52.42
16	2.50	22.87	25.99	51.14
20	2.83	24.10	25.54	50.37

(b) 1987Q2-1993Q4 (Lag order is 2)

Horizon	Std Error	DYUS	DRER	TB_US
Decomposition of Variance for Series DYUS				
1	0.48	77.69	20.77	1.54
4	0.55	79.80	17.18	3.02
8	0.56	80.03	17.00	2.97
12	0.56	79.98	17.00	3.01
16	0.56	79.97	17.00	3.03
20	0.56	79.96	17.00	3.04
Decomposition of Variance for Series DRER				
1	3.75	27.50	69.88	2.62
4	5.03	48.93	44.83	6.25
8	5.10	49.76	44.11	6.13
12	5.10	49.79	44.08	6.14
16	5.10	49.78	44.07	6.15
20	5.10	49.78	44.07	6.16
Decomposition of Variance for Series TB				
1	0.73	32.06	0.00	67.94
4	1.15	19.85	4.37	75.78
8	1.44	15.24	6.35	78.42
12	1.58	13.45	6.84	79.71
16	1.65	12.62	7.01	80.36
20	1.69	12.21	7.09	80.70

Fluctuations in real exchange rates were predominantly caused by China's trade balance and exchange rate shocks at all horizons except during the prior-unification period. The trade balance shock accounts for over 51 percent of the variability at all horizons for the whole sample period, and over 73 percent in the post-unification period. Trade balance shock increases pressure on the exchange rate, inducing appreciation. The finding also reflects China's recent move towards market-determined exchange rate.

It is found that the movement of China's trade balance against the US is attributed largely to the US output shock during the post unification period and even before, while the exchange rate effect does not contribute much. When we look at the whole sample period and also the trade balance with the rest of the world, the exchange rate effect becomes obvious, taking a percentage of 30 to 40 through the horizons. The finding seems to suggest that, after about three-decade reform, the Chinese economic system has been gradually transformed towards a market-originated system under which economic agents have become responsive to market signals to allow changes in exchange rates to influence the trade balance. However, the exchange rate effect on China's balance of trade is still limited.

4. CONCLUDING REMARKS

In this paper we have briefly reviewed the evolution of the Chinese exchange rate system and constructed a vector autoregression (VAR) model to assess if the Chinese economic system has become more responsive to the changes in the exchange rate after about three decades reform.

The results from the VAR estimations indicate that the coefficients relating China's trade balance to the once lagged changes in the real exchange rate are negative and not statistically significant in all cases, while these with two lags for the whole sample and prior-unification period show positive but insignificant, taking on values from 0.0088 to 0.0383 in the case of trade balance with the US. The

response of China's trade balance to the once lagged US and world output is positive, taking on values from 0.15 to 1.21 even though not statistically significant, and to the once lagged change in the trade balance is positive and also statistically significant, taking on values from 0.67 to 0.97. These results inspire one's expectation that, the dynamic effect of exchange rate on China's trade balance is still very limited, and China's balance of trade is mainly determined by the world demand and its trade performance, with the latter being a result of its successfully maintained comparative advantage. These are supported by the results from the impulse analysis, that the trade balance is found to be affected largely by the world demand shock and trade balance shock, and exchange rate shock affects the trade balance with an undetermined pattern. The results from the variance decomposition analysis further confirm that the movement of China's trade balance against the US is attributed largely to the US output shock during the post unification period and even before, while the exchange rate effect does not contribute much. The exchange rate effect has becomes observable only when we look at the whole sample period with the US and also the trade balance with the rest of the world. The movement of the US output is attributed largely to its own shocks during the entire sample period, while China's trade balance and the exchange rate are found to be the predominant shocks accounting for the variability of the US output in 1994-2007. The movement of the world output is attributed largely to the world output shocks, but China's exchange rate shock is found to be increasingly effective on the fluctuation of the world output. The findings seems to suggest that, after about three-decade reform, the Chinese economic system has been gradually transformed towards a market-originated system under which economic agents have become responsive to market signals to allow changes in exchange rates to influence the trade balance, but the effect on China's balance of trade is still limited.

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REFERENCES

Bell, M.W., H.E. Khor and K. Kochhar. (1993), *China at the Threshold of a Market Economy*, IMF: Washington DC.

Brada, C.J., A. Kutan and S. Zhou. (1993), "China's Exchange Rate and the Balance of Trade", *Economics of Planning*, vol. 26, pp.229-242.

Blanchard, O.J. and D. Quah, (1989), "The Dynamic Effects of Aggregate Demand and Supply Disturbances," *American Economic Review*, 79, pp.655-673.

Chang, G. Hsin and Shao, Qin (2004), "How much is the Chinese currency undervalued? A quantitative estimation". *China Economic Review,* Vol. 15, No.3, pp.366-71..

Lardy, N. (2002), *Integrating China into the Global economy*, Washington, DC: Brookings Institution Press.

Lee, J. And M.D. Chinn, (2006), "Current Account and Real Exchange Rate Dynamics in the G7 Countries," *Journal of International Money and Finance*, 25, pp.257-274.

Naughton, Barry. (1996), "China's Emergence and Prospects as a Trading Nation," *Brookings Papers on Economic Activity* 2.

Roberts, I. and R. Tyers (2001), "China's Exchange Rate Policy: The Case For Greater Flexibility", *Working Papers in Economics and Econometrics* No. 389, Australian National University, January.

Sims, C.A. and T. Zha, (1999), "Error Bands for Impulse Responses," *Econometrica*, 67, pp.1113-1156.

Tung, C-Y and B. Sam, (2004), "RMB revaluation will serve China's self-interest". *China Economic Review,* Vol. 15, No.3, pp.331-335.

Wang, H. (1993), *China's Exports Since 1979*, NY: St. Martin's Press.

Zhang, F and Z.H. Pan, (2004), "Determination of China's long-run nominal exchange rate and official intervention", *China Economic Review,* Vol. 15, No.3, pp. 360-365.

Zhang, Z.Y. (1997), "China's Foreign Trade Reform and Export Performance", *Asian Profile*, Vol. 25, No. 3, pp. 177-192.

Zhang, Z.Y. (1999), "Foreign Exchange Reform, the Balance of Trade and Economic Growth: an Empirical Analysis for China", *Journal of Economic Development*, Vol. 24, No. 2, pp. 143-162.