The Economic Impact of the Chinese *Yuan* Revaluation

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Abstract

Since the beginning of the economic reform process in 1979, the Chinese currency (yuan) was devalued on many occasions until 1994 when the two-tier foreign exchange system was ended. While the official rate of yuan had been maintained constant over seven years since 1998, the pressure on the revaluation of yuan intensified. After years of speculation and hearsay, China finally revalued the RMB by 2.1% in July 2005.

There are arguments currently on how and to what extent the official rate of the yuan should be further revalued. However, due to a de facto real appreciation of the yuan relative to its neighbor countries since 1994, the competitiveness of China's exports has been reduced. It would be therefore very difficult for the Chinese authorities to allow the yuan to revalue considerably in the near future.

This paper attempts to offer a quantitative evaluation of several policy scenarios in reference to the yuan revaluation through simulating a multi-country macroeconometric model (the Fair Model). According to the results of the simulations, the revaluation of RMB would not be appealing to the Chinese. To some extent it would further reinforce the deflation, reduce the competitiveness of China's exports and the growth of GDP. As a result, some additional policies may need to be implemented to remove the adverse impact of the yuan revaluation.

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The Economic Impact of the Chinese *Yuan* Revaluation

1. Introduction

Since the economic reform started in 1979, the Chinese currency (*yuan*) had been devalued several times until 1994 when the two-tier foreign exchange system was ended. While the official rate of *yuan* had been maintained constant over seven years since 1998, the pressure on the revaluation of *yuan* intensified. It has been perceived by some economists that the *yuan* is undervalued on an order of 15 to 35% (Frankel 2006, Zhang and Pan, 2004, Chang and Shao, 2004, Goldstein and Lardy, 2003, among others).

After years of speculation and hearsay, China finally revalued the *yuan* by 2.1% in July 2005. While the currency remains effectively pegged to a basket of hard currencies, it is allowed to fluctuate against the US dollar (USD) by less than 0.3 per day in either direction. However, the issues on whether, when and to what extent the official rate of the *yuan* should be further revalued remain unsolved. Some American politicians, as the representatives of the manufacturers and labour unions, believe that the undervalued *yuan* is responsible for much of the U.S trade deficit (it reaches $800b in which about one fourth of it is with China), while other commentators, such as Tung and Baker (2004), and Frankel (2006) argue that further revaluation of the *yuan* serves China's own interest so a considerable revaluation is deadly needed.

Though the decision over *yuan* revaluation becomes more political when some "external" pressures from the USA, Japan and Europe intensified over the last two years, the Chinese authorities, nevertheless, are still reluctant to revalue the *yuan* further. They insist that China's banking system and financial institutions must be improved before floating the *yuan* is considered. This may also be due to a fear of losing further competitiveness in China's exports following a de facto appreciation of the *yuan* since 1997. The export sector has become more significant in keeping the economy to grow, particularly when the unemployment created by widespread layoffs from state owned enterprises and sustained deflation continue to develop. National sovereignty is another concern that the Chinese authorities have to consider, since conventionally they believe that the value of a country's currency is an internal issue so it should not be intervened by external pressures.

The Chinese official position nevertheless, is shared not only by most of the academics and business people in China, but also by some western scholars, including Robert Mundell and Joseph Stiglitz, two Nobel laureates in economics. Mundell maintains that "a big change of its exchange rate will cut down China's growth rate from 9% now to perhaps half of 9%," (*People's Daily, Feb. 13, 2006)*. Other adverse economic impact will include decrease in corporate profitability, deflation in the agricultural sector, an increase in unemployment, and less foreign

direct investment. Joseph Stiglitz (2005) also argues that the *yuan* revaluation will have little effect on the trade balance for the US and the global economy, since the gaps in reduced Chinese imports in the US could be easily filled by increased imports from other developing countries.

Based on this background, this paper has two objectives. Firstly, it attempts to test the Mundell-Stiglitz Hypothesis, i.e., the economic impact of *yuan* revaluation on China and its major trade partners including the USA, Japan and Australia is virtually negative. Secondly, it attempts to seek if there are some additional measures such as expansionary fiscal policies that could be used stimulatingly along with the *yuan* revaluation to remove some of the adverse impact of the revaluation on production and international trade. After simulating a multi-country macroeconometric model (the Fair model), some preliminary results are obtained. The results seem to suggest that China should not revalue the *yuan* considerably unless some effective fiscal and/or monetary policies are simultaneously arranged.

The rest of the paper is organized as follows. Section 2 reviews China's exchange rate policy in its post-reform era. This is followed by a brief discussion on the debates of *yuan* revaluation in Section 3. Section 4 presents the hypothetical perspectives of a 20% revaluation of the *yuan*. The argument for a significant revaluation of *yuan* is rejected for its negative impact on China and the rest of the world. Concluding remarks and the policy implications are summarized in the final section.

2. Reforms in the RMB Exchange Rate Regimes

Yuan, the Chinese currency, had been a non-convertible currency for more than 50 years until quite recently. China's road toward convertibility has involved a number of important reforms which have been implemented in a step-by-step manner. Table 1 shows the exchange rate of the RMB against the USD in the last decade. The nominal rate is deflated through by a consumer index for both countries.

When China assumed its seat on the Executive Board of the International Monetary Fund (IMF) in 1980, the official rate of was about 1.50 *yuan* per USD. Since then, although the authorities have classified the currency regime as a 'managed float', in reality exchange rate had not been uniform until 1994 (Roberts and Tyers, 2001). At the beginning of 1981, an internal settlement rate was introduced, at which all purchases of foreign exchange had to take place. From 1986 to 1994 three different rates were effective at the same time: the 'official' rate (an-oft-adjusted peg to the USD); 'swap' market rates (unofficial floating rates which the central bank occasionally adjusted through market intervention); and the 'effective' exchange rates actually faced by exporters (weighted averages of official and unofficial rates, see Roberts and Tyers, 2001). The apparent overvaluation of the official exchange rate during the 1980s, at least relative to the market-based exchange rates, was a source of concern to policymakers who recognized it as a tax on exports.

Table 1 Changes in the RMB Exchange Rate and Consumer Price index

Year	(1) Nominal Exchange rate	(2) Consumer Price Index (1994=100)	(3) yuan deflator (1)/(2)	(4) % change of (3)	(5) US Consumer Price index (1994=100)	(6) % change of (5)
	100 US Dollar		100 US Dollar			
1993	576.20					
1994	861.87	100.00	861.87		100.00	
1995	835.10	94.36	788.00	-8.57	102.83	2.83
1996	831.42	87.27	725.57	-7.24	105.87	3.04
1997	828.98	82.84	686.70	-4.51	108.30	2.43
1998	827.91	79.94	661.79	-2.89	109.99	1.69
1999	827.83	79.13	655.06	-0.78	112.42	2.43
2000	827.84	80.90	669.74	1.70	116.19	3.78
2001	827.70	81.14	671.63	0.22	119.50	3.31
2002	827.70	79.94	661.63	-1.16	121.39	1.89

Sources: data 1994-2001 from China Statistical Yearbook, 2002 and data 2002 from State Administration of Foreign Exchange (SAFE), 2003

Committed to improving the trade balance, the authorities intervened in the swap market and repeatedly devalued the official rate from 3.45 *yuan* per USD in 1986 to about 5.76 *yuan* per USD in 1993, and eventually unified the official and swap market exchange rates at the prevailing swap price at 8.62 *yuan* per USD in 1994. The rate was revalued to 8.27 *yuan* per USD by 1998, and stabilized at this level until July 2005. At 19:00 on July 21, 2005, the People's Bank of China announced a revaluation of the *yuan* by 2.1% and traded at a rate of 8.11 *yuan* for the USD.

The current exchange rate regime is based on market and is an administrable floating rate (Lu, 2004). The People’s Bank of China publishes daily the median rate of *yuan* against USD according to the transaction price prevailing in the inter-bank foreign exchange market the previous day. On the basis of this, the designated banks will then list their own exchange rates (Brahm and Li, 1996 :127, Lu, 1994). The reforms have already achieved a substantial breakthrough. The currency started to appreciate since the second half of 2005 and up to now the *yuan* rate has been depreciated to about 3%. Along with the officially permitted range of fluctuation of 0.3% per business day, the Chinese authority also announced that the *yuan* now 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.

3. The Arguments for and Against the RMB Revaluation

The future direction of the *yuan*, including the possibility of shifting towards a fully floating exchange regime, has attracted considerable international attention not only from policy makers and academics, but also from the business world. Lu (2004) describes the ways in which the Bank of China has managed to stabilize the *yuan* rate in order to maintain a strong export growth. This management, more commonly described as currency manipulation by some western commentators, is carried out through several measures including open market operation and some administrative interventions. The lawmakers in most of the advanced countries including the USA, Europe Union, Japan and some international institutions such as IMF and WTO present a particularly strong argument in favour of the revaluation. On paper, the case for a revaluation seems persuasive: China's foreign exchange reserves have swollen to $800 Billion, its annual trade surplus exceeds $100 Billion. Since it has been well perceived that the *yuan* is undervalued in a range of between 15 and 35% (Frankel 2006, Zhang and Pan, 2004, Chang and Shao, 2004, and Goldstein and Lardy 2003), Tung and Baker (2004) argued that the optimal currency adjustment is a one-time maxi revaluation of roughly 15% versus the USD to a new fixed rate. Zhang and Pan (2004) also estimate that the *yuan* would have appreciated by 15-22% in 2003 compared with 1996, if there had been no government intervention.

However, a case against the *yuan* revaluation has also emerged, particularly from the Chinese side. The Chinese authorities have argued that firstly the country's foreign reserves are largely a result of the "hot money", inflows of foreign capital hoping to instantaneously capitalize on a *yuan* revaluation, rather than long term foreign direct investment in capital projects. In addition, China's trade surplus is increasingly a story of slowing imports, rather than growing exports. As investment in fixed capacity has declined, so has the demand for equipment and machinery, much of which is imported. In addition, while China's trade surplus with the US exceeded $200 Billion in 2005, China runs a deficit with most other countries it trades with. Should the *yuan* be significantly revalued, China will face stronger competition from its Asian developing economies in the markets of North America, Europe and Japan, as well as in these economies themselves.

Ironically, the views presented by some American economists, including Mundell (2006) and Stiglitz (2005), are similar to the Chinese authorities who deny the necessity of rapid *yuan* revaluation. They believe that preconditions for the *yuan* to shift to a flexible exchange rate mechanism have not yet been met. Mundell in his online discussion in 13th February 2006 pointed out that a too sharp revaluation of *yuan* would even cause a financial crisis because the revaluation will speed up the deflation and lead to a fall in import price which brings more pressure on *yuan*. Other adverse impacts include the slow down in foreign direct investments, shrinkage in profit margin of the Chinese exports and an increase in the pressure of unemployment.

According to Mundell, a floating exchange rate system is not suitable for China, and giving up the fixed exchange rate system will bring long-term adverse impact to the country (http://www.china-embassy.org/eng/gyzg/t118399.htm). He thus suggests that the *yuan* should be fixed at 8 *yuan* per USD.

Mundell's prescription is based on the nature of rapid growing export sector and the significant role it played in creating employment and maintaining social stability in China. On the one hand, as the sixth largest trading nation in the world, the trade to GDP ratio in China has increased from 10% at the beginning of reforms in the 1980s to about 40% since the late 1990s, with a pace of double digit growth in exports for more than three decades. On the other hand, the unemployment rate, particularly in the state owned enterprises as a result of tremendous increase in the number of laid-off workers has been rising since the 1980s. The unemployment rate is estimated to be around 14% for urban permanent residents in 2002 (Giles, Park and Zhang, 2005), not even to mention the vast underemployment in the rural areas. Since the export sector which is mainly labour intensive absorbs a significant portion of the underemployment labourers from the rural areas, the decline in export growth as a result of *yuan* revaluation would increase labour underutilisation. This adverse impact can also be further magnified through possible capital flight hence enormous losses in China's foreign reserves when the RMB is appreciated.

The adverse impact of *yuan* revaluation intensifies as long as deflation is concerned. Since 1994 China has experienced a prolonged period of falling prices (Guerineau and Guiliamont Jeanneney 2005:337). Consumer price index in China had been trending down for years since 1994 (see Table 1). Deflation produces a lot of problems including shrinking investment and consumption, a rising jobless rate and mounting bad loans that could ruin banks. The Chinese deflation weakened current demands because consumers expecting further price declines may choose to defer consumption. Moreover, as the real cost of capital increases and returns decrease, investments are curbed.

In reference the conflict over trade balance between the US and China, Stiglitz (2005) has argued as follows

"A succession of revaluations, eliminates China's trade surplus will have little effect on the more important problem of global trade imbalances, and particularly on the US trade deficit. China's recent gains in textile sales … largely came at the expense of other developing countries. America will once again be buying from them, so that their total imports will be largely unchanged. … Unless domestic investment goes down or domestic savings go up, the trade deficit will persist, unabated."

In a textbook version of the international economics, as long as the Marshall-Lerner condition is met, a revaluation of a country's currency helps its trading partners to improve their trade balance. Nevertheless, as Stiglize has argued, the pure theoretical

setting of two country two goods model may not be good enough to explain a more complex real world in which all countries compete for a very diversified international market. The so-called Mundell- Stiglitz Hypothesis that a considerable revaluation of the RMB will have adverse impact on China and the rest of the world in general and will have virtually no effect on improving the Sino-US trade deficit in particular is tested in the next section.

4. Model, Scenarios and Results

The Model

In order to tackle the impact of the *yuan* revaluation and to test the Mundell-Stiglitz Hypothesis, a multi-country econometric model (MCU) of Ray Fair (2004) is used. In the MCU model, any changes in one or more exogenous variables in a country will make a difference between the projected dataset and its original dataset which is based on regressions of long term historical statistical data (1960-2005) for each variable and for each country. By running the MCU model, one thus could compare the two datasets and estimate the "net effect" of the proposed policy. A group of endogenous macroeconomic variables including GDP growth, inflation, consumption, investment, export, import and employment could be compared and analysed.

There are 39 countries in the MCU model in which up to 15 stochastic equations are estimated econometrically for each country. Including the 31 stochastic equations in US model, which is part of the MCU model, there are 363 stochastic equations and about 4500 variables in the overall model. Based on its estimation of values of the coefficients for all stochastic equations, the model allows its users to forecast some proposed policy changes such as revaluation or devaluation of a currency between 2005 and 2008. The exchange rate is defined as local currency per USD, so a decrease in the exchange rate is a revaluation against the dollar.

The scenarios

The effect of changing in the value of a country's currency, more commonly known as devaluation or revaluation under a fixed exchange rate regime is well documented in economic literature. When a country revalues its currency, the export price level will rise and the price of its imports will drop in terms of foreign currencies in international market. If the country is a price taker with respect to its exports, its export prices would just be increased by the same proportion as its currency revalued. Since the foreign demand for the country's exports is negatively related to the price of the exports, the increase in the price of the exports will lead to a decrease for the country's exports. Opposite event occurs for its imports simultaneously. The revaluation is thus contractive and deflationary: the level of exports falls, the level of imports rises, and the domestic price level decreases. This in turn, through the trade and price links of the MCU model, affects the production and international trade of all

other countries in the rest of the world.

The following experiments were chosen to simulate some of the prescriptions that economists have given. Since the nominal exchange rate of *yuan* in 2000 had been fixed at 8.27 per USD between 1998 and 2005, the *yuan* rate in 2000 is chosen as one of the exogenous variables that the model intend to shock. In the first experiment, it is assumed that the *yuan* is revalued by 20% in 2005 and the rate then is maintained at 6.62 *yuan* per USD for the rest of the years between 2005 and 2008. In the second experiment, it is assumed that along with the 20% revaluation of the *yuan*, there is an additional expansionary fiscal policy of increasing the government purchases by 25% implemented between 2005 and 2008 aiming at removing some of the adverse impact of the revaluation.

The Results

The first experiment reflects a scenario that accommodates most of the estimations on the degree of overvaluation of the *yuan*. When the model is solved, the net effect of the *yuan* revaluation is obtained from comparison in values between the projected change and the original data base. By using the same method, the impact on the Chinese economy and the rest of the world can also be identified quantitatively. To assess the international repercussion of the *yuan* revaluation, the three major trade partners of China, namely the USA, Japan and Australia, are chosen for comparison. The percentage change of five major macroeconomic variables, namely GDP, GDP price index (as a proxy of inflation), export, import and current account balance are reported in Table 2.

The adverse impact on production and trade in China is clearly shown in the table. There are significant drops in four of the five variables, namely GDP, the price level, export and import. The double digit decline in both GDP and price level would have had led China into a deep recession, if not an economic crisis. Surprisingly its current account increases dramatically, perhaps as a result of a significant increase in the foreign price of the Chinese exports (26% by average) when the *yuan* was revalued.

Nevertheless, the international repercussions are not as good as some might expect for the other countries in the rest of the world. There are only limited gains in GDP in the USA, Japan and Australia but both the exports and imports decreased in these countries for most years. As a result, the current account balance deteriorated in all three countries. This seems to support the Mundell- Stiglitz Hypothesis that the *yuan* revaluation does little to the Sino-US trade balance.

Table 2 The Impact of 20% Revaluation of the RMB (% change)*

	GDP	Price Index	Exports	Imports	Current account balance**
China					
2005	-11.78	-8.14	-21.43	-5.88	113
2006	-12.88	-14.92	-20.76	-10.54	181
2007	-12.43	-19.71	-19.91	-12.90	227
2008	-11.57	-22.86	-19.03	-13.60	250
USA					
2005	0.04	0.37	0.59	-1.05	3.54
2006	-0.19	0.80	0.15	-1.84	2.32
2007	-0.39	1.09	-0.20	-2.58	1.25
2008	-20.95	1.27	-0.49	-3.07	1.77
Japan					
2005	0.33	0.20	1.77	-0.63	-35.71
2006	0.23	0.47	0.29	-1.41	-478.61
2007	0.07	0.65	-0.81	-1.94	238.47
2008	-0.06	0.76	-1.50	-2.30	152.92
Australia					
2005	0.45	0.19	0.84	-0.63	3.43
2006	0.51	0.75	0.04	-0.89	6.50
2007	0.34	1.33	-0.40	-0.84	9.52
2008	0.18	1.82	-0.61	-0.82	8.06

Note: *The percentage change indicates a departure from the base dataset when the proposed scenario, i.e., a revaluation of the RMB by 20%, is incorporated into the model.

** Two of the countries (China and Japan) have a trade surplus and another two (USA and Australia) have a trade deficit. A positive figure in the current account therefore indicates an increase in the surplus (deficit) of the country involved

The second experiment attempts to examine the recommendations raised by some economists (including Mundell, 2006, Sun and Ma, 2004, among others) that a moderate revaluation would not the beneficial to the Chinese economy unless some expansionary fiscal and/or monetary policies are also implemented. This prescription is based the national account identity which shows that the decrease in net export as a result of domestic currency revaluation can be accommodated through the use of some expansionary fiscal or monetary policies. In practice, these policies are frequently used by almost all the governments in the world to promote economic growth, to maintain price stability and to create employment, particularly during the process of recessions.

An expansionary fiscal policy involves cutting tax rates or increasing government spending in an attempt to boost GDP (aggregate demand) growth and remove inflationary pressure. The increase in government spending could also stimulate imports and exports. Assuming the 20% revaluation of the *yuan* is accompanied by a 25% increase in government spending, the results of the second experimental scenario are reported in Table 3.

Table 3 The Impact of 20% Revaluation and 25% Increase in Government Spending on the Chinese Economy

Year	2005	2006	2007	2008
GDP	-7.06 (-11.78)	-8.28 (-12.88)	-8.21 (-12.43)	-7.68 (-11.57)
GDP Price index	-4.84 (-8.14)	-9.37 (-14.92)	-12.80 (19.71)	-15.13 (-22.96)
Consumption	-4.39 (-7.39)	-6.50 (-10.32)	-7.12 (-10.96)	-6.99 (-10.63)
Investment	-5.50 (-9.22)	-8.18 (12.92)	-9.00 (-13.77)	-8.86 (-13.4)
Exports	-21.41 (-21.43)	-20.71 (20.76)	-19.85 (-19.91)	-18.97 (-19.03)
Imports	-0.45 (-5.08)	-2.22 (-10.90)	-3.34 (-12.90)	-3.60 (-13.6)
Current account balance	40.10 (113.8)	61.48 (181.45)	78.66 (226.7)	83.81 (250.4)
US trade deficit	3.11 (3.54)	1.73 (2.32)	0.56 (1.25)	1.13 (1.77)
Australia trade deficit	1.30 (3.43)	3.58 (6.5)	6.95 (9.52)	5.52 (8.06)

Note: the figure shown in the brackets is the percentage changes obtained from the first scenario of a sole revaluation of *yuan* by 20%.

Careful examining Table 3 gives interesting results (the percentage changes obtained from the first scenario of a sole revaluation of *yuan* by 20% are shown in the brackets). Firstly, the accommodation of an expansionary fiscal policy along with a considerable once-off revaluation would indeed remove some of the negative impact. As a result, China should still achieve some positive economic growth if one assumes that 9% annual growth rate is the normal pace of growth in China. Secondly, the deflation pressure would be also alleviated somewhat from an unacceptable double digit level in the sole revaluation scenario to a single digit level in the revaluation cum fiscal policy scenario for the first two years following the revaluation. More interestingly, the trade deficits in both the USA and Australia could be reduced greatly as compared with the scenario of a sole revaluation, since the expansionary fiscal policy will boost aggregate demand including exports from these two countries.

7. Conclusion

This paper tackles the issue of economic impact of an RMB revaluation on China and its major trade partners in the rest of the world. The results of experiments conducted using a simple macroeconometric model (Fair Model) seem to support the Mundell-Stiglitz contention that a significant revaluation of the *yuan* brings adverse economic

impact not only to the Chinese economy but also to the rest of the world. According to the results of the simulations, the revaluation of *yuan* would not be appealing to the Chinese. To some extent it would further reinforce the deflation, reduce the competitiveness of China's exports and the growth of GDP.
As a result, some additional policies, such as an expansionary fiscal policy may need to be undertaken simultaneously to remove some of the adverse impacts of the *yuan* revaluation, should the revaluation be inevitable in the near future.

Though with robust results, the conclusion generated from the experiments should be accepted with great caution. This is because firstly the data, variables and equations are relatively limited for the non-US countries, particularly for China in the MCU model, as compared with those used in the US model. This may lead to over-estimation of the price link effect. Secondly, in order to tackle the issues of the net impact of a maxi revaluation of *yuan*, the assumed revaluation of 20% is somewhat exaggerated. Although there are a certain degree of limitations in this research, it has rejected a considerable maxi revaluation that, as the paper has shown, would do more harm than good to the Chinese economy as well as the rest of the world. This does not, nevertheless, exclude a feasibility of a gradual and moderate revaluation of less than 10% in a period of three years, or 4% per year over a decade (Frankel, 2006:20) if the Chinese authorities have determined to make the *yuan* a convertible currency in the future.

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