Renminbi Exchange Rates and Relevant Institutional Factors

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In recent years, China has experienced rapid social and economic development. Against this backdrop, growing pressure for renminbi appreciation emerged and China's trade surplus and foreign reserves increased rapidly. This article explains the development of the RMB exchange rate by examining productivity growth and institutional factors, such as the transformation of the foreign exchange rate system and legal reforms to strengthen the rule of law.

Development of the Renminbi Exchange Rate

On January 1, 1994, China unified the "dual" exchange rate regime into a single one. The official rate before January 1, 1994 was 5.8 RMB per USD and 8.7 RMB per USD after exchange rate unification. Some observers argued that China depreciated the RMB by 40 percent in 1994. However, that argument is a misconception.

Before 1994, China was still under the "dual" exchange rate regime, under which 80 percent of the foreign exchange trading volume was at the market rate, and only 20 percent at the official rate. The 8.7 RMB per USD rate was basically the market rate at the end of 1993. During 1993, the supply of foreign exchange mainly consisted of two sources: (1) joint-venture firms that were allowed to retain their foreign exchange, and (2) domestic export companies that had excess foreign exchange retained under the foreign exchange

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retention system. Under the "dual" exchange rate regime, if a firm needed foreign exchange to import, it could obtain foreign exchange through three channels: (1) buy foreign exchange at the market rate, (2) buy a quota from the market and use the quota to purchase foreign exchange at the official rate, and (3) apply for a quota from the State Administration of Foreign Exchange (SAFE) and use the quota to buy foreign exchange at the official rate. The price of a quota was roughly the difference between the official and the market rates. My estimation is that the weighted average of the RMB exchange rate depreciated by 4 percent vis-à-vis the dollar in 1993, compared with the 8.7 RMB per USD as the starting rate of the new regime at the beginning of 1994 (Table 1). The trade surplus in 1994 was very modest, only $5.4 billion. And the trade surplus for 1995–2004 was fairly stable, indicating that the RMB/USD exchange rate was close to its equilibrium level. The appreciation pressure afterward was partly driven by the productivity gains and the institutional reasons explained in this article, and partly by the weakening of U.S. dollar, especially since 2002.

Since 1994, China has been promoting market-oriented reform of the RMB exchange rate mechanism. Three stages can be delineated:

1. 1994–96: a single and managed floating exchange rate regime based on market supply and demand. During this period, the nominal RMB/USD exchange rate rose by nearly 5 percent.
2. 1997–2005: after the 1997–98 Asian financial crisis China maintained a stable exchange rate at 8.28 RMB per USD.
3. July 2005–present: China reformed the RMB exchange rate regime by moving to a managed float based on market supply and demand with reference to a basket of currencies. The new system features and expanded floating band, an improved spot rate formation mechanism, the establishment of a forward market, reformed open market operations, and a more market-oriented foreign exchange management mechanism.

From July 21, 2005, to the end of November 2007, the RMB appreciated by a total of 12 percent against the USD. According to the Bank for International Settlements, the nominal effective exchange rate index for the RMB increased by 40.9 percent from January 1994 to February 2002, decreased by 13.1 percent from February 2002 to July 2005, and rose again by 2.1 percent from July

TABLE 1
RMB Depreciation vis-à-vis the U.S. Dollar, 1993–94

	Official Rate RMB/USD	Market Rate RMB/USD	Weighted Average Rate* RMB/USD
1993.01	5.22	7.00	6.64
1993.02	5.22	8.34	7.72
1993.03	5.22	8.20	7.60
1993.04	5.70	8.20	7.70
1993.05	5.70	8.20	7.70
1993.06	5.70	10.07	9.20
1993.07	5.70	11.20	10.10
1993.08	5.70	10.70	9.70
1993.09	5.70	10.00	9.14
1993.10	5.70	9.00	8.34
1993.11	5.80	8.90	8.28
1993.12	5.80	8.70	8.12
1993 Average	5.60	9.04	8.35
1994 Regime Change			8.70
Change in Exchange Rate (%)	–35.67	3.94	–3.98

*The official rate is weighted at 20 percent and the market rate at 80 percent.
Source: State Administration of Foreign Exchange.

2005 to November 2007. The real effective exchange rate index for the RMB rose by 58 percent from January 1994 to February 2002, decreased by 16.5 percent from February 2002 to July 2005, and then rose by 6.6 percent from July 2005 to November 2007.

Exchange Rate: Theory and Application in China

The exchange rate is the relative price of two currencies, reflecting the relative prices of factors, assets, and all products in two countries.

A country can choose between a fixed or flexible foreign exchange rate regime; and the selection, in turn, affects the effectiveness of monetary and other macroeconomic policies.

Key theories related to the exchange rate regime include the "dualistic conflict" and the "impossible triangle." The former, as explained in the Mundell-Fleming model under the assumption of free capital flows, demonstrated that monetary policy is ineffective in a fixed exchange rate arrangement, but effective under a floating arrangement. That is, the independence of monetary policy conflicts with the fixed exchange rate regime, and you can have only one of them. The theory of the "impossible triangle" (Obstfeld and Taylor 1998) expanded the Mundell-Fleming model, and showed that a government can only select two out of the following three goals: an independent monetary policy, a fixed exchange rate, and capital mobility.

However, neither theory can explain any other combination except for the extreme ("corner solution") cases of these three elements, which can be applied to the current situation in China. Yi Gang and Tang Xuan (2001) developed a more general theory of the "expanded triangle," and argued "an economy shall opt for different exchange rate systems in different stages." In cases of insignificant capital flows and less-developed derivative markets, an "intermediate" solution can help economic entities manage exchange rate risks. However, in case of large-scale capital flows and developed derivative products, a country has to take speculative attacks in addition to exchange rate risks into consideration. When an intermediary arrangement is adopted, the subsequent moral hazard and confidence crisis may turn out to be the root causes of monetary crisis. Therefore, after the free flow of capital is achieved, the exchange rate system will acquire added flexibility or turn into a currency coalition. Eventually, the "corner solution" will prevail.

A large economy like China cannot give up the independence of monetary policy. Therefore, China has to choose between a fixed exchange rate and the free flow of capital; in a sense, it has to choose between stability and efficiency (Yi 2000). Over the long run, China is bound to have a free flow of capital and a floating exchange rate regime.

Labor Productivity and Total Factor Productivity Changes

A number of factors have contributed to the fluctuation of RMB exchange rates. These factors include, among others, labor productivity and total factor productivity.

China has maintained an average annual GDP growth rate of 9.7 percent from 1978 to 2006, and the rate has exceeded 10 percent since 2003. The key contributing factors are enhanced labor productivity and total factor productivity. Such enhancements are at the core for China's increased competitiveness and are the most important contributing factors for the evolvement of China's macroeconomic policies, trade surplus, and foreign exchange reserves.

Labor Productivity

China's labor productivity (total output per worker) has skyrocketed from 1,586 RMB per worker in 1990 to 5,747 in 2005, resulting in an annual average growth rate of 8.96 percent (Table 2). This increase is largely due to rapid urbanization during which rural workers have enhanced their human capital with better education and

TABLE 2
Labor Productivity, 1990–2005

	GDP (RMB billion, based on fixed price in 1978)	Employment (Millions)	Labor Productivity (RMB billion, based on fixed price in 1978)	Labor Productivity (Annual growth rate, %)
1990	1,026.85	647.49	1,585.90	—
1991	1,121.26	654.91	1,712.09	7.96
1995	1,830.98	680.65	2,690.05	9.94
1998	2,373.75	706.37	3,360.50	6.59
1999	2,554.92	713.94	3,578.62	6.49
2000	2,769.99	720.85	3,842.67	7.38
2001	3,000.00	730.25	4,108.18	6.91
2002	3,272.66	737.40	4,438.11	8.03
2003	3,600.73	744.32	4,837.61	9.00
2004	3,963.79	752.00	5,271.00	8.96
2005	4,357.84	758.25	5,747.23	9.03
Average growth rate of labor productivity from 1990 to 2005				8.96

Source: CEIC.

new perceptions. Urbanization has also upgraded China's industrial structure and technology.

Total Factor Productivity

China's total factor productivity (TFP) has also increased (Table 3) because of significant improvements in incentive mechanisms and management. The annual growth rate of China's TFP was about 2.14 percent from 1979 to 1999, but fell to 1.22 percent during 2000 to 2005. The slowdown in the growth rate reflected rapid investment

TABLE 3
Total Factor Productivity (1990–2005)

	GDP Growth Rate (%)	TFP Growth Rate (%)	TFP index (1978 = 100)
1990	9.19	–5.82	112.66
1991	14.24	4.79	118.18
1995	10.93	3.42	147.53
1996	10.01	2.61	151.43
1997	9.28	2.10	154.65
1998	7.83	0.30	155.11
1999	7.63	0.54	155.95
2000	8.42	1.59	158.44
2001	8.30	1.13	160.23
2002	9.09	1.26	162.27
2003	10.02	0.99	163.89
2004	10.08	1.30	166.04
2005	10.24	1.03	167.75

Source: Research Bureau, People's Bank of China.

and capital formation in China after 2000, which increased the portion of output explained by capital and thereby reduced the remaining portion. Until recently the total rate of return on capital was about 20 percent per year (Bai, Hsieh, and Qian 2006: 27).

Institutional Factors

In examining prices and exchange rates in all countries, we observe that the currencies of most developing countries have been undervalued in terms of purchasing power parity—that is, a PPP discount exists for developing countries. However, PPP does not have a strong explanatory power on exchange rate movements for rather complicated reasons. Among the reasons for such a discount, I would like to emphasize the legal and judicial system—such as property rights protection, social order and security issues, education level, and the environment. Those factors, in addition to commodity quality, currency convertibility, tariffs, and transportation costs, help to explain the PPP discount of a developing country.

China has stepped into the global economic limelight in recent years chiefly because of institutional factors. These include (1) implementation of reform and opening-up policies over the past three decades, (2) establishment of a market-oriented economy system, (3) launch of a scientific development principle and adherence to the idea of a harmonious society, (4) greater respect for the rule of law and intellectual property rights, and (5) promotion of energy conservation and environment protection. All these endeavors have transformed the world's perception of China, and thus enhanced the value of Chinese products, real estate, and human resources. In short, Chinese assets and products are becoming more and more valuable as a result of significant institutional changes.

At present, the costs of Chinese labor and raw materials are relatively low, Chinese commodities are available in good quality and low prices, and assets in China are likely to appreciate. Therefore, the rest of the world has an enormous demand for Chinese products. Such demands have led to China's surging trade surpluses, high rates of investment, more than $1.6 trillion of foreign exchange reserves, and relatively fast growth of money and credit. All these factors have resulted in market disequilibria.

The Effective RMB Exchange Rate Is Adjusting

As many have noted, the effective RMB exchange rate is on the low side. Yet, I have reason to believe that the RMB exchange rate is moving toward equilibrium.

China has already integrated itself into the world economy, and the foreign exchange rate will adjust. During the last decade, certain adjustments were already made to adjust the real exchange rate through price-level increases (inflation) and appreciation of the nominal exchange rate. Either of those two means can correct the disequilibrium. They differ in that the exchange rate and price level are macro variables reflecting the relative prices among nations, while the prices of individual commodities reflect the parity variations among various kinds of commodities within a country. Price adjustments are sticky. In an economic system in which the market determines exchange rates, fast adjustments to disequilibrium occur more often than not. Using the exchange rate mechanism to achieve external balance avoids the danger of inflation, and is less costly than trying to adjust the general level of prices.

Price Adjustments: Rising Prices of Factors and Assets

Mundell, McKinnon, and Scandinavian models predict that when wages grow in line with labor productivity or total factor productivity, stable exchange rates will be maintained. In the last 10 years, except for relatively low CPI inflation, most factor and asset prices have increased at a fast pace. From 1997 to 2005, the average real wage of Chinese employees rose by nearly 11 percent per year. During the same period, wage growth in the United States and Europe was only 2–3 percent per year. Moreover, prices of raw materials, energy, and real estate in China have all increased significantly in recent years. From 2003 to 2006, the overall purchasing price indexes of raw materials, fuel, and power rose by 32.6 percent, and in 35 medium and large Chinese cities, average real estate prices have escalated by more than 5 percent per year. These price increases have pushed the real effective exchange rate closer toward equilibrium.

Excess Liquidity and Pricing Adjustments

In early 2003, the People's Bank of China found that the growth of liquidity was relatively high and began to issue central bank notes and also increased the required reserve ratio. From 2003 to 2007, China's foreign exchange reserves expanded by roughly $1 trillion. To prevent inflation, the PBOC issued a large amount of central bank notes, which sterilized the increase in the monetary base due to the

purchase of foreign exchange to maintain the nominal exchange rate at the desired level. During the period, the central bank increased the required reserve ratio 15 times, by a total of 8.5 percentage points, and mopped up about 3.4 trillion RMB from the market. By the end of 2007, outstanding central bank bills totaled 3.9 trillion RMB. In total, the PBOC sterilized more than 7 trillion RMB of base money through increasing the required reserve ratio and issuing central bank notes. From 2003 to 2007, the demand for base money amounted to over 2 trillion RMB. Thus, the PBOC has mostly sterilized the redundant liquidity. In contrast to some reports, the current level of excess liquidity is not severe.

It is necessary to keep the RMB exchange rate at a rational and equilibrium level. However, there is no free lunch. Given plenty of liquidity, the price adjustment process will be accelerated, thus bringing the economy close to equilibrium. This is the virtual connotation of the "dualistic conflict" between implementation of an independent monetary policy and maintenance of fixed exchange rates.

Conclusion

The RMB exchange rate is an economic issue. The best way to bring about an equilibrium exchange rate is further reform. Constructive dialogue will help speed up the reform process and make the convergence to a new equilibrium smoother. However, it should be noted that it takes time to establish an efficient market. From a very preliminary foreign exchange spot market, which mainly traded through the centralized automatic-matching system, China has developed a multi-tiered foreign exchange market since July 2005, including the OTC spot, forward, swap, and other derivative markets. The development of these markets has enabled financial institutions, firms, and households to adapt to exchange rate fluctuations and hedge exchange rate risks. Exchange rate adjustment is only one factor to correct the global imbalance. From the experience of Japan and Germany, the trade surplus remained even after a significant appreciation of the yen and deutsche mark. So besides the exchange rate adjustment, structural adjustments are even more important.

To move toward equilibrium, coordinated policy measures are needed for structural adjustment. To resolve China's large trade surplus and restore external balance, measures are required for promot-

ing domestic demand, increasing imports, investing abroad, and accelerating urbanization—in addition to currency appreciation. In fact, many measures can generate impacts similar to currency appreciation, such as imposing environment protection requirements, enhancing labor standards, strengthening labor protection, and upgrading the judiciary system. All these measures mean higher costs, lower competitiveness, and a reduced trade surplus, which will move the economy toward equilibrium. Also, it is important to recognize that it will take time for these measures to bring about structural changes. Policymakers in Washington and elsewhere should therefore be patient as China makes its way toward a full-pledged foreign exchange market.

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