An Analysis of the Appreciation of the Chinese Renminbi
Through the Lens of the the Nixon Shock, the Plaza Accord,
and the Japanese Yen

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Abstract

China’s currency policy has been one of the most hotly debated subjects in the United States (U.S.) over the past decade. U.S. citizens commonly believe that the peg of the renminbi (RMB) to the U.S. dollar (USD) causes Chinese employment and exports to boom at the expense of the U.S. export industry and its workers. China today faces criticisms similar to those faced by Japan as many as fifty years ago, when the yen (JPY) widely was considered undervalued against the USD. Our analysis will use a handful of models and empirical evidence from the Japanese experience with the appreciation of the JPY since 1971. In particular, we will focus on the Nixon Shock in 1971 and the Plaza Accord in 1985 to discuss the dangers posed by the appreciation of a creditor country’s currency. We will examine key ways in which the past Japanese economy was similar and dissimilar to the more recent Chinese economy to determine which of our findings related to the appreciation of the JPY are applicable to that of the RMB. We will end with a study of the international USD standard, and will propose policy solutions to the global imbalances discussed in earlier sections.

Acknowledgements: Professor Ronald I. McKinnon
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1 Introduction

Over the past decade, China has powered ahead to the global economic forefront. As of 2010, China accounted for roughly 8% of global gross domestic product (GDP), and replaced Japan as the world’s second-largest economy. Chinese economic activity surpassing that of Japan is ironic, given the striking similarities between China today and the Land of the Rising Sun three decades ago.

Under the Bretton Woods system, the Japanese yen (JPY) was pegged to the United States (U.S.) dollar (USD) after World War II (WWII), much like the Chinese renminbi (RMB) was fixed against the USD from mid-1995 until mid-2005 and off and on thereafter. Japanese real GDP grew at an average annual pace of about 9.5% from 1950 to 1971, the year the Bretton Woods system ended, compared to Chinese real GDP, which grew at an average annual pace of 10.0% from 1990 to 2011. The 21-year economic booms in both past Japan and recent China* were due largely to their fast-growing export and manufacturing industries (Davies, 2011).

However, after the Nixon Shock and the termination of the Bretton Woods agreement in 1971, the JPY began to float and appreciated against the USD. In 1974, the Japanese economy briefly contracted for the first time in two decades, and manufacturing wage growth subsequently collapsed. The Japanese economy recovered and grew consistently during the rest of the 1970s and the 1980s. On September 22, 1985, global government officials signed the Plaza Accord agreement, coordinating the appreciation of the JPY by more than 50% against the USD from 1985 to 1987, in an attempt to reduce the current account surplus of Japan and the current account deficit of the U.S. Around 1990, the Japanese economy crashed, and domestic officials have been battling slow growth and chronic deflation ever since.

* From herein, past Japan refers to the Japanese economy from 1950 to 2011, and recent China refers to the Chinese economy from 1990 to 2011.
As seen in Japan over the past twenty years, the dangers of currency revaluations are serious. Not only can economic growth slow, but also traditional monetary policy can be rendered ineffective, as interest rates are driven to the zero lower bound. The combination is perilous, because economic growth stagnates, prices fall, and central banks are left without traditional methods of stimulating their economies. The results of our analysis will show that Chinese policymakers should be concerned not only about the economic drawbacks of a RMB revaluation, but also the loss of the effectiveness of traditional monetary policy tools. In other words, a sudden RMB appreciation likely would lead the Chinese economy to a fate similar to the Lost Decade, or arguably the Lost Decades, in Japan.

Today, many global government representatives, especially U.S. policymakers, are calling on China to allow the RMB to appreciate in a manner similar to how Japanese officials permitted the JPY to be revalued in 1985. U.S. politicians recently have blamed their country’s shrinking manufacturing sector and high unemployment on China the “currency manipulator” (Bergsten, 2007). Numerous economists, especially those from the U.S., maintain that the RMB is undervalued, and therefore provides China’s export industry an unfair advantage over its foreign competitors. Such rhetoric has inspired some academics to search for a definitive answer to the question: How undervalued is the RMB? But as more and more researchers are discovering, the answer to the hotly debated topic of the RMB’s ‘true’ value is not obvious. Depending on the methodology used, the RMB may be anywhere from undervalued by as much as 40% to overvalued by a small amount (Yin-Wong et al., 2005 and 2006).
Our objective is not to determine the seemingly incalculable RMB’s ‘true’ value, but rather to analyze whether China should allow the RMB to appreciate. In our analysis, we employ the appreciation of the JPY, focusing on the Nixon Shock and the Plaza Accord, as a proxy for what policymakers should expect if the RMB is revalued. As McKinnon and Schnabl have argued in the past (2006a, 2006b, 2006, and 2007), there are many similarities between Japan’s relationship with the U.S. post-WWII and China’s relationship with the U.S since 1990. Both the past Japanese and recent Chinese economies are export-based, fast-growing, and log chronic current account surpluses, in contrast to the U.S. economy, which is consumption-based, relatively slower growing, and logs a chronic current account deficit.

At the same time, there are key differences between past Japan and recent China. I will focus on one important difference, particularly the present Chinese economy being more open than the past Japanese one. The difference in openness between the two current account surplus countries is essential to note, because changes in productivity more closely resemble changes in wages in the service sectors of more open economies. Through the use of a handful of models that relate changes in exchange rates to changes in macroeconomic variables, as well as empirical evidence, we will demonstrate that Chinese policymakers would be wise to heed the Japanese experience with the appreciation of the JPY and to resist U.S. calls for the revaluation of the RMB. To conclude, we will evaluate the success of the USD as the center of the global monetary system since WWII, and propose global central bankers adopt specific policies to reduce some of the monetary and trade imbalances in the world economy.
2 Price and Productivity Consequences of an Appreciation of a Creditor Economy’s Currency

To examine the domestic economic effects of the appreciation of the currency of a creditor economy with a trade surplus, we employ a number of models that are similar on a big picture level, but vary regarding the specifics of their applications. The models we utilize relate movements in exchange rates to changes in prices, including living costs, labor costs, and borrowing costs. While the models we use illustrate the relationship between exchange rates and prices, they do not accept Meade’s idea that exchange rates predictably relate to changes in economic activity, particularly trade balances (Meade, 1951). Such models were more applicable before the fall of the Bretton Woods System, when economies were more insular due to the greater prevalence of capital controls and less global money flows. Upon later examination of price level and trade data from past Japan and recent China, we will see that our models are representative of the impacts of exchange rate movements in practice.

2.1 The Scandinavian Model of Inflation

Our first model is the Scandinavian model of wage adjustment (Scandinavian model), which originally was used by Lindbeck (1979), and later employed by McKinnon and Ohno (1997) and Fernholz (2004) to explain how exchange rate swings and productivity changes affect an economy’s price level. The Scandinavian model assumes a cost-accommodating economy, meaning the supply side, and not the demand side, influences domestic prices. Specifically, the Scandinavian model relates changes in exchange rates and productivity to changes in the prices of tradable and non-tradable products and wages in the tradable and non-tradable industries.
Tradable products generally are defined as manufactures and commodities, such as mining and agricultural outputs, are made by industries facing foreign competition, and often are standardized. On the other hand, non-tradable products generally are defined as services, such as haircuts and construction, and do not face foreign competition. The Scandinavian model assumes the existence of perfect arbitrage opportunities, or the law of one price, for tradable goods around the world via the equation:

\[ p_t = p_w e, \]  

(2.1)

where \((p_t)\) is the domestic price of tradable goods, \((p_w)\) is the world price of tradable goods, and \((e)\) is the exchange rate of the domestic currency in terms of the foreign currency. Hence, an appreciation of the domestic currency decreases both the exchange rate \((e)\) and the domestic price of tradable goods \((p_t)\). In addition, an increase in the global price of tradable goods \((p_w)\) increases the domestic price of tradable goods \((p_t)\). On the other hand, an increase in the domestic price of tradable goods \((p_t)\) does not affect the world price of tradable goods \((p_w)\), but rather causes a depreciation of the domestic currency. Notice how global tradable prices \((p_w)\) influence domestic ones \((p_t)\), but not vice versa.

Since the mid-1940s, when the Bretton Woods agreement was signed in the aftermath of WWII, the USD has been the global reserve currency. The USD’s role as the most commonly used currency in international trade facilitated the growth of the U.S. into the largest player in global commerce. Due to the dominant role of the USD in international trade in the cases of past Japan and recent China, we assume the price level of the world refers to that of the U.S. In other words, the price level in the U.S. acts as the world’s nominal anchor. We include a more detailed
discussion of the global USD standard in Section (5), but identifying the role the U.S. plays as the center country in the global monetary system will suffice for now.

Taking the natural logarithms of both sides of Equation (2.1), we have $\ln p_t = \ln p_w + \ln e$, which we approximate as:

$$\frac{\Delta p_t}{p_t} = \frac{\Delta p_w}{p_w} + \frac{\Delta e}{e}. \quad (2.2)$$

We derive our approximation for tradable industry wage changes in a similar manner, starting with the equation $w_t = p_t Q_t / L_t$, where ($w_t$) are tradable industry wages, ($Q_t$) is value added, and ($L_t$) is labor input. Assuming constant factor income shares in the production of tradable goods, we can replace ($Q_t / L_t$) with ($q_t$), which we define as the productivity of labor in the tradable sector. Taking the natural logarithms of both sides, our equation becomes $\ln w_t = \ln p_t + \ln q_t$, which we approximate as:

$$\frac{\Delta w_t}{w_t} = \frac{\Delta p_t}{p_t} + \frac{\Delta q_t}{q_t}. \quad (2.3)$$

Note that based upon Equations (2.2) and (2.3), wages actually can fall, which seemingly contradicts the traditional notion that wages are sticky. However, we later show empirically that industries with high rates of productivity growth in current account surplus countries are vulnerable to wage stagnation and decline when the domestic currency appreciates. On the other hand, wages are relatively sticky in economies, such as the U.S., whose rates of productivity growth are comparatively low. Wage flexibility according to productivity growth rates promotes a balance of international competitiveness, particularly when exchange rates are fixed, as we will discuss more in depth later.

A key assumption of the Scandinavian model, which draws its name from Lindbeck's study of the Swedish economy, is labor market homogeneity. For Sweden, Lindbeck justified
labor market homogeneity via the bargaining practices of labor unions, which acted in solidarity to negotiate wages. For example, if tradable sector wages rose, then unions in the non-tradable sector would bargain collectively until their wages rose by a comparable amount. Although neither past Japan nor recent China was heavily unionized, our later examination of wage data will demonstrate that labor market homogeneity is an empirically valid assumption for both economies. Therefore, we assume that changes in tradable sector wages equal changes in non-tradable sector wages ($\Delta w_t/w_t$):

$$\Delta w_t/w_t = \Delta w_n/w_n.$$  \hfill (2.4)

Unlike in the tradable sector, relative price changes in the non-tradable sector are unaffected by international trade arbitrage opportunities. As such, the Scandinavian model assumes the non-tradable price level is determined solely by the production function, in which we also assume constant factor income shares. Similar to our derivation of Equation (2.3), we arrive at:

$$\Delta p_n/p_n = \Delta w_n/w_n - \Delta q_n/q_n,$$ \hfill (2.5)

and substituting Equations (2.1), (2.2), and (2.3) into (2.5) yields:

$$\Delta p_n/p_n = \Delta p_w/p_w + \Delta e/e + \Delta q_t/q_t - \Delta q_n/q_n.$$  \hfill (2.6)

Given our assumptions, mainly constant factor income shares of production and labor market homogeneity, we assert that the relative change in the domestic price level of non-tradable goods is a function of the relative changes in the world price of tradable goods, the exchange rate, and labor productivities in the domestic tradable and non-tradable sectors.

Now that we have expressions for the price levels of tradable and non-tradable goods, we derive an equation for the domestic price level $p$. We let $\alpha$ be the weight of tradable goods in $p$. 
We assume the weights of tradable and non-tradable goods in $p$ sum to one, and therefore, we have:

$$\Delta p/p = \alpha(\Delta p_t/p_t) + (1-\alpha)(\Delta p_n/p_n), \tag{2.7}$$

which via the substitution of the tradable and non-tradable price terms with Equations (2.2) and (2.6) becomes:

$$\Delta p/p = \Delta p_w/p_w + \Delta e/e + (1-\alpha)(\Delta q_t/q_t - \Delta q_n/q_n). \tag{2.8}$$

Equation (2.8) is the model we will employ to analyze price level and wage changes in past Japan and recent China. Treating all variables on the right hand side of the equation as exogenous, and assuming that productivity in the tradable sector is greater than that in the non-tradable sector, or that $q_t > q_n$, we will draw specific conclusions from our model that apply to the past Japanese and recent Chinese economies. As we will discuss in depth later, the international competition that incentivizes tradable industries to increase productivity does not face non-tradable industries, justifying the assumption that $q_t > q_n$.

From Equation (2.8), we see that three key inputs affect domestic price level changes. First, increases in the world price of tradable goods result in a one-for-one increase in the domestic price level, which includes tradable and non-tradable goods. Although a one-for-one increase in the global price of tradable goods and the domestic price of non-tradable goods may seem counterintuitive, recall that tradable goods prices increase tradable sector wages one-for-one. And when tradable sector wages rise, non-tradable sector wages climb by the same amount due to labor market homogeneity, or union collective bargaining practices.

Second, an appreciation of the domestic currency, or a decrease in $(e)$, causes the domestic price level to fall. The first sets of data we examine will be from periods when the
Japanese yen (JPY) and the Chinese RMB were fixed to the USD. Therefore, when examining our first sets of statistics, we assume $\Delta e/e = 0$, or that changes in the domestic prices of tradable goods in Japan and China converged to changes in the prices of tradable goods in the U.S., as we will demonstrate momentarily. Later, we will examine economic data from past Japan and recent China during periods when the JPY and the RMB were strengthening. In such cases, $\Delta e/e < 0$, and as we alluded to earlier, expected changes in the exchange rate also affect cross-border capital flows. Cross-border capital flows impact the domestic price level, and usually cause the effect of changes in the level of the exchange rate to materialize with a lag.

Third, a difference in productivity between the tradable and non-tradable sectors of the economy increases domestic prices. A productivity difference across tradable and non-tradable industries raises the domestic price level, because workers in the lower-productivity sectors demand to be compensated at the higher wages of the higher-productivity sectors. The increase in wages in the non-tradable sector feeds one-for-one into the prices of non-tradable goods and into the domestic price level, despite slower productivity growth in the non-tradable sector. Thus, the Scandinavian model of inflation often is called the Balassa-Samuelson effect in time series, because Lindbeck’s theory explains how productivity differences across industries affect the domestic price level across time.

2.2 Incorporation of Expectations into the Scandinavian Model

One phenomenon that falls outside the realm of the Scandinavian model is the divergence between productivity growth and wage growth evident in Japan since the mid-1970s and China from 2006 to 2009. Revisiting Equations (2.3) and (2.4), we see that an increase (decrease) in
productivity in the tradable sector should result in a one-for-one increase (decrease) in the wages of both tradable and non-tradable workers. Such a one-for-one relationship between productivity and wage growth is ideal, because it maintains a competitive balance of unit labor costs between countries with relatively high productivity growth, like past Japan and recent China, and countries with relatively low productivity growth, like the U.S. But as we observe in practice, such a one-for-one relationship between productivity and wage growth does not always hold, and competitive imbalances can ensue (see Tables 2.1 and 2.2).

What causes the one-for-one relationship between productivity and wage growth to break down in practice? A shortcoming of the Scandinavian model is that it does not account for expected changes in exchange rates. Per Equations (2.2) and (2.3), the Scandinavian model recognizes that present exchange rate changes have a one-for-one impact on the tradable price.

<table>
<thead>
<tr>
<th>Statistic</th>
<th>U.S.</th>
<th>Japan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wholesale Prices</td>
<td>1.63</td>
<td>0.69a</td>
</tr>
<tr>
<td>Money Wages</td>
<td>4.52</td>
<td>10.00</td>
</tr>
<tr>
<td>Consumer Prices</td>
<td>2.53</td>
<td>5.01</td>
</tr>
<tr>
<td>Industrial Production</td>
<td>4.40</td>
<td>14.56</td>
</tr>
<tr>
<td>Real GDP</td>
<td>3.84</td>
<td>9.45a</td>
</tr>
<tr>
<td>Nominal GDP</td>
<td>6.79</td>
<td>14.52a</td>
</tr>
<tr>
<td>Narrow Money</td>
<td>3.94</td>
<td>16.10b</td>
</tr>
<tr>
<td>Labor Productivity</td>
<td>2.55</td>
<td>8.92c</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Statistic</th>
<th>U.S.</th>
<th>China</th>
</tr>
</thead>
<tbody>
<tr>
<td>Producer Prices</td>
<td>2.81</td>
<td>1.95</td>
</tr>
<tr>
<td>Money Wages</td>
<td>2.50</td>
<td>10.41</td>
</tr>
<tr>
<td>Consumer Prices</td>
<td>2.45</td>
<td>2.97</td>
</tr>
<tr>
<td>Industrial Production</td>
<td>2.03</td>
<td>13.42</td>
</tr>
<tr>
<td>Real GDP</td>
<td>2.48</td>
<td>9.93</td>
</tr>
<tr>
<td>Nominal GDP</td>
<td>4.61</td>
<td>13.88</td>
</tr>
<tr>
<td>Narrow Money</td>
<td>3.06</td>
<td>17.49</td>
</tr>
<tr>
<td>Labor Productivity</td>
<td>5.25</td>
<td>15.75</td>
</tr>
</tbody>
</table>

level, which has a one-for-one impact on wages. But the Scandinavian model does not relate expected exchange rate changes to present changes in wages or the price level.

To relate expected exchange rate changes to wage changes, we employ a modified form of the Scandinavian model, as introduced by McKinnon (2006a):

\[ \Delta W = E(\Delta PROD) + E(\Delta S) + WRP. \]

As we have discussed already, wage growth is determined by productivity growth and exchange rate fluctuations. But in McKinnon’s modified form of the Scandinavian model, wage growth (\(\Delta W\)) is a function of expected changes in productivity and the exchange rate. In Equation (2.9), \(E\) is the expectations operator, (\(\Delta PROD\)) productivity growth, and (\(\Delta S\)) the change in the exchange rate expressed as the domestic currency in terms of the USD, akin to (\(\Delta e\)) from our earlier equations. Furthermore, wage growth also is affected by a negative risk premium (\(WRP\)), which reflects the exchange rate uncertainty exporters face when negotiating contracts with their employees. If exporters know the exact amount, by which their domestic currency will appreciate before their employees’ paydays, then \(WRP = 0\). In practice, exporters typically do not know the extent to which their domestic currency will appreciate, and \(WRP < 0\). Note that \(WRP \leq 0\) always, because exchange rate movements cannot be ‘more than certain.’

In essence, our modified Scandinavian model of wage adjustment assumes exporters negotiate wages according to how they expect productivity and the exchange rate to change. The more certain exporters are about their expectations, especially for the movement in the exchange rate, the smaller the negative risk premium, and vice versa. Under fixed-exchange rate systems, \(E(\Delta S) = 0\) and \(WRP = 0\), because exporters know their domestic currency will not fluctuate in value. As such, wage growth tends to match productivity growth in the long run, promoting an
international competitive balance of unit labor costs. But, when the currencies of current account surplus countries are allowed to float or appreciate, such as in Japan beginning in 1971 and in recent China starting in 2005, \( E(\Delta S) < 0 \) and \( WRP < 0 \). Exporters anticipate their economy’s currency will rise by an uncertain amount. Given most are risk-averse, exporters tend to under-compensate their workers relative to their productivity growth over the long run. As such, wage growth can lag productivity growth in the tradable sectors of countries, such as Japan starting in the late 1970s and China from the mid-1990s through the mid-Noughties, whose currencies appreciate (see Figures 2.1 and 2.2).

In past Japan in 1971, exporters had their first experience with a revaluation of the JPY, when officials ended the peg to the USD in the aftermath of the Nixon Shock and the fall of the Bretton Woods system. Although Japanese authorities attempted to maintain control of the JPY against the USD in the early 1970s, they relented in late 1973. As exporters came to expect the JPY to appreciate against the USD, they sharply reduced wage increases starting around 1974 in anticipation of reduced profitability. Expectations of appreciation became more entrenched in the Japanese tradable sector, as the JPY appreciated by about 25% from 1976 to 1978. Wage growth collapsed in Japan during the mid- to late 1970s (see Figure 2.1), and has been mostly stagnant to negative ever since.

While wage growth collapsed in the 1970s in Japan, productivity growth remained relatively unscathed (see Figure 2.3). As we mentioned earlier, our analysis is based on models that show changes in exchange rates predictably relate to changes in costs, such as borrowing, labor, and living costs, but do not predictably relate to changes in trade balances and productivity. The empirical evidence from past Japan confirms the validity of our analysis, as
Figures 2.1 and 2.2 from McKinnon (2011).
Japanese productivity growth has continued to outpace wage growth in the tradable sector essentially through the present day (see Figures 2.1 and 2.3). Low competitive unit labor costs in sectors, particularly manufacturing, including of automobiles, electronics, and semiconductors, are responsible for Japan’s multi-decade reign as a top exporter of vehicles and appliances. The unit labor cost imbalance, coupled with a relative excess of savings, contributed to the chronic trade surplus with the U.S. until last year. We will return to the trade imbalance between Japan and the U.S. in Section (4).

Similarly, in China, the government announced the RMB would begin to appreciate in 2005. After an initial revaluation of about 2% against the USD in mid-July 2005, the RMB appreciated by less than 1.5% through the start of September 2006. But from September 2006 through July 2008, the RMB appreciated by nearly 15% (see Figure 2.4). As evident in Table (2.3), nominal wages in China’s tradable sectors, particularly mining and quarrying and
manufacturing, peaked in 2006 and 2007, and fell through 2009, the first full year since 2004 in which the RMB did not appreciate meaningfully against the USD (see Figure 2.4). Over the same time period from 2006 to 2009, productivity in both sectors rose substantially, again confirming our analysis (see Table 2.4). To summarize, expected exchange rate appreciations can have effects as dramatic as, and in some cases more dramatic than realized exchange rate appreciations. Although the Scandinavian model does not account for expected exchange rate appreciations, we have demonstrated the impact of anticipated movements in the JPY and the RMB empirically.

2.3 Openness to Foreign Business and Non-Tradable Productivity

One key difference between past Japan and recent China is the rate of tradable good price increases. When exchange rates were fixed in each of the two aforementioned Asian economies,
### Table 2.3: Average Monthly Earnings of Employees Across Various Sectors of the Chinese Economy

<table>
<thead>
<tr>
<th>Year</th>
<th>Mining &amp; quarrying</th>
<th>Manufacturing</th>
<th>Electricity &amp; gas supply</th>
<th>Water supply &amp; sanitation services</th>
<th>Construction</th>
<th>Wholesale &amp; retail trade</th>
<th>Transportation &amp; storage</th>
<th>Accommodation &amp; food services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ave. 1996</td>
<td>37,354</td>
<td>33,833</td>
<td>79,953</td>
<td>39,304</td>
<td>35,817</td>
<td>34,904</td>
<td>40,983</td>
<td>22,198</td>
</tr>
<tr>
<td>Ave. 1997</td>
<td>36,545</td>
<td>35,402</td>
<td>80,437</td>
<td>40,281</td>
<td>37,029</td>
<td>36,406</td>
<td>42,715</td>
<td>23,528</td>
</tr>
<tr>
<td>Ave. 1998</td>
<td>40,083</td>
<td>36,431</td>
<td>86,192</td>
<td>41,708</td>
<td>37,866</td>
<td>37,696</td>
<td>44,074</td>
<td>24,039</td>
</tr>
<tr>
<td>Ave. 1999</td>
<td>41,432</td>
<td>37,738</td>
<td>91,285</td>
<td>44,729</td>
<td>36,070</td>
<td>38,695</td>
<td>45,072</td>
<td>25,117</td>
</tr>
<tr>
<td>Ave. 2000</td>
<td>43,067</td>
<td>38,914</td>
<td>91,805</td>
<td>44,341</td>
<td>36,867</td>
<td>39,541</td>
<td>45,949</td>
<td>26,060</td>
</tr>
<tr>
<td>Ave. 2001</td>
<td>44,089</td>
<td>38,412</td>
<td>97,399</td>
<td>46,002</td>
<td>37,746</td>
<td>39,775</td>
<td>48,017</td>
<td>25,973</td>
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<tr>
<td>Ave. 2002</td>
<td>44,804</td>
<td>38,435</td>
<td>93,466</td>
<td>43,917</td>
<td>36,844</td>
<td>39,152</td>
<td>46,509</td>
<td>25,687</td>
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<tr>
<td>Ave. 2003</td>
<td>47,720</td>
<td>39,549</td>
<td>95,191</td>
<td>43,954</td>
<td>37,214</td>
<td>39,610</td>
<td>45,934</td>
<td>24,951</td>
</tr>
<tr>
<td>Ave. 2005</td>
<td>47,671</td>
<td>41,658</td>
<td>91,164</td>
<td>47,647</td>
<td>36,450</td>
<td>39,545</td>
<td>46,616</td>
<td>25,121</td>
</tr>
<tr>
<td>Ave. 2006</td>
<td>53,344</td>
<td>42,383</td>
<td>97,230</td>
<td>47,251</td>
<td>38,168</td>
<td>39,360</td>
<td>48,460</td>
<td>24,968</td>
</tr>
<tr>
<td>Ave. 2007</td>
<td>51,057</td>
<td>43,169</td>
<td>96,446</td>
<td>44,447</td>
<td>40,327</td>
<td>39,475</td>
<td>49,234</td>
<td>25,560</td>
</tr>
<tr>
<td>Ave. 2009</td>
<td>48,674</td>
<td>39,152</td>
<td>95,960</td>
<td>44,234</td>
<td>40,930</td>
<td>40,154</td>
<td>48,068</td>
<td>27,171</td>
</tr>
<tr>
<td>Ave. 2010</td>
<td>52,883</td>
<td>42,420</td>
<td>96,143</td>
<td>45,404</td>
<td>41,874</td>
<td>41,970</td>
<td>49,161</td>
<td>27,829</td>
</tr>
</tbody>
</table>

*Notes: Both industry & services and services sectors statistics covered education industry (only short term tutorial and driver's training classes are included) and social work services (industry only included with children and infant babies day care institutions) since January 2008.*

### Table 2.4: Indices of Labor Productivity by Sector of the Chinese Economy

<table>
<thead>
<tr>
<th>Year</th>
<th>Mining &amp; quarrying</th>
<th>Manufacturing</th>
<th>Electricity &amp; gas supply</th>
<th>Water supply &amp; sanitation services</th>
<th>Construction</th>
<th>Wholesale &amp; retail trade</th>
<th>Transportation &amp; storage</th>
<th>Accommodation &amp; food services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ave. 2001</td>
<td>111.22</td>
<td>68.08</td>
<td>78.04</td>
<td>67.90</td>
<td>99.46</td>
<td>82.48</td>
<td>85.00</td>
<td>107.34</td>
</tr>
<tr>
<td>Ave. 2002</td>
<td>120.91</td>
<td>75.48</td>
<td>82.49</td>
<td>74.63</td>
<td>107.94</td>
<td>84.53</td>
<td>91.03</td>
<td>98.27</td>
</tr>
<tr>
<td>Ave. 2003</td>
<td>104.46</td>
<td>81.91</td>
<td>86.66</td>
<td>77.03</td>
<td>107.44</td>
<td>86.67</td>
<td>90.92</td>
<td>95.23</td>
</tr>
<tr>
<td>Ave. 2004</td>
<td>120.09</td>
<td>86.53</td>
<td>80.99</td>
<td>77.91</td>
<td>108.95</td>
<td>85.54</td>
<td>92.71</td>
<td>101.96</td>
</tr>
<tr>
<td>Ave. 2005</td>
<td>121.11</td>
<td>92.47</td>
<td>95.62</td>
<td>87.80</td>
<td>102.00</td>
<td>95.36</td>
<td>97.72</td>
<td>100.46</td>
</tr>
<tr>
<td>Ave. 2006</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
</tr>
<tr>
<td>Ave. 2007</td>
<td>130.22</td>
<td>107.38</td>
<td>104.02</td>
<td>98.80</td>
<td>100.36</td>
<td>104.91</td>
<td>105.95</td>
<td>102.75</td>
</tr>
<tr>
<td>Ave. 2008</td>
<td>122.77</td>
<td>108.46</td>
<td>101.55</td>
<td>93.69</td>
<td>95.72</td>
<td>107.51</td>
<td>107.31</td>
<td>98.80</td>
</tr>
<tr>
<td>Ave. 2009</td>
<td>157.48</td>
<td>110.73</td>
<td>98.89</td>
<td>95.45</td>
<td>94.68</td>
<td>108.34</td>
<td>106.06</td>
<td>98.15</td>
</tr>
<tr>
<td>Ave. 2010</td>
<td>189.15</td>
<td>129.66</td>
<td>103.98</td>
<td>91.27</td>
<td>102.34</td>
<td>113.43</td>
<td>111.80</td>
<td>101.92</td>
</tr>
</tbody>
</table>

*Tables 2.3 and 2.4 from NBS (2011).*
Figure 2.5: CPI and WPI Comparison Between Japan and the U.S.

Sources: IMF (2012), Japan Economic Yearbook (1960-71), and Economic Survey of Japan (1954-59)

Figure 2.6: CPI and WPI Comparison Between China and the U.S.

Sources: IMF (2012) and NBS (2011)
consumer price inflation significantly outpaced that of the U.S. However, wholesale price increases in past Japan lagged those in the U.S. during the 1950s and 1960s, while ‘wholesale’* price increases in recent China were slightly greater than those in the U.S. during the late 1990s and the early 2000s (see Figures 2.5 and 2.6). The difference in wholesale price increases between past Japan and recent China is due to several reasons, a main one of which relates to the relative openness of the two economies.

Throughout history, China generally has been a more open economy than Japan. Archaeological evidence indicates that people across Europe, Africa, the Middle East, and other parts of Asia have traveled to China since before the Common Era to trade textiles, agricultural products, precious metals, and other goods. On the other hand, much of Japan’s trade before modern times ironically relied upon China. Prior to the mid-1800s, the ports of the island nation were accessible primarily to Dutch and Chinese traders, and trade occasionally was interrupted by military conflict. As the United Kingdom (U.K.) and the U.S. rose to economic prominence and gained political influence during the 1800s and 1900s respectively, China became a less significant trading partner of Japan (Crow, 1937). But in the first half of 2009, China reclaimed its status as Japan’s top trading partner.

In comparison to recent China, past Japan’s less open policy toward the entry of foreign corporations led to a divergence of productivity growth between tradable and non-tradable industries. In past Japan, the government enforced several laws designed to protect domestic non-tradable producers from overseas competition, and encouraged foreign multinational enterprises (MNEs) to pursue licensing agreements and joint ventures (JVs) to introduce their businesses to the Japanese markets. Many foreign MNEs were hesitant to partake in licensing

* In recent China, the official statistic that tracks tradable good price increases is called the ex-factory price index, which is comparable to the wholesale price index measured by officials in past Japan.
agreements and JVs with domestic firms for fear of losing their competitive advantages. Thus, productivity in past Japan’s non-tradable sector grew relatively slowly, because foreign MNEs saw little incentive to introduce their competitive advantages into the Japanese markets.

On the other hand, recent China was relatively open to the entry of foreign MNEs. Initially, a low number of regulations pertaining to franchising allowed for the expansion of such brands as Kentucky Fried Chicken (KFC) and McDonald’s. More recently, China’s Ministry of Commerce has designed relatively structured ways for foreign MNEs to enter the Chinese markets, namely through JVs, master franchising, and wholly foreign owned enterprises (WFOEs). JVs and master franchising allow foreign firms to develop relationships, or guanxi, with local businesses and governments. At the same time, WFOEs allow foreign MNEs, such as Yum! Brands, the parent of KFC, to remain independent entities while they conduct business in China. The WFOE policy has attracted many foreign firms along with their competitive advantages that boost productivity in China’s non-tradable sectors, mainly service industries (Beamish, 1993).

The direct comparison of the entry dates of a variety of MNEs into past Japan and recent China demonstrates how quickly foreign competitive advantages were introduced into the Chinese non-tradable sector. In the table below, many of the foreign MNEs that have entered the Chinese markets established their businesses by the mid-1990s, relatively early in China’s 21-year economic boom through 2011. On the other hand, many of the same foreign MNEs did not enter the Japanese markets until after the end of past Japan’s 21-year boom in 1971. And some of the foreign MNEs that operate in China have left or have yet to enter Japan (see Table 2.5)!
The relative lack of competition from foreign MNEs in the non-tradable sector of past Japan is a key reason why recent China’s service sector productivity grew comparatively quickly. According to the Statistical Yearbook of the Republic of China (NBS, 2010), during much of the Noughties, particularly through 2008, productivity growth in non-tradable industries, such as electricity and gas supply, water supply and remediation services, wholesale and retail trade, and transportation and storage, rose at a pace competitive with productivity growth in tradable industries, such as mining and quarrying and manufacturing (refer to Table 2.4).

Unlike in past Japan, the increase in non-tradable productivity in recent China fueled a relatively sustainable rise in wages that led both consumer and wholesale prices to rise comparatively in tandem. Interestingly, productivity growth has been most sluggish in recent China’s construction sector, where most property developers are based domestically. But, construction wages have risen along with other non-tradable wages in accordance with the Scandinavian model of inflation (refer to Tables 2.3 and 2.4). China’s fall in property prices over
the past several months may be a sign that the increase in construction wages that has outpaced productivity growth since 2004 is unsustainable. But the Chinese construction sector aside, we conclude that recent China’s relative openness to the entry of foreign businesses led to smaller gaps between non-tradable productivity and wage growth and between consumer and wholesale price increases than in past Japan.
3 The Relationships Between Exchange Rates and Capital Flows

Before we empirically analyze the relationship between the appreciation of the domestic currency and capital flows in past Japan and recent China, we must establish a framework for how capital flows respond to changes in exchange rates. As McKinnon identifies (2012), the capital flows most responsive to exchange rate movements are hot money flows, which are driven primarily by carry trades. Carry traders profit by borrowing in economies where expected returns are relatively low and lending or investing where expected returns are relatively high. Expected returns are determined by anticipated asset price movements and changes in exchange rates. While carry traders can invest in a wide array of instruments, we will focus on the case in which they purchase bonds.

When carry traders borrow in lower-yielding currencies and invest in higher-yielding ones, they realize returns from the both the interest rate differential and the change in the exchange rate between the currencies borrowed and purchased. In particular, a(n) appreciation (depreciation) of the borrowed currency decreases (increases) profits, while a(n) appreciation (depreciation) of the purchased currency increases (decreases) profits. Thus, when speculators anticipate the currency of an economy, such as Japan before 1990 and recent China, with relatively high interest rates will appreciate, carry traders may borrow a relatively low-yielding currency and lend in terms of JPY or RMB (Jaffe and Mandelker, 1976).
3.1 The International Fisher Effect and Hot Money Symptoms

As such, the expected appreciation of an economy’s currency increases foreign demand for domestic fixed income assets. The rise in demand results from carry traders bidding fixed income prices higher and interest rates lower, as embodied by the International Fisher Effect:

\[ i_s - i_d = E(\Delta e), \]

(3.1)

where \((i_s)\) is the U.S. nominal interest rate, \((i_d)\) is the domestic (Japanese or Chinese) nominal interest rate, \(E\) is the expectations operator, and \((e)\) is the exchange rate, again where the domestic currency is expressed in terms of USD.

Although the International Fisher Effect is not robust empirically, by assigning \((e)\) as an exogenous variable, we can draw useful conclusions about the relationship among interest rate differentials, expected exchange rate movements, and the attractiveness of carry trades. As the expected appreciation of the JPY against the USD increases, carry traders find borrowing USD-denominated assets and investing in JPY-denominated ones more attractive. Speculative demand bids up fixed income asset prices and lowers interest rates in Japan. Indeed, Japan has experienced rising Japanese government bond (JGB) prices and falling nominal interest rates since after the signing of the Plaza Accord signaled to speculators that the JPY would appreciate substantially. But note that the steady appreciation of JGBs and decline in nominal interest rates materialized with a lag, and did not begin until the start of Japan’s deflationary bust in 1990, five years after the terms of the Plaza Accord agreement were enacted (see Figure 3.1).

Why did the appreciation of the JPY begin in 1985, but not affect nominal interest rates in the manner described by the International Fisher Effect until half a decade later? The answer lies mainly in the flows of hot money. Hot money flows are somewhat difficult to trace, but
domestic stock and real estate market performances and foreign exchange reserves provide proxies for capital inflows. When the currencies of past Japan and recent China were announced to appreciate in 1985 and 2005, domestic stock markets rose dramatically, as international speculators purchased Japanese and Chinese assets to profit from JPY and RMB strength. In an attempt to control the rates of appreciation of their currencies, the domestic central banks, namely the Bank of Japan (BoJ) and the People’s Bank of China (PBoC), accumulated reserves to mitigate the effects, such as accelerating inflation, of hot money inflows. Between late 1985 and the start of 1990, the Nikkei 225 (Nikkei), one of the most commonly used benchmark for Japanese stock market performance, about tripled. Analyzing the historical closing values of the Nikkei dating back to the start of 1984, the five-year-to-date returns from January 1, 1989 (the end of the first five-year period in our data set) until February 20, 1990 were more than three standard deviations above the historical mean (see Figure 3.2). A 200% nominal return over five
years is an exceptional run for any stock market, and appears unlikely to have occurred in past Japan without significant speculative capital inflows (Yahoo! Finance, 2012).

Similarly, Japanese urban property prices more than doubled between 1985 and 1991, according to data from the Japan Real Estate Institute (see Figure 3.3). Hot money inflows bid
up real estate prices at rates never seen in Japan over at least the past forty years (Global Property Guide, 2012). In addition, Japan’s foreign exchange reserves, which were relatively unchanged in the first half of the 1980s, almost quadrupled during the second half of the 1980s, as the BoJ tried to maintain a controlled rate of appreciation of the JPY in the face of hot money inflows (see Figure 3.4).

In recent China, the RMB strengthened essentially continuously from mid-2005 until mid-2008, when the PBoC again fixed its currency to the USD to smooth the volatility generated by the 2008 financial crisis. In mid-2010, the PBoC resumed allowing the RMB to appreciate, and the currency continued to climb against the USD through the end of 2011. Although recent China has not experienced a devastating collapse similar to that of Japan in the early 1990s, recent China has experienced similar symptoms of hot money inflows. When the RMB strengthened from mid-2005 to mid-2008, the Shanghai Composite Index (Shanghai Composite),

![Figure 3.4: Japan’s Reserves Excluding Gold (1980-90)](image-url)
the primary mainland benchmark for Chinese stock market performance, roughly tripled, peaking at almost six times its mid-2005 value early in the fall of 2007. At the close of roughly half of the 95 trading days from September 10, 2007 to January 18, 2008, the Shanghai Composite three-year-to-date return was more than three standard deviations above the long-term average dating back to the start of the millennium. Outside of the aforementioned period, there never was a trading day when the three-year-to-date return of the Shanghai Composite was greater than three standard deviations above the historical mean return since 2000 (see Figure 3.5) (Yahoo! Finance, 2012).

Also similar to Japan, China experienced a real estate boom, particularly in its urban centers. Research from private equity firm KKR (McVey, 2011) shows a composite index of real estate prices throughout major Chinese cities about doubled between 1998 and 2011 (see Figure 3.6), as U.S.-led pressure to allow the RMB to appreciate grew on Chinese officials. Notice how

Figure 3.6: Urban Property Prices in China

Figure 3.7: PBoC Balance Sheet Expansion

Source: IMF (2012)
the ascent of urban property prices in Japan was faster and sharper than which that occurred in China, an idea we will revisit momentarily. Other data from Global Property Guide (2012) shows nominal nationwide house price annualized growth peaked at more than 40% in 2008, when the RMB last appreciated before the failure of Lehman Brothers.

Also during the 2000s, China’s foreign exchange reserves realized significant growth, which similar to the advance of urban property prices, was less sudden compared to that in Japan after the Plaza Accord. Among other factors responsible for the relatively sharp advance in Japan’s reserves and urban property prices, the RMB appreciation in 2005 was a unilateral operation, while the JPY appreciation in 1985 was a multilateral operation. In addition, compared to past Japan, recent China had looser capital controls before its currency started to appreciate, allowing for greater inflows of hot money.

Since the turn of the millennium, the PBoC has multiplied its balance sheet by a factor of approximately five to defend against hot money inflows (see Figure 3.7). At the same time, note that China’s foreign exchange accumulation slowed from late 2008 to early 2009, when the financial crisis centered in the U.S. caused hot money flows to reverse and the USD to appreciate (Davies, 2011). In other words, we can see empirically that reserve accumulation not only picks up during periods of hot money inflows and domestic currency appreciation, but also slows down during periods when hot money inflows subside and the domestic currency is comparatively stable. Having demonstrated the relationship between capital flows and exchange rates, we next will examine the interaction between capital flows and monetary policy.
3.2 Hot Money Flows and Monetary Policy

The effects of exchange rate movements on hot money flows and domestic nominal fixed income interest rates are similar to those on nominal benchmark interest rates set by the domestic central bank. In fact, because hot money flows are difficult to quantify, domestic central bankers essentially become speculators, who must decide between setting interest rates high enough to cool their economies and setting interest rates low enough to deter hot money inflows. Like he introduced a negative risk premium into the Scandinavian model of wage adjustment, McKinnon (2006a) also introduces one into the Fisher Effect equation to arrive at:

\[ i = i^* + E(\Delta S) + IRP \]  

(3.2)

In our modified Fisher Effect equation, \((i)\) is the nominal interest rate on a domestic currency-denominated fixed income asset, and \((i^*)\) is the nominal interest rate on a USD-denominated fixed income asset. \(E\) is the expectations operator, \((\Delta S)\) is the change in the exchange rate of the domestic currency in terms of USD, and \((IRP)\) is the negative interest rate risk premium.

As we discussed earlier, hot money flows can destabilize domestic asset prices, and even can lead to chronic deflation, as in the case of Japan. Hence, central banks, such as the past BoJ and the recent PBoC, must account for hot money flows when making monetary policy decisions intended to promote stable prices. However, the past BoJ and the recent PBoC faced situations analogous to a catch 22, in that higher interest rates curb domestic demand, reducing inflationary pressures, but also attract hot money inflows, increasing inflationary pressures. The reverse is true for lower interest rates. Equation (3.2), demonstrates how the domestic central bank must target benchmark interest rates that will compensate investors appropriately for perceived interest rate and exchange rate risk. Otherwise, the domestic central bank exposes its economy to hot
money inflows when interest rates are set too high, and hot money outflows when interest rates are set too low. But setting interest rates to minimize hot money flows is impossible in practice, and the central bank is left to speculate how capital movements will respond to changes in benchmark borrowing costs.

History indicates that central banks, such as the past BoJ, on average are likely to set interest rates lower in the long run to spur domestic growth and to prevent hot money inflows. While a bias toward lower interest rates mitigates inflationary pressures from abroad, looser monetary policy can have devastating deflationary consequences when implemented after a surge in hot money inflows. For example, during Japan’s economic slowdown of the early 1990s, the BoJ began to lower interest rates after a period of steady to rising rates from 1987 until 1991. The decline in interest rates facilitated a rush of hot money out of Japan, contributing to the 1990-92 Nikkei and real estate bubble collapses (refer to Figures 3.2 and 3.3). The sharp fall in nominal asset prices led to powerful persistent deflationary forces, to which the BoJ responded by continuing to lower interest rates throughout the 1990s. In 1999, interest rates reached their zero lower bound, and Japan has been mired in a liquidity trap ever since (Trading Economics, 2012).

China and the world at large should heed the Japanese deflationary experience when determining whether the RMB should appreciate against the USD. While China has not experienced a deflationary collapse since the RMB started to appreciate in 2005, there are signs that China should be careful. Short-term benchmark interest rates declined sharply in China in late 2008, and the PBoC has resorted to expansionary monetary policies again in the past nine months. As we discussed earlier, the Shanghai Composite is down more than 50% from its all-
time high reached early in the fall of 2007 (Yahoo! Finance, 2012), and according to online Chinese real estate brokerage SouFun (2012), average nationwide home prices have been falling since the end of last summer.

Compared to past Japan, recent China aggressively has used policy alternatives to benchmark short-term interest rate changes to attempt to promote domestic price stability without affecting hot money flows. In particular, China has utilized reserve requirement ratio (RRR) adjustments to control loan growth and to target inflation. Unlike changes in the short-term benchmark interest rate, RRR adjustments directly affect the behavior of only domestic banks, and have relatively little impact on the decisions of speculators and on hot money flows. From 2010 through mid-2011, the PBoC raised its benchmark short-term interest rate five times, and hiked its RRR twelve times. Since monetary easing began in the middle of last year, China has not changed its benchmark short-term interest rate, and has cut its RRR twice (Trading Economics, 2012). The PBoC’s reliance on RRR is a prudent approach to conducting monetary policy and to mitigating the problems associated with hot money flows. Nonetheless, when targeting benchmark short-term interest rates and exchange rate trading bands, Chinese policymakers should heed the lessons of the JPY appreciation via the Plaza Accord and Japan’s subsequent deflationary experience.
4 Exchange Rates, Spending Habits, and Solutions to Trade Imbalances

Conventional wisdom holds that the appreciation (depreciation) of the currency of an economy will decrease (increase) the balance of trade. Traditional economic thinking claims that currency appreciation increases the prices an economy’s exports, reducing their attractiveness to foreigners. In turn, foreign demand for and the overall value of exports decline. At the same time, currency appreciation decreases the prices of an economy’s imports, increasing their attractiveness to domestic consumers. In turn, domestic demand for and the overall value of imports rise. The fall in exports and rise in imports reduces the balance of trade. Traditional economic thinking claims that currency depreciation works in reverse, increasing demand for exports and reducing demand for imports, causing an increase in the balance of trade (Meade, 1951).

4.1 The Savings Identity and Historical Applications

However, the traditional approach to evaluating the effects of foreign exchange fluctuations on an economy’s trade balance is limited in its applications. The conventional approach examines only how an economy’s trade sector responds to currency movements, and fails to look at the economy as a whole. Our approach is more macroeconomic than the traditional one, and we start by defining savings \( S \) as income \( Y \) less consumption \( C \) and government spending \( G \):

\[ S = Y - C - G. \] (4.1)
Then, we substitute Equation 4.1 into the fundamental identity $Y = C + I + G + X - M$, where ($I$) is investment, ($X$) is exports and ($M$) is imports, and rearrange to arrive at the savings identity:

$$S - I = X - M.$$ (4.2)

In effect, the proposition that an economy’s trade balance improves in response to currency depreciation is equivalent to the proposition that savings rises relative to investment in response to currency depreciation, and vice versa. And traditional economic thought does not claim that net domestic saving increases when an economy’s currency depreciates, or vice versa. Through our examination of historical data, we will demonstrate that an economy’s balance of trade exhibits a closer relationship to saving and spending behavior than to the value of an economy’s currency (McKinnon, 2010).

Japan is a prime example of how changes in exchange rates have less of an impact on an economy’s trade balance in the long run than does spending behavior. Japan exhibited a regular balance of trade surplus from around 1980 until last year, despite a steady appreciation of the JPY against the USD since 1970. In addition, during the short periods where the JPY weakened, namely 1978 to 1985 and 1995 to 1998, Japan’s trade surplus grew considerably (see Figure 4.1). Furthermore, Japan has had a bilateral trade surplus with the U.S. consistently from the mid-1960s through present. Although most of the Noughties are not shown in Figure (4.2), the Japanese bilateral trade surplus with the U.S. was only about 6% smaller in 2011 than in 2003, the last year shown in Figure (4.2) (USCB, 2012).

Although Japan’s trade balance did not exhibit a close relationship to the value of the JPY over the past several decades, Japan’s net domestic savings as a percentage of GDP have been in decline since 1986 (see Figure 4.3). Similarly, Japan’s household savings rate (see Figure 4.4)
**Figure 4.1:** Japan Multilateral Trade Balance

**Figure 4.2:** Japan and China Bilateral Trade Balances with the U.S.
Figure 4.3: Japan Net Domestic Savings

Japan Net Domestic Savings as a Percentage of GDP

Source: Data from Trading Economics (2012)

Figure 4.4: Japanese Household Savings Rate Decline and Age Increase

Source: CEIC (2012)
has been in decline since the mid-1970s. The decline in national savings has coincided with an aging population. The consumer spending life cycle theory dictates that older people have lower savings rates than younger people, and moreover, that retired people have negative savings rates, because they spend their savings and usually earn little to no income. The median age in Japan has risen from under 30 in 1970 to about 45 today, and the percentage of the population over 60 has more than doubled since 1980 (CEIC, 2012). Japan’s household savings rate fell to a low of nearly 0% in 2008 (refer to Figure 4.4), and last year, Goldman Sachs economist Chiwoong Lee projected it would turn negative by 2013. In the case of Japan, declines in saving fueled by aging demographics appear to exhibit a stronger relationship with the dwindling of the Japanese trade surplus than the appreciation of the JPY.

Although the RMB has not been appreciating for as many years as the JPY, China’s trade balances over the past seventeen years have behaved fairly similarly to those of Japan during the 1970s and 1980s. China has maintained a trade surplus with the world and a bilateral one with the U.S. since at least 1994, the first year in which the RMB appreciated in decades, as displayed in Figure (4.5). Despite the RMB’s climb from 1994 to present, albeit interrupted on two main occasions, China built its trade surpluses with the world and the U.S. until the financial crisis of 2008. China’s multilateral and bilateral trade surpluses reached record highs in 2008, even as the RMB crawled to fresh convertible-era highs against the USD (see Figure 4.6). Although China’s trade surplus with the world has not set new records since the 2008 financial crisis, China’s bilateral trade surplus with the U.S. reached a fresh all-time high last year, despite further appreciation of the RMB against the USD (USCB, 2012).
Figure 4.5: China’s Multilateral and Bilateral (with the U.S.) Trade Balances

Source: China Customs Statistics

Figure 4.6: China Gross Savings as a Percentage of GDP

Sources: Trading Economics (2012) and World Bank (2010)
China’s gross savings as a percentage of GDP has been trending higher over the past decade. China’s high savings rate (see Figure 4.6), especially compared to that of the U.S., has fueled the growth of its trade surplus. Whereas in Japan, the decline in savings has been attributed to an aging population, in China, the increase in savings has been attributed to the relative lack of a welfare state. The growth in China’s trade surplus with the U.S. since 2000 is less explained by the appreciation of the RMB against the USD than by the increases in Chinese savings and U.S. spending.

Perhaps the most obvious example of an economy with a trade deficit that persists despite a depreciating currency is the U.S. Since 1975, the U.S. has run a trade deficit that generally has grown overtime. Simultaneously, the USD trade-weighted index has weakened by about 40% since 1971 and by more than 50% since its peak in 1985 (FRED, 2012) (see Figure 4.7). Although the widening trade gap has not coincided with a domestic currency appreciation, as traditional economic theorists would expect, the declining trade balance has coincided with a fall in savings. U.S. gross national savings as a percentage of GDP have been falling steadily since at least 1980, as shown in Figure (4.8) (Trading Economics, 2012). Moreover, the U.S. personal savings rate reached a peak of 10.9% in 1982, and declined through 2005, the year in which the personal savings rate actually turned negative for a quarter (FRED, 2012) (see Figure 4.9). Through our examination of trade data from Japan, China, and the U.S., we conclude that changes in savings rates have a more predictable impact on an economy’s trade balance than do currency fluctuations.
**Figure 4.7**: USD Trade-Weighted Index

**Figure 4.8**: U.S. Gross Savings as a Percentage of GDP

*Sources: Trading Economics (2012) and IMF (2012)*
Figure 4.9: U.S. Personal Savings Rate

Personal Saving Rate (PSAVERT)
Source: U.S. Department of Commerce: Bureau of Economic Analysis

Shaded areas indicate US recessions.
2012 research.stlouisfed.org
5 The Dollar Standard to Date and Ways of Reform

Aggregating many of the ideas supported by our analysis in earlier sections, we discuss the implications of the global USD standard and possibilities for reform. Reflecting historically, the USD became the world reserve currency almost incidentally, because the U.S. was the only industrial country after WWII with stable inflation and currency convertibility on both its current and capital accounts. The relatively late entry of the U.S. into WWII meant the postwar U.S. economic and monetary systems were better conditioned for global trade, in comparison to many of the European and Asian (namely Japanese) economies that had less stable prices and utilized exchange controls. Although the Bretton Woods Agreement did not explicitly declare the USD the world reserve currency, the state of the world naturally led to the increased use of the USD in international trade. As such, the global USD standard was established, and served mainly a dual purpose as the world’s primary medium of exchange and nominal price anchor.

5.1 Complications of the Dollar Standard

While the USD reliably has performed its role as the primary facilitator of international commerce since the end of WWII, the USD unreliably has served as the global nominal price anchor, particularly from the 1970s onward. After WWII, the relative price stability in and the openness of the U.S. economy allowed the Federal Reserve (Fed) to focus primarily on domestic wellbeing. In other words, the presence of capital controls overseas meant that the Fed’s actions had relatively few international consequences, such as effects on hot money flows. Notice the relative stability of the U.S. WPI and nominal interest rates between 1950 and the late 1960s, and
the convenience Germany and Japan found in pegging their currencies to the USD to reap the benefits of the stability of the global nominal price anchor (see Figure 5.1 and Table 5.1).

But in comparison to the two decades following WWII, the USD has not performed well as a nominal price anchor since the mid-1960s. In the late 1960s during the Vietnam War, increased government spending caused inflation in the U.S. to accelerate mildly. In what became known as the Nixon Shock of August 1971, U.S. Treasury Secretary John Connally suspended the convertibility of the USD into the yellow metal. President Richard Nixon’s administration closed the gold window to prevent the precious metal reserves of the U.S. from flowing overseas and to facilitate financing the Vietnam War. Many of the U.S.’ largest trading partners agreed to appreciate their currencies by 17%, leading to hot money flows out of the U.S. and into many of its trading partners. The movement of hot money led to inflation worldwide, including in the
U.S., where the Fed expanded the money supply to attempt to reduce unemployment via larger price increases, an idea supported by the Phillips Curve fallacy.

From 1975 to 1976, the global economy fell into recession, dampening inflation. But once again, due to the Phillips Curve fallacy, political pressure to devalue the USD increased. In addition, “Japan bashing” became politically popular in Washington, D.C., as the JPY appreciated and the island nation logged a chronic trade surplus with the U.S. In 1977, the administration of incoming President Jimmy Carter advocated for another depreciation of the

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### Table 5.1: Nominal Interest Rate Volatility in the U.K. and the U.S.

<table>
<thead>
<tr>
<th>Mean Annual Interest Changes</th>
<th>Britain</th>
<th>United States</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Long-term Bonds</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gold standard</td>
<td>0.07</td>
<td>0.14</td>
</tr>
<tr>
<td>Dollar standard</td>
<td>0.45</td>
<td>0.29</td>
</tr>
<tr>
<td>Floating</td>
<td>0.99</td>
<td>1.05</td>
</tr>
<tr>
<td><strong>Short-term Bills</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gold standard</td>
<td>0.98</td>
<td>1.01</td>
</tr>
<tr>
<td>Dollar standard</td>
<td>0.77</td>
<td>0.69</td>
</tr>
<tr>
<td>Floating</td>
<td>2.05</td>
<td>1.57</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mean Monthly Interest Changes</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Long-term Bonds</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gold standard</td>
<td>0.03</td>
<td>0.03</td>
</tr>
<tr>
<td>Dollar standard</td>
<td>0.09</td>
<td>0.08</td>
</tr>
<tr>
<td>Floating</td>
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<td>0.26</td>
</tr>
<tr>
<td><strong>Short-term Bills</strong></td>
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<td></td>
</tr>
<tr>
<td>Gold standard</td>
<td>0.50</td>
<td>0.40</td>
</tr>
<tr>
<td>Dollar standard</td>
<td>0.16</td>
<td>0.14</td>
</tr>
<tr>
<td>Floating</td>
<td>0.53</td>
<td>0.39</td>
</tr>
</tbody>
</table>

Figure 5.2: Volatility of Nominal Exchange Rates among the USD, JPY, and Deutsche Mark

(Percent changes from previous month)

Source: IMF, International Financial Statistics
USD, particularly against the JPY. The depreciation again resulted in a rush of hot money out of
the U.S., leading to even higher global inflation. In late 1978, global monetary authorities had to
intervene to stabilize the falling USD, but the worldwide inflation problem was not addressed
until the following year, when the hawkish Fed Chairman Paul Volcker took office. U.S. WPI
finally returned to tolerable levels in the mid-1980s, but nominal interest rates and exchange
rates grew more volatile after the fall of the Bretton Woods system (see Table 5.1 and Figure
5.2). Such WPI and nominal interest rate and exchange rate behavior continued through the turn
of the century.

During the Noughties, consistently artificially low interest rates set by the Fed led to
global monetary instability. As alluded to in earlier sections, substantial reserve accumulation by
emerging market central banks, rapid rises in emerging market stock indices, and real estate
bubbles in the U.S. and Europe, were fueled by the Fed’s low interest rate policies under
Chairman Alan Greenspan. After the collapse of the real estate bubbles in the Western world and
the financial crisis of 2008, Fed Chairman Ben Bernanke lowered nominal interest rates to their
zero lower bound, and embarked on an unprecedented monetary expansion driven mainly by
episodes of quantitative easing. The result has been an expected return differential dream for
carry traders, who speculate by borrowing cheaply in the U.S. and investing in stocks,
commodities, and long-term fixed income instruments all over the world, especially in high
growth areas, such as China and other so-called emerging economies.

Further complicating today’s monetary instability are calls by U.S. politicians for China
to revalue the RMB against the USD, similar to the Japan bashing during the 1970s and 1980s.
Once again, U.S. politicians have promoted the fallacy that exchange rate adjustments can be
used to eliminate trade imbalances. As we demonstrated earlier using the net savings equation and historical data, the rise of the RMB against the USD has not, and will not cause either the trade surplus of China to decline or the trade deficit of the U.S. to shrink.

5.2 Proposals for Reform

The rehabilitation of the global USD standard mainly requires balancing international trade and restoring the U.S. currency’s role as the world’s nominal price anchor. Despite fears that the USD will lose its dominance in global trade, the U.S. currency continues to serve as the main facilitator of international commerce (see Table 5.2). In fact, the European debt crisis, and to a lesser extent, foreign exchange interventions by numerous central banks, including the BoJ

<table>
<thead>
<tr>
<th>Currencies Involved in Foreign Exchange Trading (percent of global trading)</th>
</tr>
</thead>
<tbody>
<tr>
<td>---</td>
</tr>
<tr>
<td>Dollar</td>
</tr>
<tr>
<td>EMS currencies and euro*</td>
</tr>
<tr>
<td>Yen</td>
</tr>
<tr>
<td>Pound</td>
</tr>
<tr>
<td>Swiss franc</td>
</tr>
<tr>
<td>Canadian and Australian dollar</td>
</tr>
<tr>
<td>All other currencies</td>
</tr>
<tr>
<td>Memorandum</td>
</tr>
</tbody>
</table>

*Source: Bank for International Settlements*
and the Swiss National Bank, have reaffirmed the USD’s status as the world’s premier medium of exchange.

But while the USD has been the main currency used in international commerce since the establishment of the Bretton Woods system, trade has not always been balanced, as we discussed in the previous section. Based on our earlier analysis, the U.S. must increase its net domestic savings, and its surplus trading partners, for example China, must increase expenditures. Such actions by the U.S. and China would reduce the record U.S. budget deficit and national debt, and relieve China of its role as the number one foreign financier of U.S. spending.

Although China and a number of countries have pushed for world reserve currency alternatives to the USD, China ironically plays a crucial part in supporting the USD’s dominance. Without China’s unusually large savings to finance the U.S.’ unusually large expenditures, the U.S. economy would be vulnerable to a sharp economic downturn, similar to that which occurred in 1991. In 1991, the U.S.’ two largest foreign creditors Germany and Japan nearly stopped lending internationally to address their domestic economic troubles. As its expenditure financing evaporated, the U.S. ran a fleeting current account surplus for the first time since 1982 (McKinnon, 2012) (see Figure 5.3). The U.S. experience with its largest creditors in 1991 serves as a proxy for how reliant the U.S. economy and the global USD standard are on China today.

To restore the USD’s role as the world’s nominal price anchor, we look to the two post-WWII decades, when the USD fulfilled its duty of global price stability. Compared to today, capital controls were more widely and aggressively used by the major economic powers, excluding of course the U.S., and the Fed set interest rates closer to their natural free market
levels. As a result, destabilizing hot money flows, the main cause of today’s global monetary instability, were less of a problem in the immediate post-WWII era than at present.

The remedy for the present price instability would be for monetary policymakers, especially the Fed, to adopt a more global approach to decision-making in lieu of its current relatively domestic one. The Fed still abides by its dual mandate of stable prices and full employment, as stipulated in the Federal Reserve Act of 1913. But in 1913, the U.S. and most of the world operated on the gold standard, and most of international commerce was conducted in British pounds, French francs, and German marks. During the gold standard, nominal interest rates were more stable (refer to Table 5.1), as were prices and nominal exchange rates. The global monetary system has evolved tremendously since 1913, though the Fed’s domestic approach to policymaking hardly has changed.
A global approach to monetary policy would account for trends in hot money flows in addition to changes in domestic unemployment and inflation. First, the Fed, the BoJ, the Bank of England (BoE), and the European Central Bank (ECB), the two foremost of which have set the lower end of the target range for their short-term benchmark interest rates at zero, and the two latter of which have set their short-term benchmark interest rates near zero, should acknowledge that their low interest rate policies promote destabilizing hot money flows into relatively high-growth economies. The four previously mentioned so-called developed world central banks should set interest rates closer to their natural levels, at least levels at which real interest rates are nonnegative, to discourage hot money flows into commodities and foreign asset markets. In general, developed world central banks should raise interest rates when their currencies depreciate, which usually occurs when hot money flows pick up, and vice versa. The convergence of interest rates between the developed world and the so-called emerging markets would reduce upward pressure on commodity prices and on asset prices in economies with appreciating currencies, thus mitigating global inflation.

As for the central banks outside the developed world, global policymakers must recognize the legitimacy of the use of capital controls to prevent hot money flows from destabilizing domestic price levels. The international community must allow nations, like Brazil and China, whose central bankers and finance ministers have been vocal critics of the global inflationary consequences of the Fed’s low interest rate policies and defendants of the use of capital controls in emerging markets, to intervene in foreign exchange markets to stabilize domestic prices and currency values. We already have a precedent for what happens when a developing economy does not control international runs into, and subsequent runs out of, its
domestic asset markets. To avoid a fate similar to that of Japan in the late 1980s and early 1990s, developed economies must raise domestic interest rates toward their natural levels, and emerging economies must be allowed the free use of capital controls (McKinnon, 2012).

5.3 Conclusion

In conclusion, considerable cooperation among global policymakers is necessary to fix the present malfunctioning of the global USD standard. The U.S. must increase savings and raise interest rates, while China must increase spending and be permitted to use capital controls. Contrary to popular U.S. sentiment, the Chinese government revaluing the RMB could lead to a severe economic downturn in China, similar to that experienced by Japan following the JPY revaluation agreed upon during the Plaza Accord. Instead, global policymakers should focus on adjusting spending and saving behavior to balance international trade and adopting global monetary policies to better control hot money flows. Such reforms would promote stability in the global monetary system, and serve the best interests of the U.S., China, and the world.

But in reality, U.S. policymakers show little sign of reigning in their China bashing. If Chinese authorities resume allowing an appreciation of the RMB against the USD, their actions will attract hot money inflows. Ultimately, when the flow of hot money reverses due to an economic slowdown, the consequences may be severely deflationary and analogous to those faced by the Japanese economy over the past approximately twenty years. At the same time, recent China’s relative openness to foreign business and higher non-tradable sector productivity growth is a key difference compared to past Japan. A smaller gap between non-tradable productivity and wage growth in recent China may have led to more sustainable wage growth
than in past Japan. Thus, Chinese wages may be less vulnerable to a fall as extreme as that which occurred to Japanese wages during the mid-1970s following the Nixon Shock.

Nonetheless, the similarities between past Japan and recent China are too numerous and significant to ignore, and we assert that global officials should heed our call for multilateral cooperation in reducing savings and spending imbalances while maintaining a stable exchange rate between the RMB and the USD.
References


