China, Japan, and Maintaining an International Competitive Balance under a Fixed Exchange Rate

RICARDO FERNHOLZ
Department of Economics
Stanford University
Stanford, CA 94305
fernholz@stanford.edu

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Abstract

Post-World War II Japan and China from the 1980s to the present are two of the greatest success stories of economic development in the twentieth century. Interestingly, much of this economic development took place while both countries fixed their respective dollar exchange rates. With both countries expanding much more rapidly than the United States, competitive balance—in the sense of alignment in the price of tradable goods—had to be maintained by the adjustment of macroeconomic variables other than the nominal exchange rate. We show that in the case of both China and Japan nearly all of this adjustment came in the form of money wage growth in the manufacturing sector that far outstripped that in America. On the monetary side, between 1950 and 1971 (under the Bretton-Woods system of fixed dollar exchange rates) Japan did not have to deal with continual pressure to appreciate the yen as China has had with the yuan since 1994. This uneasiness about the credibility of the fixed dollar exchange rate in China, coupled with a massive accumulation of foreign denominated assets, has led to the syndrome of conflicted virtue there. We examine the effects of this, as well as its implications in terms of the sustainability of the yuan-dollar exchange rate into the future.
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1 Introduction

Since the end of World War II, the world has seen a number of inspiring stories of economic development. In both Western Europe and East Asia, a handful of previously underdeveloped nations managed to transform themselves into nations with modern, vigorous economies in the span of a few decades. No two countries exemplify this success better than Japan and China.

Around 1950, Japan began to intensively modernize its economy, with growth largely buoyed by its rapidly expanding export industries. This campaign was so successful that, by the 1980s, Japan was one of the world’s largest economies and arguably its premier manufacturer of high-tech products. On the other hand, China’s emergence has been a more recent phenomenon. In the early 1980s, China started to open its economy and was soon in the midst of a rapid export-driven expansion, much like that of Japan. This expansion continues today, as China’s economy remains one of the fastest growing in the world, and should soon be among the largest as well.

One of the important similarities between these two episodes is that much of both nations’ rapid growth occurred while maintaining fixed dollar exchange rates. Indeed, Japan fixed its exchange rate at 360 yen per dollar in 1950 and maintained this rate until the collapse of the Bretton-Woods fixed dollar standard in 1971. Similarly, China fixed its exchange rate at 8.28 yuan per dollar in 1994, and has not strayed from this rate since. Because both countries expanded much faster than the United States during these years, a competitive macroeconomic adjustment, coming from somewhere other than the exchange rate, was necessary.

In Section 2, we examine this adjustment process using the Lindbeck (Scandinavian) model of wage adjustment as our guide. In particular, we show that rapid nominal wage growth in manufacturing allowed both China and Japan to remain competitively balanced with the United States. In Section 3, we shift our focus to the conduct of monetary policy and analyze some of the issues that China and Japan have faced. We discuss the effect of the recent accumulation of liquid dollar assets in China, and show how this, combined with fears that the yuan will appreciate against the dollar, has resulted in the syndrome of conflicted virtue. In order to unify our discussions in Sections 2 and 3, we emphasize the inevitable collapse of Japan’s fixed exchange rate and the future sustainability of China’s fixed exchange rate throughout.
2 Competitive Macroeconomic Adjustment on the Real Side of the Economy

In this first section we examine the movement of the basic macroeconomic variables—prices, productivity, output, and wages—in China and Japan versus the United States. With their dollar exchange rates fixed, both China and Japan expanded much more rapidly than the United States, thus forcing other variables to adjust in order to maintain a competitive balance. We refer to competitive balance here in the sense of alignment in the wholesale price of tradable goods.

We show that this adjustment process in China over the last ten years has been very similar to that in Japan from 1950 to 1971, with some important differences. In both countries, expansionary monetary policy allowed nominal wages in the tradable goods sector to grow far faster than in the United States, thus maintaining a competitive balance. At the same time, however, consumer prices behaved quite differently. In fact, the less protectionist policies of the Chinese government have helped that country avoid any exaggerated Balassa-Samuelson effect such as that seen forty years ago in Japan.

The similarities we observe in this section are significant because they represent a common pattern of real macroeconomic behavior among rapidly industrializing economies that choose to fix their exchange rates. Furthermore, our data and analysis demonstrate that smooth competitive adjustment in such situations is indeed possible without repeatedly appreciating the exchange rate.

2.1 The Lindbeck Model of Wage Adjustment

In order to guide our discussion of competitive adjustment in China and Japan, we need a model that explains the movement of the relevant macroeconomic variables. Following the analysis in McKinnon and Ohno (1997), we shall use the Scandinavian model of wage adjustment from Chapter 1 of Lindbeck (1979) to do this. We present the simplest version of the model here, as that provides the basic framework that we need.

In the Scandinavian model, the economy is split into a tradable sector and a nontradable sector, each producing one good (typically, the nontradable sector is primarily a service sector). Because of arbitrage opportunities in the world market for tradable goods, the law of one price must hold for these goods and so we have $p_t = p_w e$, where $p_t$ is the domestic price of tradable goods, $p_w$ is
the world market price for tradable goods, and $e$ is the exchange rate. Taking the logarithm of both sides of this equation, we have $\log p_t = \log p_w + \log e$, which leads to the desired relationship between the relative rates of change: $\Delta p_t / p_t \approx \Delta p_w / p_w + \Delta e / e$.

We shall follow the convention and write this relationship as

$$\hat{p}_t = \hat{p}_w + \hat{e}, \quad (2.1)$$

where a hat above a variable denotes the relative rate of change of the variable. In a similar manner, we can derive

$$\hat{w}_t = \hat{p}_t + \hat{q}_t, \quad (2.2)$$

where $w_t$ is the wage in the tradable sector and $q_t$ is the productivity of labor in the tradable sector. Of course, (2.2) requires that we assume constant factor income shares in the production function for tradable goods. In other words, we assume that $w_t = p_t Q_t / L_t$, where $Q_t$ is value added and $L_t$ is labor input (both variables are for the tradable sector). Thus, we can see that $q_t$ is defined as $Q_t / L_t$.

One of the simplifying assumptions we shall make is that of a homogenous labor market (Lindbeck (1979) presents the model in this manner as well). This is often the result of solidarity between labor unions in different sectors of the economy, thus keeping wage growth relatively equal across sectors. We shall see later that, roughly speaking, this is an empirically valid assumption for both Japan and China (see Figure 2.9, for example). With the homogenous labor market we arrive at

$$\hat{w}_t = \hat{w}_n, \quad (2.3)$$

where $w_n$ is the wage rate in the nontradable sector.

To derive the equation for prices in the nontradable sector, we again assume constant factor income shares in the production function of those goods. By its nature, the nontradable sector is not subject to international arbitrage opportunities, and so the price level is determined purely by the production function. In a manner similar to (2.2), we obtain

$$\hat{p}_n = \hat{w}_n - \hat{q}_n, \quad (2.4)$$

where $p_n$ is the domestic price level for nontradable goods and $q_n$ is the productivity of labor in the nontradable sector. A simple substitution using (2.3) and (2.2) yields

$$\hat{p}_n = \hat{p}_w + \hat{e} + \hat{q}_t - \hat{q}_n. \quad (2.5)$$
So, in the Scandinavian model of wage adjustment, given the assumptions we have made so far, the price level in the nontradable sector of the economy is affected by the world price for tradable goods, labor productivities in the tradable and nontradable sectors, and the exchange rate.

We can now derive an equation for the overall domestic price level. If we let \( \alpha \) be the weight of tradable goods in the domestic price index (so \( p = p_t^{\alpha} p_n^{1-\alpha} \)), we have

\[
\hat{p} = \alpha\hat{p}_t + (1 - \alpha)\hat{p}_n,
\]

which can be transformed by simple substitutions into

\[
\hat{p} = \hat{p}_w + \hat{e} + (1 - \alpha)(\hat{q}_t - \hat{q}_n).
\]

This is the main equation of the basic version of the model in Lindbeck (1979). It is important to note that, so far, we have ignored the demand side of the economy. This can be justified by assuming that it is cost-accommodating, and so has no influence on the domestic price level of either tradable or nontradable goods.

We now want to consider the implications of this model. That will, of course, depend on which variables are treated as exogenous and endogenous, respectively. Let us first assume that labor productivity in both sectors (\( \hat{q}_t \) and \( \hat{q}_n \)), the weight of each sector in the domestic price index (\( \alpha \)), and the international price of tradable goods (\( \hat{p}_w \)) are all exogenous variables. Since our analysis is to apply to the situation of China and Japan under fixed dollar exchange rates, we shall assume that \( \hat{e} = 0 \) throughout. Additionally, we shall assume that \( \hat{q}_t > \hat{q}_n \). This is usually an empirically realistic assumption since the sheltered nontradable sector of an economy faces no international competition by definition, and so it is under less pressure to improve productivity.

With everything in place, we see that there are two main factors that contribute to domestic inflation. First, any increase in the international price of tradable goods (\( \hat{p}_w \)) will lead to a corresponding increase in the domestic price level. Intuitively, it is clear that a rise in the price of tradable goods will increase the price of all goods in the domestic market. However, the model goes further and actually predicts an equal increase in the domestic price level. If only certain goods in the domestic market are tradable, why would one expect a one-for-one increase in the price level? The reason is that an increase in the price of tradable goods leads to an increase in the tradable sector wage (\( \hat{w}_t \)) by (2.2). This, in turn, affects the wage rate in the nontradable sector because of (2.3), which then drives up the price of nontradable goods. Thus, we have an increase in the price of nontradable goods in the domestic market to go along with the exogenous increase in the
world price of tradable goods. The mechanism behind this is the solidarity of wage setting policy by unions in different domestic industries (tradable and nontradable).

Secondly, the model predicts that a large gap between productivity growth in the tradable goods sector and the nontradable goods sector \((\hat{q}_t - \hat{q}_n)\) will drive up the domestic price level. To understand this intuitively, we consider the effects of an increase in \(\hat{q}_t\). Equation (2.2) tells us that an increase in the productivity of labor in the tradable goods sector will lead to an equal increase in the wage in that sector. But, because wages in the two sectors move together, the wage in the nontradable sector increases as well, leading to an increase in the price of nontradable goods and therefore increasing the overall price level of the domestic economy as a whole.

2.2 Productivity and International Competitive Balance

Having introduced the Scandinavian model of wage adjustment, we can now begin looking at the actual data within this context. In Tables 2.1 and 2.2, we report the average yearly movement of some key macroeconomic variables for Japan and China (versus the United States) during the relevant years.

In these tables, labor productivity is calculated by taking the value added in a particular sector and dividing it by the number of workers in that sector. The Japanese labor productivity and nominal wage data are only for the manufacturing sector (tradable goods), while in the case of China we include the entire secondary sector of the economy as classified in NBS (2003), minus construction. Therefore, not only does this include the manufacturing sector, but also the mining and quarrying sector, and the production and supply of electricity, water, and gas sector, both of which are not normally classified as tradable goods sectors. The reason for this discrepancy is that NBS (2003) does not report value added for the manufacturing sector in China alone. As a result, the number in Table 2.2 under labor productivity movement for China, 10.77 percent, is probably slightly lower than the true labor productivity movement in China’s tradable goods sector.

We also note that in Table 2.2 we report the ex-factory price index from NBS (2003) under wholesale prices for China, instead of a wholesale price index. The reason for this is that China does not publish a wholesale price index. Furthermore, the ex-factory price index is defined as an index of the first sale price of industrial products, and thus it is comparable to the standard wholesale price index.

<table>
<thead>
<tr>
<th>Wholesale prices</th>
<th>Money wages</th>
<th>Consumer prices</th>
<th>Industrial production</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S.</td>
<td>Japan</td>
<td>U.S.</td>
<td>Japan</td>
</tr>
<tr>
<td>1.63</td>
<td>0.69&lt;sup&gt;a&lt;/sup&gt;</td>
<td>4.52</td>
<td>10.00</td>
</tr>
<tr>
<td>Real GDP</td>
<td>Nominal GDP</td>
<td>Narrow money</td>
<td>Labor Productivity</td>
</tr>
<tr>
<td>U.S.</td>
<td>Japan</td>
<td>U.S.</td>
<td>Japan</td>
</tr>
<tr>
<td>3.84</td>
<td>9.45&lt;sup&gt;a&lt;/sup&gt;</td>
<td>6.79</td>
<td>14.52&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

Table 2.2: Key economic indicators for China and the United States, 1994 - 2002 (average annual percent change). Note that labor productivity and money wages refer to the industrial sector. Source: IMF, International Financial Statistics, CD-ROM, October 2003, unless otherwise noted. Chinese manufacturing wage data, labor productivity data, real income data, and wholesale price data are from China Statistical Yearbook, 2003. Labor productivity data for the U.S. are obtained from the index for the nonfarm business sector as reported by the Bureau of Labor Statistics.

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<tr>
<td>U.S.</td>
<td>China</td>
<td>U.S.</td>
<td>China</td>
</tr>
<tr>
<td>1.10</td>
<td>1.24&lt;sup&gt;a&lt;/sup&gt;</td>
<td>3.02</td>
<td>10.87</td>
</tr>
<tr>
<td>Real GDP</td>
<td>Nominal GDP</td>
<td>Narrow money</td>
<td>Labor productivity</td>
</tr>
<tr>
<td>U.S.</td>
<td>China</td>
<td>U.S.</td>
<td>China</td>
</tr>
<tr>
<td>3.19</td>
<td>8.41</td>
<td>5.04</td>
<td>10.51</td>
</tr>
</tbody>
</table>

Perhaps the most striking similarity in the data in Tables 2.1 and 2.2 is the tremendous gap between the rate of economic growth in China and Japan versus that in the United States. This gap can be seen in dramatic fashion in Figures 2.1 and 2.2, where real income and industrial output are plotted over time. Both China and Japan, while maintaining a fixed dollar exchange rate, expanded...
much more rapidly than the United States. From 1994 to 2002, Chinese real income and industrial output increased an average of 8.41 percent and 12.17 percent, respectively—well over twice as fast as the corresponding rates of growth in the United States. In postwar Japan, the numbers are similar. In situations such as these, competitive balance with the rest of the world, in the sense of parity among wholesale prices for tradable goods, is normally preserved by the rapidly expanding economy appreciating its currency. As we know, however, both China and Japan maintained fixed dollar exchange rates during these periods, so any adjustment had to come from elsewhere.

From Tables 2.1 and 2.2, we can see that it was not only Japanese and Chinese production that grew faster than in the United States, but also money wages in manufacturing. Once again, a graphical analysis helps demonstrate just how dramatic this difference is. In Figures 2.3 and 2.4, we plot nominal wages in manufacturing for China, Japan, and the United States. From 1994 to 2002, money wages in the industrial sector of the Chinese economy grew over three times as fast as in the United States—10.87 percent versus 3.02 percent. For the Japanese economy from 1950 to 1971, this gap is not quite as large, but equally impressive, as Japanese wages grew an average of

![Figure 2.1: Real income and industrial production in the United States and Japan from 1952 to 1971. Semilog scale, 1952 = 100. Source: IMF, International Financial Statistics, CD-ROM, October 2003. Real income data for Japan are obtained from OECD Economic Surveys: Japan, 1964-1971.](image)
10 percent per year versus only 4.52 percent per year in the United States.

Such rapid growth in money wages could only be accompanied by expansionary monetary policy in China and Japan. Indeed, this is exactly what we see in Tables 2.1 and 2.2, with narrow money (defined as M1) increasing an average of 16.1 percent in Japan from 1953 to 1971 versus 3.94 percent in the United States from 1951 to 1971 (see Figure 2.5), and 17.82 percent in China from 1994 to 2002 versus 3.8 percent in the United States during the same period (see Figure 2.6). In both China and Japan, narrow money grew faster than nominal GDP while the opposite was true of the United States. Such monetary expansions in China and Japan were consistent with each country’s stated goal of maintaining a fixed dollar exchange rate. Without the expansions, each country’s currency would have appreciated and nominal wages would not have been able to rise as rapidly as they did. Thus, in such a case, repeated currency appreciations, instead of nominal wage growth, would have maintained an equilibrium world price for tradable goods. Note that we shall treat tradable goods as goods created in the manufacturing sector throughout.

If we consider a more direct measure of productivity such as the labor productivity estimates reported in Tables 2.1 and 2.2, we can see this in the context of the Scandinavian model of wage adjustment from Section 2.1. Table 2.2 shows that labor productivity in China from 1994 to 2002
has increased an average of 10.77 percent annually, over three times larger than in the United States, where labor productivity increased an average of only 2.49 percent annually during the same period. Similarly, increases in Japanese labor productivity from 1951 to 1971 are far greater than in the United States from 1950 to 1971—8.92 percent versus 2.55 percent.

From (2.2), this large gap between labor productivity growth must either be accompanied by an equally large gap in wage growth in the tradable goods sector, or by a dramatic decline in the price of tradable goods. But, (2.1) tells us that a decline in the price of tradable goods occurs only if the exchange rate, $e$, also declines, since we are assuming the world market price of tradable goods, $p_w$, is fixed. Of course, a decline in the exchange rate is simply an appreciation of the currency. Therefore, the Lindbeck model predicts exactly what we expected: given the manner in which the Japanese and Chinese economies outperformed the United States during their respective time periods, they could either continuously appreciate their currencies against the dollar, or keep a fixed dollar exchange rate and allow wages in the manufacturing sector to grow more rapidly than in the United States. As we know, both China and Japan chose the latter.

![Figure 2.3: Nominal manufacturing wage growth in the United States and Japan from 1950 to 1971. Semilog scale, 1950 = 100. Source: IMF, International Financial Statistics, CD-ROM, October 2003.](image)
Interestingly, Tables 2.1 and 2.2 reveal that the difference between nominal wage growth in China and Japan versus that in the United States is nearly in perfect one-to-one correspondence with the difference between their labor productivity growth rates. In other words, the gap between Chinese and American growth in labor productivity is approximately the same as the gap between Chinese and American growth in nominal wages. The same is true of Japan. From 1994 to 2002, Chinese labor productivity in the manufacturing sector grew 8.28 percent faster than in the United States. Meanwhile, nominal wages in industry grew 7.85 percent faster in China, almost completely compensating for this rapid growth in labor productivity, and thus leaving little pressure on domestic tradable goods prices. In a similar manner, from 1951 to 1971 Japanese labor productivity and nominal wages in the manufacturing sector grew 6.37 percent and 5.48 percent faster than in the United States, respectively. Thus, like the case of China, the gap in labor productivity growth in Japan was almost entirely accounted for by faster wage growth. As a result, there was little pressure on the domestic price of tradable goods.

Not all aspects of the competitive adjustment processes in China and Japan have been the same, however. In Figure 2.5, we see that money growth in Japan was volatile and unsteady from 1954...
to around 1958, at which time it settled down to a level well above that in the United States. Similarly, in Figure 2.3 we see that money wage growth in the manufacturing sector of the Japanese economy slowed to levels at or below those in the United States in the early to mid 1950s. This is not a coincidence. When Japan first fixed its exchange rate at 360 yen per dollar in 1950, this was not a fully credible policy, as rapid inflation during the early 1950s—caused by the Korean War—left Japanese prices uncompetitive internationally. The threat of a devaluation was real, leaving expectations about the future dollar-yen exchange rate uncertain, and thus making it difficult for wages to adjust properly and maintain a competitive balance between Japan and the United States (see McKinnon and Ohno (1997)). Interestingly, it was not until the late 1950s, at which time the fixed dollar-yen exchange rate was finally becoming credible, that the Japanese economy really began to take off. In fact, most of the gap in labor productivity growth between Japan and the United States that we observed above occurred during the 1960s (see Johnson (1982) or Jorgenson (1988)).

On the other hand, such exchange rate problems have not, for the most part, been a significant source of trouble for China during the past ten years. From 1994 to 2003, money wages in

the manufacturing sector of the Chinese economy have consistently grown faster than in the United States, albeit with somewhat of a slowdown around the time of the Asian Financial Crisis in 1997 (Figure 2.4). At the same time, money growth has also been more rapid in China (Figure 2.6), and as a result the competitive adjustment process has been relatively smooth.

These examples highlight the importance of future exchange rate expectations. In particular, if the exchange rate is not securely fixed, the competitive adjustment process we have just described does not function properly. In today’s world of floating exchange rates, it is often hard for a country that just fixed its exchange rate to gain any credibility in its policy. It sometimes takes several years of maintaining this policy for future expectations to settle down (as in the case of Japan). Of course, if such credibility can be gained, it can be argued that the competitive adjustment process associated with a rapid economic expansion will be more smooth than under a floating exchange rate.
2.3 Price Movement and the Balassa-Samuelson Effect

We now consider the behavior of prices in China and Japan, continuing with the Scandinavian model of wage adjustment as our guide. In Figures 2.7 and 2.8, we plot the movements of the consumer and wholesale price indices in Japan and the United States from 1952 to 1971, and China and the United States from 1994 to 2002, respectively. Note that in Figure 2.8 we plot the ex-factory price index for China instead of a wholesale price index, an issue we discussed in Section 2.2.

In Section 2.1, after presenting the Scandinavian model, we concluded that any country with a large gap between labor productivity growth in the tradable and nontradable goods (generally services) sectors would have a rapidly increasing general price level (equation (2.7)). Additionally, such a productivity gap should have no effect on the domestic price of tradable goods because the term $\hat{q}_t - \hat{q}_n$ does not enter into (2.1). Consequently, in such a case we should expect an unusually large gap between the general and tradable price indices. Indeed, this is nothing more than the well known Balassa-Samuelson effect. If we associate the consumer price index with the general price

![Graph of Price Indices]


14
level of an economy, and the wholesale price index (or ex-factory price index in the case of China) with the price level of tradable goods, we can begin to draw inferences from our data.

Before continuing, however, we note that our conclusions in the preceding paragraph relied on the crucial assumption that wages in the tradable and nontradable goods sectors move together, regardless of productivity changes in the nontradable goods sector. Recall that this is (2.3). In order to determine the empirical validity of this assumption, we plot the movements of wages for various different sectors of the Chinese economy from 1994 to 2002 in Figure 2.9. There, we can see that wages grew quite uniformly across the different sectors of the economy. In fact, wages in nontradable goods sectors such as social services and wholesale and retail were among the fastest growing in China. As a result, we conclude that (2.3) is indeed a valid assumption to make while analyzing price movements in China from 1994 to 2002. We can reach the same conclusion for price movements in Japan from 1950 to 1971 (see McKinnon and Ohno (1997), Chapter 3).

One of the most significant distinctions between the data in Table 2.1 and the data in Table 2.2 is in the gap between consumer and wholesale price indices. From 1950 to 1971, Japanese consumer

prices increased an average of 5.01 percent annually while wholesale prices increased only 0.69 percent annually. In China from 1994 to 2002, these figures are 3.22 percent and 1.24 percent, respectively, a much smaller gap. In fact, if we look at these numbers more closely and consider Figure 2.8 as well, we see that from 1994 to 1997 China underwent rapid price inflation in which consumer prices rose more sharply than wholesale prices, and then afterwards, from 1997 to 2002, consumer and wholesale prices moved quite closely together. Furthermore, the general price level in China was relatively stable from 1997 to 2002 (it actually went down slightly), after having rapidly increased during the previous three years.

There are several different explanations for this recent period of stable, somewhat deflationary price levels in China. One factor has been a decline in consumer spending. Many of China’s state-owned enterprises have recently been reducing the number of workers they employ in order to avoid redundancy, a policy that has led to rising unemployment and declining consumer confidence and spending. Additionally, a growing imbalance between economic development in rural and urban areas, combined with a persistent lack of infrastructure in these rural areas, has also reduced

![Figure 2.9: Nominal wages across different sectors of the Chinese economy from 1994 to 2002. Semilog scale, 1994 = 100. Source: China Statistical Yearbook, 2003.](image-url)
spending. Another deflationary factor has been a steady increase in the overall level of supply in the Chinese economy. During the first half of the 1990s, China underwent an unprecedented investment boom that has led to a buildup of production supply that far exceeds final demand. Finally, the deflationary effect of the Asian Financial Crisis in 1997 and the recent economic slowdown in the United States have also had a downward effect on price levels in China. For a more detailed analysis of this deflationary period, see Lin (2000) or Yu (2000).

Regardless of the reasons for this recent deflation, in the context of the Lindbeck model the alignment of movements in consumer and wholesale prices and the stabilization of the general price level both point to the same conclusion. Namely, the gap between labor productivity growth in the tradable and nontradable goods sectors in China from 1994 to 2002 was not large. More precisely, this gap was smaller than the gap seen in the Japanese economy from 1950 to 1971. Figure 2.7 demonstrates that Japanese consumer prices grew consistently faster than wholesale prices between 1952 and 1971. This exaggerated Balassa-Samuelson effect is simply not present in the Chinese case. It is important to note, however, that regional productivity gaps do exist and are quite large in China even though the Scandinavian model does not take them into account. A detailed discussion of these regional imbalances can be found in Tan and Zhang (2004).

Why this distinction between Japan and China? At the end of World War II, the Japanese nation and economy were in shambles, so the government naturally assumed an active role in restoring economic prosperity. This government role quickly became more far-reaching and long-term than anything customary, and the end result was the emergence of Japanese developmentalism, or developmental authoritarianism. Besides encouraging the growth of the tradable, manufacturing industries, the Japanese developmentalist state protected vast sectors of the economy from international competition and over-regulated domestic competition in many of these same sectors. This protection extended to sectors well beyond the natural scope of the nontradable goods sector, resulting in the creation of an unusually large and inefficient nontradable goods sector in the postwar Japanese economy (for a more detailed discussion of Japanese developmentalism see Johnson (1982) or McKinnon and Ohno (1997)).

In the framework of the Lindbeck model of wage adjustment, this amounts to a large \(1 - \alpha\) term (because the nontradable goods sector is larger than usual) in (2.6) and a large productivity gap, \(\hat{q}_t - \hat{q}_n\), in (2.7). Both have the same effect. That is, both \(1 - \alpha\) and \(\hat{q}_t - \hat{q}_n\) enter into (2.7) positively, and so should cause general prices to increase more rapidly. Moreover, since neither of these terms
enter into (2.1), we would not expect any effect on the domestic price of tradable goods. Combining the two, we expect to see rapidly increasing consumer prices and relatively stable wholesale prices in Japan from 1950 to 1971. In other words, we expect a growing gap between consumer and wholesale prices, or an exaggerated Balassa-Samuelson effect, in Japan.

Indeed, this is precisely what we observed in Table 2.1 and Figure 2.7. Between 1950 and 1971, Japanese consumer prices grew an average of 5.01 percent annually while wholesale prices only grew 0.69 percent annually. So large a gap is not present in the Chinese case, particularly after prices stabilized there in 1997. This is an important distinction between the two countries because the exaggerated Balassa-Samuelson effect can lead to rapid general price inflation (despite stable wholesale prices) which dramatically complicates monetary policy. This problem can sometimes become severe enough to force a currency appreciation, which then threatens the sustainability of the fixed exchange rate in the future.
3 Monetary Issues and Policy

Having analyzed the competitive adjustment mechanism in terms of productivity and wages in Section 2, we are now ready to look more thoroughly at the monetary side of the economy in Japan and China. We have already seen that both countries allowed their monetary bases to grow rapidly in order to accommodate large increases in nominal wages while maintaining fixed dollar exchange rates, but we have not considered the details of how monetary policy was conducted and what challenges were faced (or in the case of China, what challenges are still being faced).

Because China has been more financially open in the past ten years than Japan was from 1950 to 1971, the experiences of the two economies have been quite different. While Japan’s monetary policy was geared toward maintaining a balance of payments equilibrium, China has consistently run balance of payments surpluses since 1994. One consequence of this has been a massive accumulation of liquid dollar claims against foreigners, which, combined with foreign accusations of unfair Chinese trading practices, has brought the syndrome of conflicted virtue upon the Chinese economy.

In this section we examine these issues, and discuss the sustainability of a fixed dollar exchange rate in the case of both Japan and China. While history has already shown that Japan’s fixed exchange rate was doomed to collapse in 1971, can China avoid such an outcome, and is it desirable for it to try?

3.1 Monetary Policy in Japan

Upon the end of the Korean War in 1953 and the subsequent end to rapid Japanese price inflation, the Japanese economy settled down and began its natural business cycle. It is around this time that the Bank of Japan could begin to normally conduct monetary policy and establish its objectives for the next fifteen years.

Of course, since deciding to fix the yen at 360 to the dollar in 1950, one objective of monetary policy was immediately set. Namely, the Bank of Japan would have to intervene in the foreign exchange market to defend the dollar-yen exchange rate whenever it was necessary. With the exchange rate fixed, such interventions would be necessary any time the Japanese balance of payments was not in equilibrium. More specifically, if the balance of payments was in deficit, it meant that an excess supply of yen existed and so the Bank of Japan would have to intervene by buying yen with its foreign exchange (dollars). Conversely, if the balance of payments was in surplus, demand for
yen exceeded supply and so the Bank of Japan would have to intervene by selling yen and receiving foreign exchange.

It is important at this point to distinguish between a normal and a sterilized foreign exchange intervention. A normal intervention simply refers to a central bank either buying or selling foreign exchange, and doing nothing more. Such interventions can, however, have undesirable effects on a country’s money supply, particularly in the case of large scale interventions. For example, when the Bank of Japan buys yen to defend the dollar-yen exchange rate, this also contracts the Japanese monetary base (because it is buying up yen). If it decides that such an effect is undesirable, the Bank of Japan can offset it by promptly expanding the monetary base by an amount equal to the magnitude of the foreign exchange intervention. As a result, the money supply is left as it was before the intervention. Similarly, if the Bank of Japan intervenes by selling yen, this expands the Japanese monetary base. If such an effect is undesirable, the bank can follow up the intervention with a balancing contraction of the monetary base, thus leaving it as it was before. Anytime a central bank decides to offset the effects of foreign exchange intervention in this manner, it is called a sterilized intervention. Central banks often find sterilized intervention desirable because it allows them to maintain control over the domestic money supply even when massive foreign exchange intervention is a necessity.

As it turns out, Japan, along with many other industrialized nations, often chose to partially sterilize its foreign exchange interventions in the 1950s and 1960s. According to Michaely (1971), when the Bank of Japan was forced to sell dollars and purchase yen, it would usually follow this up by lending to commercial banks, thus sterilizing some of the effects of the intervention on the Japanese money supply. As we shall see in Section 3.2, sterilized intervention has also been an important part of monetary policy in China.

Beyond intervening in the foreign exchange market to defend the dollar-yen exchange rate, the Bank of Japan also took into account non-exchange rate related issues when conducting monetary policy. According to the bank itself, all but two of the thirteen periods of sustained loose or tight monetary policy from 1955 to 1972 were carried out in an attempt to get the balance of payments into equilibrium. More specifically, if the balance of payments was in surplus, the Bank of Japan would increase the rate of growth of the monetary base in an attempt to stimulate domestic demand and thus increase Japanese imports of foreign goods and reduce this surplus. If the balance of payments was in deficit, the rate of growth of the monetary base would be slowed in order to cool
down the domestic economy and thus reduce imports of foreign goods and improve the balance of payments. Normally, such monetary interventions would be sustained until the balance of payments was at an equilibrium, regardless of the effect on other variables such as the domestic price level or the level of employment.

This official policy, as described by statements from the Chairman of the Bank of Japan Policy Board, is consistent with the conclusions of most independent research on the subject. Michaely (1971), for instance, examines monetary policy during periods of balance of payments surplus and periods of balance of payments deficit (from mid-1950 to the late 1960s), and finds that nearly all balance of payments surpluses (deficits) were accompanied by loose (tight) monetary policy from the Bank of Japan. Suzuki (1980) reaches a similar conclusion with a less statistically detailed analysis.

In Figure 3.1, we plot the current account balance and net inflows of foreign direct investment in Japan from 1950 to 1971. Beginning around 1950 and continuing until the late 1960s, Japan maintained very restrictive controls on capital flows. These controls made the nonreserve portion of the Japanese capital account (which includes foreign direct investment) practically negligible in

![Figure 3.1: Current account balance and net foreign direct investment in Japan from 1950 to 1970. Source: OECD, Economic Surveys: Japan, 1964-1971.](image)
the overall balance of payments. Therefore, in practice, the balance of payments was effectively the same as the current account. With this in mind, we can see in Figure 3.1 that the Japanese balance of payments (current account), starting in 1950 and continuing up until about 1968, exhibited no clear trend towards a surplus or a deficit. By the late 1960s, however, this equilibrium had eroded away as the balance of payments ballooned to a surplus of over two billion dollars. We shall return to this growing surplus a little later. For now, it is enough to note that Figure 3.1 supports our conclusion that Japanese monetary policy was directed towards maintaining equilibrium in the balance of payments.

Of course, monetary authorities cannot only concern themselves with the balance of payments. Maintaining a stable domestic price level and full employment must be important considerations as well. And, indeed, this was the case for Japan. More specifically, besides keeping the balance of payments in equilibrium, maintaining a stable domestic wholesale price level and a level of demand compatible with the supply of capital plant and equipment in the economy were also important goals of the Bank of Japan. Full employment is not included in this priority list because the nature of the Japanese economy is such that even in times of economic slowdown, Japanese unemployment does not significantly increase.

Because of Japan’s under-developed economic state at the start of the 1950s, these considerations were not inconsistent with the primary concern of maintaining an equilibrium in the balance of payments. At that time, a shortage of foreign exchange was the main supply constraint on the Japanese economy—it was needed to import primary materials which could then be used to expand the capital equipment base. Consequently, any sustained balance of payments surpluses and the resulting accumulation of foreign exchange would promptly lead to supply expansions. It is precisely this relationship between the balance of payments and the supply side of the economy that allowed all three of the Bank of Japan’s primary goals to match up.

To understand how this worked, consider a situation in which domestic supply of goods and services exceeds domestic demand. In an open economy such as Japan, this implies that the balance of payments is in surplus (the excess supply is exported abroad). In response, the Bank of Japan then loosens monetary policy, which helps stimulate domestic demand and reduce the balance of payments surplus. But, because the balance of payments surplus has caused an accumulation of foreign exchange and therefore an expansion of the supply side of the economy, this monetary expansion does not exert much upward pressure on domestic prices. As a result, the Bank of Japan
is able to realign domestic demand with domestic supply and return the balance of payments to equilibrium without destabilizing domestic prices. Conversely, if domestic demand exceeds domestic supply, this process is reversed. In such a situation, the balance of payments is in deficit as domestic demand is satisfied by importing from abroad. The Bank of Japan then responds by tightening monetary policy, which helps curb domestic demand and reduce the balance of payments deficit. Again, however, because the balance of payments deficit has drained Japanese foreign exchange reserves and thus slowed supply side expansion, this monetary contraction causes little deflationary pressure. Therefore, the Bank of Japan is able to reduce the balance of payments deficit and realign domestic supply with domestic demand without significantly affecting prices. As before, the bank’s three main policy objectives do not contradict each other.

Interestingly, the 1950s and 1960s turn out to be a period when an approximate balance between domestic saving and investment was commonplace among most of the largest economies of the world, including Japan. As evidence, Feldstein and Horioka (1980) find that, during this time period, changes in saving and investment within individual countries were highly correlated. Furthermore, Bayoumi (1990) reveals the mechanics of this balance by demonstrating that, within a particular country, if private saving sometimes did not quite match up with domestic investment (as was often the case), the government would adjust fiscal policy and hence public saving, so that overall saving would indeed match investment. It is precisely this investment-saving balance that kept the balance of payments of countries such as Japan close to equilibrium and allowed monetary policy to pursue equilibrium without contradicting other policy considerations. In a sense, then, this balance aided the sustainability of Japan’s fixed dollar exchange rate policy. Without it, a fixed dollar exchange rate might have meant running persistent balance of payments surpluses or deficits, something which can eventually lead to problems. As we shall see in Section 3.2, such a saving-investment balance is not typical and is especially not the case in today’s world economy where, since the early 1990s, China has been running consistent balance of payments surpluses.

By the late 1960s, the Japanese economy had graduated to a more mature state of development. No longer was a shortage of foreign exchange the major constraint on the supply side of the economy, but instead shortages of labor and a clean environment became prominent. As a result, the alignment of the Bank of Japan’s three main policy objectives—stable wholesale prices, equilibrium in the balance of payments, and maintaining a level of demand compatible with the supply of capital plant and equipment in the economy—was no longer guaranteed. Suzuki (1980) describes this shift in the
economic environment:

As the resource constraint moved from foreign exchange and capital plant and equipment to such factors as labor, the environment, and energy, the level of effective demand could no longer be judged on the basis of the relation between overall supply capacity, available foreign exchange, and capital equipment, but had to be decided in the light of its relation with the scarcer resources of labor, a healthy environment, and oil supplies. Estimating the appropriate level of final demand on the basis of these criteria was no guarantee that the result would be consistent with the other two objectives of internal price stability and equilibrium in the balance of payments. (Yoshio Suzuki 1980, p. 212)

If we return to our analysis of a balance of payments surplus from above, we can see this more clearly. With the Japanese economy in its new state, the constraints on the supply side of the economy are now independent of the balance of payments, and so it is no longer valid to assume that a balance of payments surplus will lead to a supply side expansion. Consequently, if a shortage of nontradable items such as labor, a clean environment, and land (all of which are unaffected by the balance of payments) is causing domestic price inflation, even though a monetary expansion may eliminate a balance of payments surplus, it will likely cause prices to rise even faster. Hence, the contradiction in the three main policy objectives.

If we go back to Figures 2.7 and 3.1, we see that during this period from the late 1960s to the early 1970s Japanese wholesale prices were starting to rise faster than previously, while, simultaneously, the Japanese balance of payments was exploding to a surplus of over two billion dollars. Indeed, this is precisely the situation we just described above. The only difference is the policy response undertaken by the Bank of Japan; it chose to stray from its main policy objective of maintaining an equilibrium in the balance of payments in order to try to stem the rise in wholesale prices. This meant a tightening of monetary policy (initiated in 1969), and its effect on the balance of payments surplus was predictable—it grew even larger (see Figure 3.6).

By the late 1960s, a combination of loose monetary policy and expansionary fiscal policy in the United States had induced its wholesale prices to begin rising more rapidly than they had previously (Figure 2.7). With respect to the rules of the game for the fixed-rate dollar standard that prevailed at the time (see McKinnon (1996)), this meant that the world price of tradable goods was no longer being properly anchored. Consequently, the rest of the world began to feel the inflationary pressure that this brought upon them, with some countries going so far as to severely tighten their monetary
policies in an attempt to get their domestic price inflation below that in the United States. This, in turn, contributed to American sentiments at the time that the dollar was overvalued against foreign currencies and strengthened demands that the dollar be devalued. These events culminated in President Richard Nixon’s forced devaluation of the dollar in 1971, effectively ending the fixed-rate dollar standard and ushering in an era of floating exchange rates.

It is important to note that in the years just prior to this devaluation, there was a rapid anticipatory rush out of dollars. In the case of Japan, this meant a significant rush into yen and a rapid accumulation of foreign exchange reserves. We can see this quite starkly in Figure 3.2 where we plot the accumulation of liquid foreign assets in Japan from 1953 to 1971. In this figure, official foreign exchange reserves include government holdings of gold. Net foreign assets of banking institutions represent net commercial bank holdings of foreign assets as detailed in IMF (2003). Short-term and unrecorded capital outflows include non-monetary short-term capital outflows and a cumulative measure (starting at zero prior to 1950) of the net errors and omissions

![Figure 3.2: Liquid foreign asset accumulation in Japan from 1953 to 1971. Source: OECD, Economic Surveys: Japan, 1964-1971. Official foreign exchange reserves and net foreign assets of banking institutions data are from the IMF, International Financial Statistics, CD-ROM, October 2003.](image-url)
category of the Japanese balance of payments. Listing errors and omissions as cumulative unrecorded capital outflows follows by convention from McKinnon and Schnabl (2004), and is commonplace when treating countries that exhibit restrictive controls on capital outflows. Finally, other liquid foreign assets include such things as net securities sales to foreigners, net loans to foreigners, and net longer-term sales of trade credits to foreigners. As expected, we can see in Figure 3.2 just how dramatically Japan’s capital controls managed to restrict the accumulation of foreign assets other than official exchange reserves up until the late 1960s and the loosening of these controls.

For now, however, we are only concerned with the buildup of foreign exchange reserves. And, indeed, Figure 3.2 demonstrates that after hovering around zero for most of the 1950s and 1960s, Japan’s official holdings of foreign exchange began to explode around 1969, eventually reaching a level of over 10 billion dollars by 1971. We can clearly see the extent to which investors were betting on the dollar devaluing against the yen. But, was such a devaluation a foregone conclusion?

As long as the United States’ perception that the dollar was overvalued against other currencies grew, such a devaluation was indeed inevitable. Additionally, if wholesale price inflation in the United States continued to remain uncomfortably high for the rest of the world, it was probably undesirable for foreign countries to maintain fixed dollar exchange rates anyway. The rules of the game for the fixed-rate dollar standard clearly stipulate that the United States must anchor the world price level by keeping domestic inflation under control (McKinnon (1996)), a rule that the United States was clearly violating. Thus, there is little that the Bank of Japan or any other foreign central bank could have done to prevent the devaluation of the dollar.

3.2 Conflicted Virtue and Monetary Policy in China

The conduct of monetary policy in China has been quite different from the Japanese experience of the 1950s and 1960s. If nothing else, much of this can be attributed to the vast differences between the world economy of today and that of forty years ago.

For one thing, since the 1980s the domestic balance between saving and investment that was once so common in countries has all but vanished, with the most egregious example being the United States’ burgeoning current account deficits in the past few years. During the 1980s and into the early 1990s, China maintained a rough current account balance and it looked as if it could perhaps avoid any large, sustained balance of payments disequilibria. Unfortunately, this trend
has all but disappeared since about 1994, when China began to run consistent current account surpluses coupled with even larger inflows of foreign direct investment. This combination has led to sustained large scale balance of payments surpluses over the past ten years. We plot this situation in Figure 3.3. According to the figure, starting in 1992, net foreign direct investment into China increased dramatically and has remained well above 30 billion dollars annually since 1994, when China fixed its dollar exchange rate. Similarly, in every year since 1994 China has run a current account surplus, with the peak coming in 1997 when this surplus ballooned to nearly 40 billion dollars.

In order to understand the significance of this disequilibrium in the balance of payments, we need to first consider the stability of the dollar-yuan exchange rate. Since fixing its exchange rate at 8.28 yuan per dollar in 1994, China has faced two major threats against this fixed rate. The first occurred in the midst of the East Asian Financial Crisis of 1997-98, when depreciations by almost all of China’s East Asian neighbors put tremendous deflationary pressure on the Chinese economy (see Figure 2.8) and hurt the competitiveness of Chinese exports. Despite this turbulence

![Figure 3.3: Current account balance and net foreign direct investment in China from 1990 to 2002. Source: IMF, International Financial Statistics, CD-ROM, October 2003.](image)
and a plethora of advice from foreign economists telling it to depreciate, China held fast to its fixed dollar exchange rate and chose instead to combat these problems with a large scale fiscal expansion by the government. It is widely accepted today that China’s refusal to depreciate the yuan helped to stabilize the East Asian economies during the crisis and aided in the region’s speedy post-crisis recovery (McKinnon and Schnabl (2004)).

The second major threat against the Chinese currency is more recent. Because the current account and the capital account always sum to zero, China’s consistent current account surpluses since 1994 have been matched by equal capital outflows. Furthermore, since foreign direct investment has not been a source of capital outflow during this same time period (indeed, it has been a significant source of capital inflow), this outflow has had to come in a more liquid form. Of course, capital outflows mean simply that China has been lending to foreigners. Such lending would normally not be a problem, except that, in this case, because of the predominance of the dollar in world finance, most of it has had to be in dollars instead of yuan. This, in turn, has meant the rapid accumulation of liquid dollar denominated claims on foreigners.

It is precisely this accumulation of liquid dollar assets in China that has led to recent pressure on the Chinese currency. In order to understand how this occurs, we must first understand what is meant by the syndrome of conflicted virtue. McKinnon and Schnabl (2004) describe this title:

Countries that are “virtuous” by having a high saving rate tend to run surpluses in the current account of their international balance of payments, i.e., lend to foreigners. But, with the passage of time, two things happen. (1) As the stock of dollar claims cumulates, domestic holders of dollar assets worry more about a self-sustaining run into the domestic currency forcing an appreciation. (2) Foreigners start complaining that the country’s ongoing flow of trade surpluses is unfair, and results from an undervalued currency. Of course (1) and (2) interact. The greater are foreign mercantilist pressures for appreciation of the domestic currency, the greater is the concern of the domestic holders of dollar assets. As runs out of dollars into the domestic currency begin, the government is “conflicted” because appreciation could set in train serious deflation ending with a zero interest liquidity trap. (Ronald McKinnon and Gunther Schnabl 2004, p. 15)

Because China has a relatively stable financial history, domestic firms and households generally prefer to hold their assets in yuan instead of dollars. Dollar assets represent a risk to these domestic asset holders since the possibility of a fluctuation in the dollar-yuan exchange rate always exists.
The main concern is that an appreciation of the yuan against the dollar would lower the yuan value of their assets. Consequently, recent years have seen major conversions of dollar assets into yuan in China, much like the runs out of dollars described in McKinnon and Schnabl (2004) above.

At the same time as this accumulation of dollar denominated assets, China’s burgeoning balance of payments surpluses have made China and its fixed exchange rate increasingly the target of outside criticism, particularly from the United States and Japan. Accusations of unfair trading practices and excessive competitiveness, sometimes coupled with threats of trade sanctions if the yuan is not appreciated against the dollar, have become widespread.

The major complaint of the United States is that China’s fixed dollar exchange rate is keeping the yuan artificially low against the dollar, and this is contributing to the growing bilateral trade deficit the United States has with China. We show this bilateral trade deficit in Figure 3.4, where we can see that since 1990 it has been growing rapidly to the point where by 2003, according to the U.S. Department of Commerce, it had reached nearly 125 billion dollars. As long as this trend continues (there is no reason to think it will not), pressure by the United States on China to appreciate its currency may become even more intense. Japan, on the other hand, is concerned that exports

![Figure 3.4: Bilateral United States trade balance with China from 1990 to 2003. Source: U. S. Department of Commerce.](image-url)
of very inexpensive Chinese products are contributing to the crippling deflation that has slowed its economy since the 1990s. These feelings have prompted leading officials in the Japanese government to pressure the Chinese to appreciate the yuan.

Why doesn’t China just concede to the demands of foreigners and appreciate its currency? This may seem like a simple solution to the conflicted virtue dilemma, but it can have devastating consequences. The most telling example has been the experience of Japan over the last thirty years. After floating the yen in 1971, repeated appreciations of the yen against the dollar followed for the next twenty years (usually because of mounting American pressure over bilateral trade imbalances), each time imposing tremendous deflationary pressure on the Japanese economy. The appreciations were intended to reduce Japan’s substantial bilateral trade surpluses with the United States, but instead their only noticeable effect was to cripple the Japanese economy through deflation. By the mid 1990s, United States pressure to have the yen appreciate was no longer part of official policy. However, despite this important shift, Japan’s economic woes have not gone away as a substantial negative risk premium on interest rates for yen assets has persisted, with damaging economic consequences (see Goyal and McKinnon (2003)).

Thus, it seems likely that it is in China’s best interest to avoid acquiescing to this foreign pressure and appreciating the yuan against the dollar. And, indeed, to this day this is what China has done. However, because growing fear of appreciation has resulted in a tremendous run from dollars into yuan, in recent years the People’s Bank of China has had to intervene massively in the foreign exchange market to defend the fixed exchange rate. This, in turn, has meant an accelerated accumulation of foreign exchange and other liquid foreign assets in China. To get a better idea of the size of this liquid dollar asset buildup, and to compare it with the experience of Japan in the 1950s and 1960s, we shall now devise two distinct methods of estimating the extent of liquid asset accumulation in an economy.

We begin this process with the basic balance of payments identity. Namely,

\[ CA + CP = 0, \]  

where \( CA \) is the current account and \( CP \) is the capital account. Of course, the problem now is that the capital account encompasses liquid and illiquid assets. We need to separate the capital account so that we can distinguish between the two. If we let \( \Delta OER \) be the change in official exchange reserves, \( \Delta PFA \) be the change in private foreign assets, \( FDI \) be inflows of foreign direct investment, \( PF \) be net inflows of portfolio investment (securities), \( L \) be net loans from foreigners,
be net purchases of trade credits from foreigners, \( S \) be net inflows of non-monetary short-term capital, and \( OUT \) be unrecorded capital outflows, then we can write the capital account as

\[
CP = FDI + PF + L + TC + S - OUT - \Delta OER - \Delta PFA.
\]  

(3.2)

We note here that unrecorded capital outflows (\( OUT \)) refer simply to the net errors and omissions section of the balance of payments, a convention that we introduced and explained in Section 3.1.

In order to clarify (3.2), we note that capital outflows enter into the capital account with a minus sign, while capital inflows enter into it with a plus sign. The reasoning behind this is that a capital inflow represents a loan from foreigners and therefore the sale (or export) of an asset, so it enters the capital account with a plus sign (just as exports of goods enter into the current account with a plus sign). In (3.2), the capital inflows are precisely \( FDI, PF, L, TC, \) and \( S \). Conversely, a capital outflow represents a loan to foreigners and thus the purchase (or import) of an asset. Again, if we look at (3.2) we can infer that \( OUT \) has a minus sign because it represents a capital outflow, and \( \Delta OER \) and \( \Delta PFA \) have minus signs because they represent imports of foreign assets.

We now want to group \( PF, L, \) and \( TC \) together, and let \( OLA = -PF - L - TC \), where \( OLA \) simply refers to other liquid foreign assets. Such a label is valid because portfolio investment, loans, and trade credits represent liquid capital flows, and, furthermore, when we reverse their signs they become net capital outflows, and hence assets. With this substitution in place, we can now rewrite (3.2) as

\[
CP = FDI + S - OLA - OUT - \Delta OER - \Delta PFA,
\]  

(3.3)

which we can then substitute into (3.1) to obtain

\[
CA + (FDI + S - OLA - OUT - \Delta OER - \Delta PFA) = 0.
\]  

(3.4)

Knowing that foreign direct investment (\( FDI \)) represents the only truly illiquid capital flow in (3.3), we can make a simple algebraic manipulation to (3.4) in order to obtain an expression for the flow of foreign liquid assets into an economy in a given year. If we let \( FFL \) be this flow of liquid assets, we have

\[
FFL = CA + FDI = OLA + OUT + \Delta OER + \Delta PFA - S.
\]  

(3.5)

From (3.5), we conclude that liquid foreign asset accumulation can be indirectly estimated by taking the sum of cumulative current account balances and cumulative inflows of foreign direct investment. To understand this relationship intuitively, we note that (3.5) simply states that in a
given year, the current account plus any illiquid liabilities to foreigners must match the flow of liquid foreign assets. This is a simple consequence of the fundamental balance of payments identity coupled with the observation that the capital account is made up of flows of liquid and illiquid assets.

Now that we have two methods of estimating liquid foreign asset accumulation, we are ready to apply both to Japan and China. We shall first consider the left side of (3.5). In Figure 3.5, we plot cumulative current account surpluses and cumulative inflows of foreign direct investment in China from 1990 to 2002. We do the same for Japan between 1950 and 1971 in Figure 3.6. Figure 3.5 shows just how massive this accumulation of assets has been in China, especially in the last five years. By 2002, cumulative current account surpluses and cumulative net inflows of foreign direct investment amounted to nearly 600 billion dollars. In addition, we can see that net inflows of foreign direct investment have been primarily responsible for this rapid buildup, although current account surpluses have been far from negligible, their cumulative amount reaching nearly 200 billion dollars in 2002.

This is in stark contrast to the case of Japan in Figure 3.6. From 1950 until about 1968, the current account plus any illiquid liabilities to foreigners must match the flow of liquid foreign assets. This is a simple consequence of the fundamental balance of payments identity coupled with the observation that the capital account is made up of flows of liquid and illiquid assets.

Now that we have two methods of estimating liquid foreign asset accumulation, we are ready to apply both to Japan and China. We shall first consider the left side of (3.5). In Figure 3.5, we plot cumulative current account surpluses and cumulative inflows of foreign direct investment in China from 1990 to 2002. We do the same for Japan between 1950 and 1971 in Figure 3.6. Figure 3.5 shows just how massive this accumulation of assets has been in China, especially in the last five years. By 2002, cumulative current account surpluses and cumulative net inflows of foreign direct investment amounted to nearly 600 billion dollars. In addition, we can see that net inflows of foreign direct investment have been primarily responsible for this rapid buildup, although current account surpluses have been far from negligible, their cumulative amount reaching nearly 200 billion dollars in 2002.

This is in stark contrast to the case of Japan in Figure 3.6. From 1950 until about 1968,
cumulative current account surpluses and net inflows of foreign direct investment were almost negligible (even negative for a few years), barely even climbing above one billion dollars up until 1968. Note that negative net inflows of foreign direct investment, because they point downwards in Figure 3.6, overlap the bar that represents current account surpluses (hence we see an overlap in the representative patterns). Interestingly, we do see a rapid accumulation of liquid foreign assets in Japan (nearly 11 billion dollars), entirely in the form of large cumulative current account surpluses, between 1969 and 1971, at which time the yen was forced to appreciate. As we described in Section 3.1, this was largely due to the Bank of Japan’s tight monetary policy at a time when the balance of payments was already in surplus.

What kind of results do we get if we try the more direct method of estimating liquid foreign assets given by the right side of (3.5)? Because of stringent Chinese restrictions on short term capital flows, we shall assume that $OLA$ and $S$, the two short-term capital flows in (3.5), are both zero. Thus, directly estimating the liquid foreign asset accumulation in China consists of counting official foreign exchange reserves, net private foreign assets, and cumulative unrecorded capital outflows.
In Figure 3.7, we plot the movement of these three variables, as well as the total of the three, in China from 1994 to 2002. We note that, in this figure, official foreign exchange reserves do not include government holdings of gold, and net foreign assets of banking institutions represent net commercial bank holdings of foreign assets as detailed in IMF (2003).

As in Figure 3.5, we can see that the accumulation of liquid foreign assets inside China has been steadily growing since 1994, with the most rapid growth in the past couple of years. By 2002, liquid foreign asset accumulation totalled over 500 billion dollars. This is indeed a large number, although somewhat less than what we estimated in Figure 3.5 above. If we look back to Figure 3.2 in Section 3.1, we can see this same method of direct estimation for Japan between the years of 1953 and 1970. In this case, we do not assume that either of \( OLA \) or \( S \) is zero. While it is true that Japan restricted capital flows during the relevant time period, we can justify this based on the small magnitude of liquid foreign asset accumulation in Japan. If we assumed that anything was automatically zero, we would get widely varying results with the two different estimates in (3.5) (although both would be relatively close to zero).
In Figure 3.2, we see a situation similar to that in Figure 3.6. From 1953 until about 1967, liquid foreign asset accumulation in Japan was practically nonexistent, even dipping below zero for a few years in the early 1960s. By 1968, however, liquid foreign assets, almost entirely in the form of official foreign exchange reserves and gold, had started rapidly flowing into Japan as a result of ballooning balance of payments surpluses and fears of a dollar devaluation. This trend continues until 1971, at which time the liquid asset accumulation had reached a level of nearly 11 billion dollars. Note that this estimate is very close to the alternative estimate we made above.

To better see the two estimates of liquid foreign asset accumulation, for both Japan and China we plot the direct (right side of (3.5)) and indirect (left side of (3.5)) estimates side by side in Figures 3.8 and 3.9. Additionally, we actually tabulate these estimates for each year in Tables 3.1 and 3.2. From Figure 3.8, we can see that, in the case of Japan, the two estimates line up quite closely. Indeed, both point to the same conclusion. Namely, from 1953 to 1967 liquid foreign asset accumulation in Japan was negligible, and then, starting in 1968, this accumulation rapidly
grew until, by 1971, it had reached a level over twice that of anytime before. If we look at Table 3.1 as well, we can see that in 1967 our direct estimate of liquid foreign assets in Japan is 555 million dollars, while our indirect estimate is 469 million dollars. In 1971, the direct and indirect estimates are 10.94 billion dollars and 10.88 billion dollars, respectively. Thus, according to either estimate, in a period of four years we see an increase in liquid foreign asset accumulation by a factor of more than ten. By any standard, this is a very rapid buildup, and it demonstrates just how strong expectations of a dollar devaluation were by the end of the 1960s.

Consistent with what we saw earlier (Figure 3.2), this buildup came primarily in the form of an accumulation of official foreign exchange reserves. According to the last line of Table 3.1, in 1971 this component of total liquid foreign assets was 14.46 billion dollars, while other liquid foreign assets (net securities sales to foreigners, net loans to foreigners, and net longer-term sales of trade credits to foreigners) was only 3.42 billion dollars and both net foreign assets of banking institutions and cumulative short-term and unrecorded capital outflows were negative. Such figures highlight the effects of growing Japanese current account surpluses and extensive intervention by the Bank of
Japan to maintain the tenuous dollar-yen exchange rate.

In the case of China, Figure 3.9 shows that, while both estimates of liquid foreign asset accumulation do indicate an extensive buildup, they do not line up as well as in the case of Japan above. Indeed, according to Table 3.2, the direct estimate of liquid foreign asset accumulation is sometimes as much as 100 billion dollars lower than the indirect estimate that relies on cumulative current account surpluses and net inflows of foreign direct investment. Regardless of this discrepancy, the general trend of both estimates is unmistakable. Namely, liquid foreign asset accumulation

<table>
<thead>
<tr>
<th>Year</th>
<th>Official Foreign Exchange Reserves</th>
<th>Net Foreign Assets of Banking Institutions</th>
<th>Cumulative Short-term and Unrecorded Capital Outflows</th>
<th>Other Liquid Foreign Assets</th>
<th>Total Liquid Foreign Assets</th>
<th>Cumulative Current Account Surpluses</th>
<th>Cumulative Net FDI Inflows</th>
<th>Alternative Estimate of Liquid Foreign Assets</th>
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<td>858</td>
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<td>25</td>
<td>27</td>
<td>-33</td>
<td>974</td>
<td>999</td>
<td>58</td>
<td>1057</td>
</tr>
<tr>
<td>1955</td>
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<th>Cumulative Unrecorded Capital Outflows</th>
<th>Total Liquid Foreign Assets</th>
<th>Cumulative Current Account Surpluses</th>
<th>Cumulative Net FDI Inflows</th>
<th>Alternative Estimate of Liquid Foreign Assets</th>
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In China since 1994 has been rapidly growing and is now far more extensive than at any time in Japan between 1950 and 1971. According to the last line of Table 3.2, in 2002 the direct estimate of liquid asset accumulation in China is 504.32 billion dollars, and the indirect estimate is 580.22 billion dollars. It is safe to say that the true number lies somewhere in between these two. Furthermore, Table 3.2 tells us that this liquid asset accumulation has been primarily due to a buildup of official foreign exchange reserves, which totalled 286.41 billion dollars in 2002.

These numbers indicate just how serious the syndrome of conflicted virtue has become in China. As liquid foreign assets have accumulated and fears of a yuan appreciation have grown, massive runs out of dollars and into yuan have become common. Consequently, the People’s Bank of China has had to intervene in the foreign exchange market more frequently and more extensively in order to maintain the fixed dollar-yuan exchange rate. This, in turn, has led to the rapid accumulation of official foreign exchange reserves that we see in Table 3.2 and Figure 3.7.

In the realm of monetary policy, such extensive foreign exchange intervention is significant because, unless sterilized, it constitutes a rapid increase in the money supply. While it is true that since 1994 the People’s Bank of China has allowed the domestic monetary base to grow quite rapidly in order to accommodate the expanding domestic economy (see Figure 2.6), the increases in its foreign...
exchange reserves have become so large in recent years that sterilization has become a necessity. Without it, the money supply would simply grow too quickly, even for the rapidly developing Chinese economy. Such concerns are even greater today, as fears of overheating have put pressure on officials to tighten monetary policy.

To observe the extent of sterilization, we obtained data on Central Bank Bill issues and the effect of foreign exchange interventions on the Chinese money supply from the People’s Bank of China. In September 2002, in order to sterilize the effects of intervention, the bank began to issue Central Bank Bills. These bills are low-interest bearing yuan-denominated bonds with maturities ranging from three months to one year. In Figure 3.10, we plot the amount of outstanding Central Bank Bills along with the cumulative impact of foreign exchange intervention on the monetary base in China from September 2002 to March 2004. Additionally, in Table 3.3 we track the accumulation of foreign exchange reserves in China due to interventions along with the effect this has had on the monetary base and the extent of sterilization through Central Bank Bill issues. Note that this table

![Figure 3.10](image_url)

Figure 3.10: Cumulative monetary impact of foreign exchange intervention with partial sterilization in China from September 2002 to March 2004. Source: People’s Bank of China.
covers the same time period as Figure 3.10. Before continuing, we should point out that the decline in official foreign exchange reserves in December 2003 (Table 3.3) was not the result of events in the foreign exchange market. Instead, it reflects a donation of 45 billion dollars of foreign exchange by the People's Bank of China to the Bank of China and the China Construction Bank. Indeed, we see that official reserves would have increased in December 2003 if not for this donation.

According to Figure 3.10, in a span of under two years foreign exchange intervention would have resulted in a monetary expansion of approximately 200 billion dollars if the People's Bank of China had not sterilized it. We also see that the value of outstanding Central Bank Bills grew to well over 50 billion dollars by early 2004. Thus, during this period of nineteen months, sterilization reduced the expansionary effect of intervention on the monetary base by about one third. While significant, this degree of sterilization is still far from completely offsetting the effects of interventions.

From Table 3.3, we see that in January 2004 the value of outstanding Central Bank Bills in China was 39.27 billion dollars and the cumulative effect of foreign exchange intervention on the monetary base was 178.14 billion dollars. Combining these two numbers, we conclude that, from September 2002 to January 2004, the effect of foreign exchange intervention on the monetary base, after sterilization, was approximately 140 billion dollars. Considering that the base of narrow money in China grew from approximately 839 billion dollars in September 2002 to 1.01 trillion dollars in January 2004 (an increase of about 170 billion dollars), we see that much (over 80%) of the growth of narrow money during that time period can be attributed to the impact of interventions in the foreign exchange market—with sterilization—by the People's Bank of China.

In recent years, the People's Bank of China has started to raise the ratio of total deposits that commercial banks are required to hold on reserve at the central bank. Specifically, in September 2003 this ratio was raised from six percent to seven percent, and then in April 2004 it was raised again to seven and a half percent. Because these reserves at the People's Bank of China do not earn any interest and cannot be leant out, they are effectively a contraction of the money supply. We can think of it as an alternative form of sterilization that the central bank has implemented to go along with the direct sterilization we discussed above. To estimate the effect of the required reserve ratio on the monetary base, we first note that the only deposits included in narrow money are demand deposits. Therefore, a required reserve ratio of seven and a half percent reduces the monetary base by seven and a half percent of total demand deposits. Since the total value of demand deposits in China at the end of March 2004 was about 800 billion dollars, we estimate that reserve requirements
Table 3.3: Monthly impact of partially sterilized foreign exchange intervention on both foreign exchange reserves and the monetary base in China from September 2002 to March 2004 (billions of dollars). Source: People’s Bank of China.

<table>
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<tr>
<th>Month</th>
<th>Official Foreign Exchange Reserves</th>
<th>Effect of Foreign Exchange Intervention on the Monetary Base</th>
<th>Cumulative Effect of Intervention on the Monetary Base</th>
<th>Total Central Bank Bills Outstanding</th>
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on these deposits contract the base of narrow money by approximately 60 billion dollars. According to Table 3.3, in March 2004 the value of outstanding Central Bank Bills in China was 71.97 billion dollars. Thus, we see that the effects of direct (through bond issue) and indirect (through reserve requirements) sterilization on the narrow money base in China have been similar. Indeed, the impact of this indirect sterilization has been significant.

These data demonstrate how conflicted virtue has affected the Chinese economy. Large runs out of dollar assets and into yuan, caused by the extensive accumulation of liquid foreign assets combined with outside pressure to appreciate the yuan, have resulted in giant increases in foreign exchange reserves. As we just observed, in recent years these increases have become large enough to
force the People’s Bank of China to sterilize some of their effects in order to avoid undesirably large increases in the money supply. As there is no reason to think this process will slow down or stop in the near future, China will likely find itself sterilizing the effects of foreign exchange accumulations even more extensively in coming years.

It is natural to wonder if China’s position is sustainable indefinitely. From a purely fiscal point of view, as long as the interest paid on Central Bank Bills remains lower than the interest earned on the central bank’s dollar denominated assets (usually a mixture of Treasury Bills and medium and long term United States Government Bonds), extensive sterilization should impose no real burden. Thus, theoretically speaking, there is no reason to conclude that the People’s Bank of China will not be able to appropriately sterilize the effects of foreign exchange interventions in the future, regardless of how large scale such interventions become. Perhaps, then, the most serious threat to the sustainability of China’s current situation is foreign pressure to appreciate the yuan. Indeed, it is not out of the question that such pressure could become overwhelming enough to force the Chinese to abandon the fixed exchange rate. Japan, for instance, found itself in precisely this situation quite often in the 1980s.

In this regard, persistent and growing bilateral current account surpluses with the United States are a real concern for the Chinese because they fuel complaints that China’s currency is undervalued. Unfortunately for the Chinese, much of this imbalance is the result of an unusually low level of saving in the United States, and thus out of China’s control (see McKinnon and Ohno (1997)). Of course, China is not completely powerless in this situation. For instance, any measures to expand imports of foreign goods (particularly American goods) that China can adapt are likely to be beneficial. If China can at least prevent its bilateral trade imbalances from getting any larger, this would likely lessen foreign pressures to appreciate the yuan. Then, the Chinese would be in a position to reaffirm their commitment to a fixed dollar-yuan exchange rate, a move that would likely calm some of the fear of appreciation among dollar asset holders and thus dampen the effects of conflicted virtue.
4 Concluding Remarks

We have now examined the issues arising from competitive macroeconomic adjustment and the conduct of monetary policy under a fixed exchange rate in Japan from 1950 to 1971 and China from 1994 to the present. This analysis is especially instructive when we observe the similarities between the two Asian neighbors. In particular, when either country had its dollar exchange rate securely fixed, in the sense that expectations were that the exchange rate would not change, nominal wages grew in accordance with productivity and thus a smooth competitive adjustment was achieved. In these situations, repeated currency revaluations were not necessary, and may have only confused an otherwise effective adjustment process.

As we have seen, however, maintaining a fixed exchange rate can often be a great challenge. Japan, for instance, after fixing the yen at 360 to the dollar for over twenty years, had to appreciate its currency once wholesale price inflation in the United States—the anchor of the fixed-rate dollar standard—began to speed up in the early 1970s. Indeed, it was this inflation that marked the end of the entire Bretton-Woods fixed-rate dollar standard. China has also had its troubles. Since fixing the yuan at 8.28 to the dollar in 1994, consistent balance of payments surpluses have led to an accumulation of liquid foreign assets and, therefore, conflicted virtue, which we discussed at length in Section 3.

Regardless of these recent difficulties and whatever international pressure the Chinese may feel, it is likely in their best interest to remain as steadfast as possible regarding the fixed dollar-yuan exchange rate. Indeed, the experience of Japan after 1971 demonstrates the potentially devastating consequences a yuan appreciation could have. Even if conflicted virtue intensifies in the short run, and the People’s Bank of China continues to rapidly build up foreign exchange reserves, as long as the bank remains committed to the fixed exchange rate in the long run, expectations will eventually adapt to this and the burden imposed by conflicted virtue will subside.

Of course, as we described at the end of Section 3, this process could be greatly aided if the Chinese did not run such a large bilateral trade surplus with the United States. Imbalances of this kind, accompanied by foreign pressure to appreciate the yuan, are likely the single greatest threat to the sustainability of China’s fixed exchange rate. Unfortunately, in the case of the United States, this surplus is largely a consequence of an unusually low level of saving in America, and thus is mostly out of China’s control. Furthermore, China needs to be clear that the current dollar-yuan exchange rate is not in question. When the Chinese hint that they are considering appreciating
the yuan, as they have recently done (see Buckley (2004)), it undermines the credibility of their exchange rate policy and therefore alters future expectations. This, of course, intensifies conflicted virtue, threatening the sustainability of the fixed exchange rate.

It remains to be seen if China will decide whether to keep the yuan at 8.28 to the dollar. The data we have examined here indicate that there appears to be no disadvantage—with respect to competitive adjustment—in doing so. Unfortunately, there is more to consider than simply competitive adjustment. Foreign concerns about bilateral trade imbalances and an undervalued yuan are also important considerations for the Chinese, and may one day provoke an appreciation of the yuan. For now, we can only wait and watch.
References


