The End of Chimerica

Niall Ferguson[†] and Moritz Schularick[‡]
[†]*Harvard University and* [‡]*Freie Universität Berlin.*

Abstract

For the better part of the past decade, the world economy has been marked by an economic order that combined Chinese export-led development with US over-consumption. The financial crisis of 2007–09 likely marks the beginning of the end of the Chimerican relationship. In this paper, we look at this era as economic historians, trying to set events in a longer-term perspective. In some ways, China's economic model in the decade 1998–2007 was similar to the one adopted by West Germany and Japan after World War II. Trade surpluses with the United States played a major role in propelling growth. But there were two key differences. First, the scale of Chinese currency intervention was without precedent, as were the resulting distortions of the world economy. Second, the Chinese have so far resisted the kind of currency appreciation to which West Germany and Japan consented. We conclude that Chimerica cannot persist for much longer in its present form. As in the 1970s, sizeable changes in exchange rates are needed to rebalance the world economy. The token adjustment proposed recently by Beijing is unlikely to suffice.

I. Introduction

For the better part of the past decade, the world economy has been dominated by a unique geo-economic constellation that we have called 'Chimerica': a world economic order that combined Chinese export-led development with US over-consumption on the basis of a financial marriage

between the world's sole superpower and its most likely future rival (Ferguson and Schularick 2007). For China, the key attraction of this marriage was its potential to propel the economy forward by means of export-led growth. Thanks to the Chimerican symbiosis, China was able to quadruple its gross domestic product (GDP) since 2000, raise exports by a factor of five, import western technology and create tens of millions of manufacturing jobs for the rural poor. For America, Chimerica meant being able to consume more, save less and still maintain low interest rates and a stable rate of investment. Over-consumption meant that between 2000 and 2008, the United States outspent its national income by a cumulative 45%, that is, the total US spending over the period was 45% higher than the total income (Reisen 2009). Purchases of goods from China in excess of income accounted for about a third of over-consumption.

For a time, it seemed like a marriage made in heaven. Chimerica accounted for around 13% of the world's land surface, a quarter of its population, more than a third of its GDP and around two-fifths of global economic growth in the past ten years. It also seemed like a marriage with positive externalities for the rest of the world. Global trade boomed and nearly all asset prices surged. Yet, like many another marriage between a saver and a spender, Chimerica was not destined to last. We believe the financial and economic crisis of 2007–09 has put the marriage on the rocks. The reduction of the imbalance between the United States and China – in short, the dissolution of Chimerica – is now indispensable if equilibrium is to be restored to the world economy.

In this paper, we consider the much-discussed problem of global imbalances as economic historians, trying to set events in a longer-term perspective. We argue that China's economic ascent came about as a result of a strategy of export-led growth that followed the earlier examples of West Germany and Japan after World War II. However, a key difference was the sheer scale of Chinese currency intervention and the corresponding reserve accumulation. The resulting distortions for the world economy were also far greater than anything seen in the 1950s and 1960s. In the presence of highly integrated and poorly regulated financial markets, this massive reserve accumulation sparked a debt-fueled asset bubble in the West, again unlike anything seen in the post-war decades. Taken together, these differences render comparisons with the Bretton Woods system of very limited use (Dooley et al. 2003).

We believe that the imbalances of the past decade were, to a large degree, a function of exchange rate undervaluation and will not be resolved automatically without major exchange rate adjustments. The historical record has shown time and again that policies of real exchange rate undervaluation can be sustained for a long time without generating the inflationary pressures

predicted in economic theory. Indeed, economic historians have often seen real exchange rate policies as important factors in explaining growth performance, in particular, in the post-war catching-up process in Europe (Eichengreen 2007). Cheap relative production costs supported the profitability and, hence, investment in manufacturing industries, while surplus labour or organized wage restraint avoided a loss of competitiveness. Thus, we do not agree with the view that Chinese surpluses can be explained simply in terms of household savings behaviour. We see the Chimerican world as the result of a policy of intervention in foreign exchange markets that served two goals: to promote export-led industrialization and to build a cushion against future financial crises. Because of the pervasive role of the state in China's financial sector, the effectiveness of capital controls and the large supply of surplus labour, a policy of real exchange rate undervaluation and reserve accumulation was not automatically corrected by inflation in the way that some economic models predict. Growing real exchange rate undervaluation can account for many of the striking features of China's recent growth spurt that are otherwise hard to reconcile: a sharp increase in domestic investment, which was accompanied by an even stronger rise in national savings. The savings surge was driven by corporate profits, not by households, and was especially pronounced in exchange-rate-sensitive manufacturing industries.

Nor do we think the precipitous decline of the US savings rate and the widening of the current account deficit were simply consequences of behavioural changes by the American public. Government policies on the other side of the Pacific were also partly responsible for the build-up of the imbalances. The Federal Reserve mistakenly turned a blind eye to the asset bubble being inflated by excessive financial leverage and the distortion of interest rates by Chimerica. The Congress was much too cavalier in promoting home ownership regardless of households' ability to service their mortgages. The Treasury and other responsible bodies underestimated the systemic risks created by financial engineering and particularly by the explosive growth of the over-the-counter derivatives market.

The financial crisis of 2007–09 marks the beginning of the end of the Chimerican relationship. First, the Chinese authorities understand that heavily indebted American consumers cannot be relied upon to return as buyers of Chinese goods on the scale of the period up to 2007. Second, the Chinese dislike their exposure to the US dollar in the form of around two trillions of USD-denominated reserve assets. But the temptations to continue business as usual are also great on both sides. In order to stimulate their ailing export industries, the Chinese authorities seem resolved to carry on effectively pegging their currency to the dollar. American policy makers seem equally willing to prolong America's addiction to cheap money as long as the economy is in a precarious state.

This paper argues that the end of Chimerica is desirable, although the divorce needs to be amicable and its costs kept down. In the light of our analysis, currency adjustments must become a top priority in the international political debate. The world economy's key structural imbalance is that the second biggest economy has effectively pegged its currency to that of the largest economy at a strongly undervalued exchange rate. This does not mean that currency revaluation is all that is needed for a rebalancing of the world economy. Domestic policy changes in the United States and China have to support the process in a number of important ways. But in the aftermath of the financial crisis, the undervalued renminbi rate poses a threat. It limits US recovery by overvaluing the dollar in key Asian markets and it continues the dangerous reliance of the US economy on cheap money, excessive consumption and imports of savings from the rest of the world. It also invites other economies to engage in a kind of race to the bottom of competitive currency interventions. There are already worrisome signs that such a race has begun.

Historically, big adjustments in the relative production costs and income levels have generally come about as exchange rate adjustments. Between 1960 and 1978, for example, the deutsche mark (DM) appreciated cumulatively by almost 60% against the dollar, while the Japanese yen appreciated by almost 50%. The lesson from history is that exporters can live with substantial exchange rate revaluations when major gains in productivity are being achieved. The world – and particularly China – should prepare for similar adjustments if it is to draw the right conclusions from the current financial crisis and from post-war economic history.

II. Chimerica and the Crisis

China's integration into the world economy was by far the most important development of the economic history of the past decade. In the 1990s, Zhu Rongji and his right-hand man, Wen Jiabao, embraced foreign trade and foreign direct investment as cornerstones of a new Chinese development strategy (Branstetter and Lardy 2006). They convinced other members of the leadership in Beijing to embark on a strategy of export-led growth following the examples of its East Asian neighbours, Japan and Korea, but also imitating the policies adopted by many European economies under the post-war Bretton Woods system (Dooley et al. 2003; Eichengreen 2007). Following substantial renminbi devaluation in 1994 and the opening up of the economy to FDI, the strategy quickly bore fruit as multinational companies started to relocate production to China. The Chinese export machine began to take off rapidly after the World Trade Organization (WTO) accession in 2001, generating higher and higher trade surpluses.

Exports in 2000 were in the range of US$250 billion, but climbed to US$1.3 trillion in 2008. China's current account surplus in 2001 was a mere US$17 billion. By the end of 2008, it was approaching US$400 billion (International Monetary Fund 2009b).

As exports expanded, the authorities in Beijing consistently bought dollars to avoid appreciation of their currency. China's currency interventions served two goals: first, to promote export competitiveness, as export industries provided rapid productivity gains as well as new jobs and income; second, to build up reserves as a cushion against the risks associated with growing economic and financial integration, painfully illustrated by the experience of other countries in the 1997–98 Asian crisis (Feldstein 1999; European Central Bank 2006; Obstfeld et al. 2009). For political reasons, the Communist Party leadership in Beijing feared financial instability even more than other governments and was unwilling to subject itself to the vagaries of international capital markets.

The result of sustained currency intervention was a vast accumulation of dollar-denominated securities in the reserves of the People's Bank of China (PBoC) and the State Agency for Foreign Exchange. Already by 2000, China had currency reserves of US$165 billion, slightly above 10% of GDP. In 2009, currency reserves reached US$2.3 trillion, equivalent to more than 50% of China's annual output (Setser and Pandey 2009). As we and others have argued, such persistent currency intervention caused a growing distortion in the global cost of capital: the real economic shock of China's integration into the world economy should have led to a lower capital–labour ratio and hence higher real interest rates (Ferguson and Schularick 2007). But global interest rates – both long term and short term – continued to decline.

The accumulation of large war chests of foreign reserves through currency intervention opened up a Pandora's box of financial distortions. Ben Bernanke argued that a 'glut' of savings from emerging markets was a key factor in the decline of US and global real-long term interest rates, despite the parallel decline in US savings and the fact that the United States deficit manifested itself before the Chinese surplus (Bernanke 2005, 2007). Lower interest rates in turn enabled American households to increase consumption levels and worsened the imbalance between savings and investment. And, because foreign savings were predominantly channelled through government (or central bank) hands into safe assets such as Treasuries, private investors turned elsewhere to look for higher yields. This led to a more general re-pricing of financial risk, which in turn incentivized financial engineers to develop new financial products such as securitized debt instruments (Economic Report of the President 2009; see also Hunt 2008).

This is not to say that reserve accumulation was the only cause for the current crisis. The financial disaster that began in 2007 had multiple causes:

regulation built on the idea of the efficiency of financial markets; incentives for bankers that encouraged them to focus on short-term profits and stock market performance and to ignore the liquidity risks on their balance sheets; an asymmetric Federal Reserve policy of ignoring asset bubbles but mitigating busts; and, last but not least, the willingness of households in the Anglo-Saxon world and elsewhere to turn themselves into highly leveraged, unhedged investment vehicles that speculated on real estate. Beijing cannot be blamed for the reckless lending and borrowing engaged in by western financial institutions. Yet had it not been for the Chinese willingness to fund America's consumption and real estate speculation habit, long-term interest rates in the United States would almost certainly have been substantially higher, acting as a circuit breaker for the housing bubble. It was not 'financial terror' that undermined Chimerica, as some commentators had feared. The main threat, as it turned out, was the distortion of global interest rates and the complacency it generated. Bank-rolled by China, the US economy overdosed on debt.

With the benefit of hindsight, it is easy to argue that a world order built on net capital flows from China to America was bound to end in tears. (That was why our term 'Chimerica' was always intended as a play on the word 'chimera'.) In the past decade, capital was flowing in large quantities on a net basis to an economy that presumably had a lower marginal productivity of capital than the lender economy. Capital flows that were driven by currency intervention rather than by higher rates of return on investment merely financed a boom in consumption and a decade of household dis-saving. Investment spending in the United States did not increase in the past decade and capital inflows merely substituted for household savings.

III. Export-Led Growth and Reserve Accumulation: A Historical Perspective

An export-centred growth strategy coupled with currency intervention and reserve accumulation is nothing new. After all, western Europe and Japan, as well as South Korea and Taiwan, all successfully pursued similar strategies. In all cases, productivity gains coupled with wage restraint led to the rapid development of the manufacturing sector and sustained export growth. Rising corporate profits financed rising investment, which in turn supported manufacturing capacity and productivity (Eichengreen 2007). To some commentators, the resemblance between these past growth strategies and modern China's appeared to be so close that it was legitimate to refer to 'Bretton Woods II' (Dooley et al. 2003).

It is therefore illuminating to compare China in our time with West Germany and Japan during their phase of rapid catching up. At first sight,

the analogy is close. In terms of GDP measured in current dollars, both West Germany and Japan in the 1960s were about 10–15% of the size of the United States. China's economy in the year 2000 was also about 12% of the size of the US economy [although it is much bigger on the basis of purchasing power parity (PPP)]. All three countries owed much of their rapid growth to manufacturing, albeit with very different specializations. However, the resemblances end there. Figures 1 and 2 show the amount of dollar-denominated reserves accumulated by West Germany and Japan from the 1950s to the 1970s and by China since 1990. In the first chart, we scale the stock of dollar reserves by US GDP to show the relative size and impact of currency interventions on the American economy.[1] The second chart displays the accumulated reserve stocks in percentages of national GDP.

The charts demonstrate how outsized China's reserve accumulation has been compared with previous periods of export-led growth. At the height of post-war growth in the 1960s, West Germany and Japan grew their dollar reserves basically in line with US GDP, keeping the ratio stable at about 1% before moving slightly higher in the early 1970s when capital flows and valuation gains led to an increase. On a yearly basis, reserve accumulation was about 1% of GDP on average in Germany and not even 0.5% in Japan. By contrast, a dramatic shift in Chinese reserve accumulation occurred in the early 2000s. Starting at a level of dollar reserves equivalent to about 1% of US GDP in 2000, China's reserves reached 5% of US GDP in 2005, rising to 8% in 2007 and finally reaching about 10% in 2008. At the end of 2009, China's USD reserves are likely to be equivalent to 12% of US GDP, compared with about 1% a decade ago. The picture is similar if we scale reserve assets by national GDP. Both Germany and Japan, during their periods of export-led growth, kept reserve stocks relatively stable to their GDP at around 5%. From 1992 onwards, China's reserves increased from 5% to above 50% of the national GDP. The annual average net accumulation over the past decade stands at 7.5% of GDP.

What accounts for the unprecedented amount of reserve accumulation in China? In Table 1, we show the current account, capital account and reserve account flows by country and year, contrasting the 1955–75 period for Germany and Japan with the past two decades for China. First, China's reserve accumulation was mainly driven by the trade account surpluses. These in turn are far higher than anything seen by either Germany or Japan. Second, China had much higher capital inflows, a reflection of the fact that there is more financial integration and outsourcing of production today than
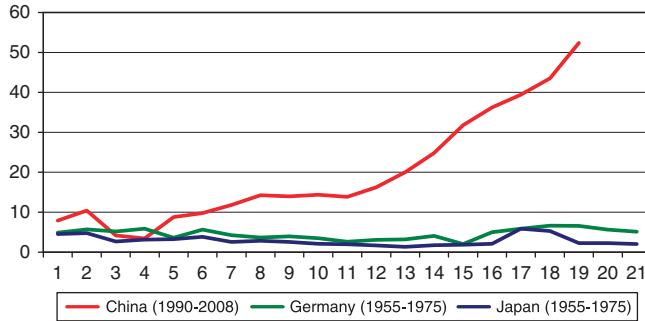
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[1]In China's case, we assumed that 70% of reserves are held in dollars: for Germany and Japan, we assumed that all reserves were held in dollars, certainly a generous assumption in this context.
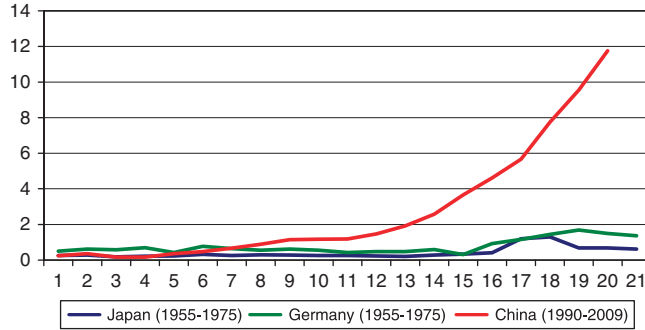
Figure 1: Foreign currency reserves, percent of US GDP

Source: International Monetary Fund (2009a).

Figure 2: Foreign currency reserves, percent of own GDP

Source: International Monetary Fund (2009a).

was the case under the Bretton Woods system. Clearly, then, the comparison with Bretton Woods is somewhat misleading. Figure 3 makes it clear that despite high capital inflows, Chinese reserve accumulation has mainly been a function of a massive trade surpluses that the authorities prevented from translating into a stronger currency by continued market interventions. This time really *was* different.

Given the scale of Chinese currency interventions, a natural question to ask is how the authorities were able to maintain internal equilibrium. Economic historians are familiar with the Bundesbank's fight for internal price stability in the face of capital inflows and current account surpluses under Bretton Woods (Emminger 1977; Holtfrerich 1998). These problems seem negligible by comparison with the Chinese case. In a standard model, exchange rate intervention should lead to monetary expansion, which in turn drives up domestic prices, nullifying the real effect of intervention (McKinnon 2006). China's financial system, however, is owned and managed by the govern-

Table 1: Current Account, Capital Account and Reserve Growth, Percent of GDP

	Germany (1955–75)			Japan (1955–75)				China (1990–2008)		
	Current account	Capital account	Reserve increase	Current account	Capital account	Reserve increase		Current account	Capital account	Reserve increase
1955	1.24	− 0.35	1.02	0.98	0.34	0.13	1990	2.97	0.60	2.86
1956	2.24	− 0.08	2.52	− 0.13	0.09	0.66	1991	3.13	0.87	3.32
1957	2.73	− 1.23	2.37	− 2.06	0.38	− 1.38	1992	1.28	1.42	− 0.41
1958	2.59	− 1.01	1.49	0.82	0.29	1.05	1993	− 1.81	4.08	0.28
1959	1.66	− 2.56	− 0.68	0.99	− 0.75	1.26	1994	1.19	6.06	5.23
1960	1.58	0.42	2.65	0.32	− 0.16	1.13	1995	0.21	4.58	2.97
1961	0.96	− 1.51	− 0.69	− 1.83	0.02	− 0.63	1996	0.81	4.46	3.55
1962	− 0.44	− 0.17	− 0.24	− 0.08	0.46	0.58	1997	3.75	4.94	3.64
1963	0.26	0.16	0.72	− 1.12	0.82	0.05	1998	3.01	3.58	0.60
1964	0.12	− 0.32	0.10	− 0.58	0.41	0.15	1999	1.95	2.38	0.80
1965	− 1.36	0.47	− 0.28	1.02	− 0.52	0.12	2000	1.71	2.79	0.89
1966	0.10	− 0.12	0.40	1.18	− 0.82	− 0.03	2001	1.31	1.36	3.58
1967	2.02	− 2.40	− 0.03	− 0.15	− 0.25	− 0.06	2002	2.44	2.51	5.17
1968	2.22	− 1.15	1.31	0.71	− 0.02	0.60	2003	2.80	3.57	7.10
1969	1.25	− 3.13	− 2.40	1.23	0.01	0.35	2004	3.55	3.77	10.67
1970	0.45	2.14	3.21	0.97	− 0.43	0.44	2005	7.19	2.81	9.27
1971	0.39	1.36	1.40	2.52	0.59	4.71	2006	9.53	− 0.40	9.29
1972	0.29	1.41	1.78	2.17	− 0.83	1.03	2007	10.99	4.14	13.65
1973	1.21	1.34	1.70	− 0.03	− 1.77	− 1.48	2008	9.85	3.17	9.68
1974	2.42	− 0.61	− 0.89	− 1.02	− 0.46	0.28				
1975	1.10	0.00	0.22	− 0.14	− 0.28	− 0.14				
Mean	1.10	− 0.35	0.75	0.27	− 0.14	0.42		3.47	2.98	4.85

Sources: Deutsche Bundesbank (1976); International Monetary Fund (2009a); Statistics Bureau of the Japanese Ministry of Internal Affairs (2009).
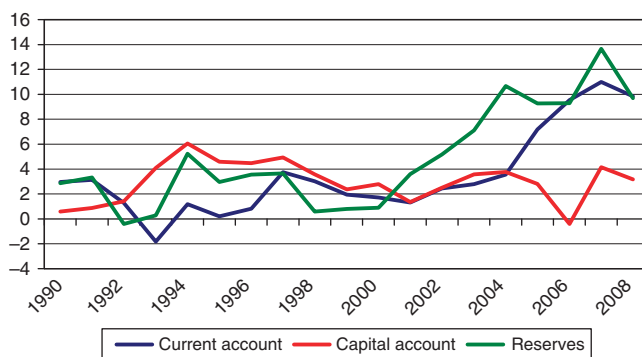
Figure 3: Current account, capital account, reserve growth in China 1990–2008, percent of GDP

Source: International Monetary Fund (2009a).

ment. Capital controls are in place for most non-FDI types of flows and give monetary policy considerable room for manoeuvre. Sterilization and bank lending policies are dealt with by decree, so that the government can force banks to buy trillions of low-yielding renminbi sterilization bonds or alter

their reserve ratios. Deposit and lending rates are also set by the government. This has allowed China to intervene in the currency market while retaining control over domestic monetary aggregates. Reserve accumulation has not translated into runaway growth of monetary aggregates (at least not until the unprecedented loosening in financial conditions that took place in the first half of 2009). To be sure, China's success in sterilizing the reserve inflows cannot be taken for granted. The costs of this policy were low as long as Chinese interest rates were lower than or at a level similar to those in the United States, but since the Fed lowered interest rates to zero, the interest rate differential has turned positive, so that the rate the PBoC has to pay on its sterilization bills exceeds the rate it receives on short-term US paper. It will become more difficult over time to manage the effects of reserve accumulation. But this process could be very slow – probably too slow for the rebalancing that the global economy needs over the coming years.

IV. The Exchange Rate and the Savings Glut

Looking at China's massive reserve accumulation, some commentators routinely point to the savings behaviour of Chinese households. The Chinese current account surplus is seen as a function of underlying savings, largely unaffected by the exchange rate (McKinnon 2007). Cultural, social and demographic factors are thought to lead to a very high precautionary household savings rate. The trouble with this view is that there has been no change in the savings rate of Chinese households in the past decade while the current account surplus has climbed to double digits (Kuijs 2005; Wolf 2009). In reality, the increase in the total savings in the past decade has come mainly from retained corporate earnings and surpluses of government-owned companies, as shown in Figure 4 (Barnett and Brooks 2006). The increase in corporate profits in the past decade has been very strong and tracked the ballooning trade surplus as shown in Figure 5. Profits of Chinese industry have increased eightfold since 2000 while the trade balance expanded almost 12 times.

A key question is what role currency undervaluation played in generating the increase of both the trade surpluses and corporate profits. To be sure, some economists argued for a long time that the renminbi was undervalued (see Goldstein 2006; Goldstein and Lardy 2008) and warned of the inherent dangers of this distortion. But their warnings were not popular in a world of low interest rates and booming asset markets. The immediate effects on America and the West were seductively positive. Rising consumption and low bond yields promoted growth and sustained asset prices. Cheap Chinese goods kept goods inflation low. Even the Fed bought into the argument that credibility gains and the higher productivity of the US economy were behind the decline in interest rates.
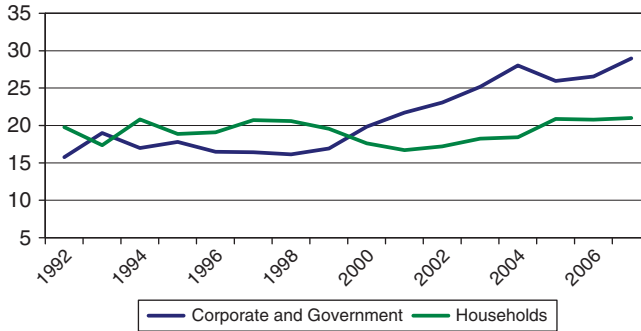
Figure 4: Savings rates in China, percent of GDP

Source: CEIC, Goldman Sachs (Hong Kong).

By how much is the Chinese currency undervalued? Estimates for the undervaluation range widely from 0% to 50% (Goldstein and Lardy 2008) depending on the methodology adopted. In our view, the most promising approach has been to focus on the unit labour cost-based real exchange rate between the renminbi and the dollar (Ferguson and Schularick 2007).[2] Unit labour costs are defined as the cost of the labour inputs (total wages) needed to produce a unit of output. If these productivity gains (relative to the productivity gains abroad) are not reflected in proportionate exchange rate changes, the economy gains in competitiveness and more production will be relocated to the cheaper currency area. Table 2 shows the key metrics needed to calculate unit labour costs in China. We find that while wages and employment in China have grown rapidly in recent years, the increase in output has been even faster thanks to rapid productivity gains. Chinese unit labour costs declined in eight out of the last nine years, sometimes substantially. The nominal revaluation of the renminbi of approximately 15% between 2005 and 2008 was not enough to counteract this trend.

As Figure 6 shows, Chinese unit labour costs today are about 40% lower than that in 1998, while the nominal exchange rate has only appreciated by 15%, leaving a net gain in wage competitiveness of 25%. It is also clear from Table 2 and Figure 7 that the development of unit labour costs explains most, although not all, of the swings of the Chinese current account surplus in the past decade. Chinese labour cost started to decline relative to the United States after 1999, but the current account surplus started to grow slightly later, after 2001. Other contributing factors included China's WTO accession in 2001, which opened up formerly protected markets to Chinese products

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[2]These distortions render official CPI and PPI data less meaningful. Moreover, China's economic ascent is a story of job creation in manufacturing industries with a great role played by labour costs.

Figure 5: The trade surplus and industrial profits in China, 2000–08

Source: CEIC, Goldman Sachs (Hong Kong).

Table 2: Unit Labour Costs in Chinese Manufacturing 2000–08, Yearly Change Percent

	Real output	Nominal wages	Employment	Unit labour cost	US unit labour cost	ULC change differential	Change in nominal exchange rate	Deprecia-tion of RMB on ULC basis
2000	14.0	12.3	− 1.6	− 3.4	4.9	− 8.3	0.0	8.3
2001	14.5	11.7	0.4	− 2.4	0.8	− 3.1	0.0	3.1
2002	20.1	12.6	− 3.8	− 11.3	0.4	− 11.6	0.0	11.6
2003	27.0	13.6	2.1	− 11.3	0.8	− 12.1	0.0	12.1
2004	21.1	12.3	5.9	− 2.9	− 0.2	− 2.7	0.0	2.7
2005	27.0	12.3	7.2	− 7.5	− 2.9	− 4.7	− 1.0	3.7
2006	23.6	14.0	7.2	− 2.4	3.1	− 5.4	− 2.7	2.8
2007	26.6	16.2	7.7	− 2.7	0.1	− 2.8	− 4.7	− 2.0
2008	13.8	11.0	2.7	0.0	2.6	− 2.6	− 8.5	− 5.9

*Note*: Chinese data for 2008 are estimates based on Goldman Sachs, Hong Kong.
Sources: Output, employment and wage figures from CEIC and Banister (2005, 2007); Banister and Lett (2009); US unit labour costs come from the BLS database.

(Prasad 2007). Direct policies to encourage exports (like tax incentives) and measures to attract foreign direct investment to special economic zones may have also played a role.

　　Nevertheless, the unit labour cost data show very clearly that, despite the minor currency adjustments that have occurred since 2000, manufacturing production in China was much cheaper in dollar terms in 2008 than it was in 2000. The table demonstrates that the mechanism that is supposed to correct
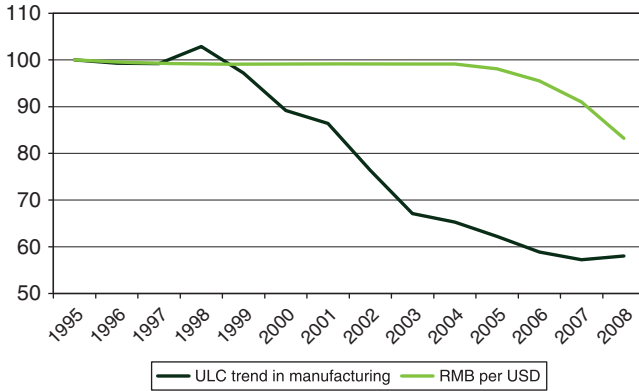
Figure 6: Unit labour costs in Chinese manufacturing and the RMB/USD exchange rate

Source: CEIC, Bureau of Labor Statistics; Goldman Sachs (Hong Kong).
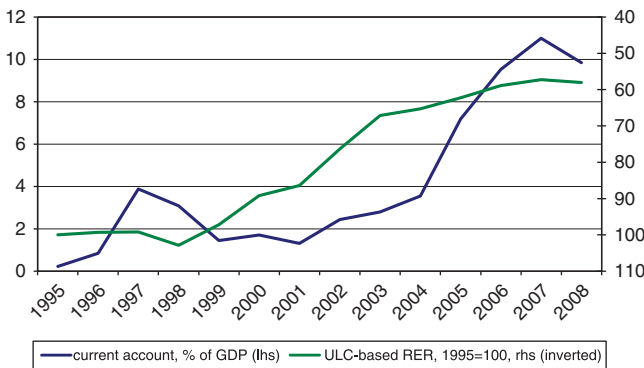
Figure 7: The ULC-based real exchange rate and China's current account surplus, 1995–2008

Source: Own calculations, International Monetary Fund (2009a).

international imbalances by raising China's price level relative to America's was not operating in the past decade. Nor did revaluation after 2005 compensate for the growing competitiveness of Chinese manufacturing. As Figure 7 shows, the current account surplus continued to widen rapidly.

Economists are usually quick to doubt the long-run sustainability of policies based on real exchange rate undervaluation. Yet, as the financial crisis has reminded us, inductive economic theory can be convincing on paper but misleading in practice. Recent empirical and historical studies have painted a nuanced picture of growth strategies based on real exchange rate under-valuation (Levy-Yeyati and Sturzenegger 2007; Eichengreen 2008; Rodrik 2008). These authors have argued that, in practice, policies of real exchange rate undervaluation are possible over relatively long periods and often seem to

deliver success. One mechanism through which a cheap exchange rate leads to growth is through changing the relative prices of domestic and foreign goods, depressing real wages and thereby boosting corporate savings and investment (Levy-Yeyati and Sturzenegger 2007; Gala 2008). Essentially, this was what happened in China over the past decade. Moreover, the massive supply of unskilled labour from the countryside prevented broad-based wage pressures from emerging. Spillover effects from the tradable to the non-tradable sector (the Balassa–Samuelson effect) were therefore slow to materialize. With a combination of capital controls, tight regulation of credit and a huge pool of unorganized labour, Beijing was able to operate a consistently undervalued real exchange rate without generating high inflation.

V. The 64,000 Renminbi Question

Plenty of estimates for the fair value of the Chinese currency already exist. Our aim here is not to provide yet another questionable figure for a fundamental equilibrium exchange rate for China.[3] Instead, we want to focus on a measure of competitiveness of manufacturing production in China. In order to gain an idea about the competitive advantages conferred on Chinese industry by a 'cheap' exchange rate, we compare the level of dollar wages in China with dollar wages in other economies, controlling for differences in labour productivity. Simply speaking, one would expect that differences in wages, expressed in the same currency (that is in dollars), should ultimately reflect differences in worker productivity. In other words, wages in China should be considerably lower than in the United States on the grounds that Chinese workers have less capital to work with and are therefore less productive. Persistent differences in wages after adjusting for productivity differences could signal exchange rate misalignments.

The data for 2008 show hourly Chinese dollar wages in manufacturing of about US$1.20 compared with US$31.00 in the United States. Thus, Chinese wages were on average only about 4% of those in US industry. At the same time, Chinese GDP per capita stood at about 20% of the US level; hence, aggregate productivity was considerably higher than the wage level implies. While this gap might seem huge at first, such deviations are not uncommon in developing countries. We therefore aim to make the comparison more systematic and look at a broad historical sample of ten developing countries over the past 30 years. The question we ask empirically is whether the gap between wages and productivity in China is artificially low judged by the experience of other developing countries in the past three decades. This simple approach has proved particularly useful in the context of economies

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[3]An excellent survey can be found in Goldstein and Lardy (2008).

that transition from communism to the free market. As prices are not fully liberalized in transition economies, reliable estimates of the price level are hard to come by (Krajnyak and Zettelmeyer 1998).

We use the data on hourly wages in manufacturing from the Bureau of Labor Statistics (BLS), which are available from 1996 for a broad sample of developing and developed economies. We complement these figures with Chinese data that have recently been made available by the BLS thanks to the painstaking efforts of Judith Banister (2005, 2007) and Banister and Lett (2009). Chinese wage data are very difficult to compile and many institutional differences need to be taken into account, such as in-kind payments, various additional wage-like benefits and the differences between state-owned enterprises and private as well as between coastal and western regions. To give an example, in Banister's calculations, the average hourly wage in Chinese manufacturing in the year 2007 was about US$1.77 for urban workers and 97 cents for all workers. Assuming a 45-h work week, this would correspond to monthly wages of US$345 in urban areas and about US$190 for all workers. Such numbers are accepted as realistic by experts on the ground.

We control for productivity differences using GDP per capita data in PPPs from the World Bank. If anything, this approach is likely to understate labour productivity in Chinese manufacturing. First, we use the 2005 variant of the World Bank PPP data, which show a Chinese GDP per capita almost 40% lower than assumed previously.[4] Second, we denominate output by population not workers, which, given China's large remaining agricultural workforce, almost certainly understates the productivity levels in the tradable sector. Productivity could also be understated in the light of considerable growth rates of physical investment in China, which have led to a much higher stock of capital per worker than in comparable developing countries. All in all, we therefore think that our estimates are more likely to understate than to overstate Chinese manufacturing productivity.

The dependent variable in the regression is the dollar wage level relative to the United States. The results of the panel estimation, using data for ten developing economies over the 1980–2008 period, are shown in Table 3. On the bases of the estimated coefficients, we then perform out-of-sample calculations of the 'fair' exchange for China. This is the exchange rate that would eliminate such differences in wages between China and other countries as are not explained by the lower productivity of Chinese workers.

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[4]The latest ICP study showed a surprisingly high Chinese price level that was almost 40% higher than assumed previously. However, the study was carried out by the Chinese National Bureau of Statistics and international verification was limited. The higher price had the effect of lowering Chinese per capita GDP in purchasing power parities by the same amount, with the effects of making China considerably poorer than previously thought.

Table 3: Wages and Productivity in Manufacturing (1980–2008) (Dependent Variable: Dollar Wage Level Relative to United States (log))

	Pooled	Random effects	Fixed effects
Observations	149	149	149
Countries	10	10	10
R^2	0.84	0.84	0.83
GDP per capita relative to United States (log)	1.096***	1.204***	1.300***
	(0.000)	(0.000)	(0.000)
Constant	−0.333***	−0.257*	−0.146
	(0.000)	(0.066)	(0.166)
Exchange rate that would align Chinese dollar-wages with productivity			
RMB/USD	3.56	4.18	4.52
Undervaluation (%)	48	39	34

Notes: *P*-values in brackets.
Country sample 1980–2008: Brazil, Mexico, Korea, Taiwan, Singapore, Spain, Philippines, Poland, Czech Republic, Hungary.
***P-value $\leq$ 0.01; **P-value $\leq$ 0.05; *P-value $\leq$ 0.1.
Sources: BLS (2009), International Monetary Fund (2009b), Banister (2005, 2007) and Banister and Lett (2009).

The result is telling: the point estimates vary, but the current exchange rate, after adjusting for differences in productivity, is clearly undervalued by somewhere between 30% and 48%. And, as noted above, there are good reasons to believe that these estimates are likely to mark to the lower bound. To put things into perspective, it would take an exchange rate adjustment of 30–50% to erase the competitive advantage that China has built up relative to other developing countries over the past 30 years. Even a 50% adjustment would result in Chinese wages reaching just 8% of US levels, instead of the current 4% (compared with a productivity level of 20%). In short, given the rapid productivity gains of recent years, China's export sector remains highly competitive and the real exchange rate strongly undervalued. The consequences of this undervaluation have, in our view, become too huge for the world economy to bear.

VI. Exchange Rate Adjustments in History

The story so far is that the Chinese economy underwent rapid gains in productivity over the past decade. Unit labour costs continued to decline for most of the period in absolute terms and relative to other countries. These gains were not translated into exchange rate realignments, leading to massive gains in competitiveness for China. Despite the vagaries of Chinese statistics, we think there is strong evidence that productivity-adjusted

production in China today is 40% cheaper than a decade ago. As a result, trade surpluses have jumped, corporate profits have boomed and inward investment has surged, resulting in unprecedented reserve accumulation. This has been a major contributor to the global imbalances that played such an important part in the financial crisis. We have shown that a 30–50% revaluation of the renminbi would barely suffice to bring productivity-adjusted wage costs in China into line with what they should be. Yet a currency adjustment of this magnitude is likely to be strongly opposed by Chinese authorities who, as between 2005 and 2008, are likely to offer no more than a slow, crawling appreciation relative to developed country currencies. In the following, we again look at the post-war rise of Germany and Japan to put the Chinese case into a historical context. In particular, we want answers to two crucial questions: first, how large would such an alignment of the value of the currency be by historical standards? Second, what does the historical experience tell us about how changes in relative unit labour costs occur over time?

Owing to the rapid productivity gains during the 'economic miracle' in the 1950s, West Germany started to run external surpluses soon after the transition to full current account convertibility was made in 1958 (Emminger 1977). Against the background of full employment and rising inflationary pressures, the Bundesbank quickly faced a conflict between internal and external goals, that is between domestic price stability and exchange rate stability, which became a central policy issue for the following decade. Interestingly, the Bundesbank was at first inclined to give priority to the external equilibrium; it was the government that pushed for revaluation, arguing that internal stability should take priority (Holtfrerich 1998). This prepared the ground for the first revaluation from 4.20 to 4.00 DM per dollar in March 1961. The realignment was generally seen as too small, however, and by the end of the decade, the German currency was back under pressure to appreciate against both the dollar and the other European currencies. A number of devaluations of close trading partners (such as the 14% devaluation of the British pound in 1967) effectively resulted in a continuous trade-weighted appreciation of the currency. The next revaluation (by 9.3%) was forced on the authorities in 1969 as a reaction to the weakness in the other European currencies and the dollar. As the Bretton Woods system slowly disintegrated, the mark became the 'antipode' of the dollar and large swings in capital flows complicated the management of the currency. Faced with another wave of capital flows, Germany closed the exchange window on 5 May 1971, in order to preserve the internal value of the currency and the mark floated freely until the Smithsonian Agreement led to a new parity that was about 14% stronger against the dollar. But the Smithsonian Agreement provided only temporary relief. Another 10% revaluation followed on 12 February 1973. Finally, the

mark revalued by another 3% before the joint float of the European currency snake against the dollar started later that same year (von Hagen 1998). In the following years, the dollar continued to weaken. By 1975, the cumulative appreciation of the mark against the dollar since 1960 approached 60%.

Japan's post-war development strategy was even more focused on exports. The exchange rate was the centre of macroeconomic policy (Eichengreen and Hatase 2007). The rate was fixed at 360 yen per dollar and remained at that level until 1970. In the tumultuous year 1971, the Bank of Japan at first tried to resist pressure to appreciate, but finally allowed the yen to float to 314 per dollar. After the collapse of the Smithsonian Agreement in 1973, the yen floated upward to 265 per dollar and, by 1978, it had broken the critical mark of 200. However, unlike the German authorities, the Bank of Japan was more willing to forsake some internal stability to keep the exchange rate stable and at competitive levels. In 1974 the Japanese inflation rate briefly reached 25%. In total, the Japanese currency appreciated by about 45% during the course of the 1970s, as shown in Figure 8.

Japan underwent a second episode of strong currency appreciation after the Plaza Accord in 1985. The yen rose from an annual average of 238 per dollar in 1985 to 128 in 1988, an appreciation of about 45% within three years. Japan's experience with currency appreciation in the mid-1980s is sometimes interpreted as an indication that currency adjustments are ineffectual in reducing the current account surplus (McKinnon 2007). Just like Japan back then, it is argued, renminbi revaluation today would not necessarily lead to changes in the underlying current account, which is determined by savings–investment balances. However, the relevance of Japan's experience in the 1980s to China today is not entirely clear. First, an important difference between China today and Japan in the 1980s is the
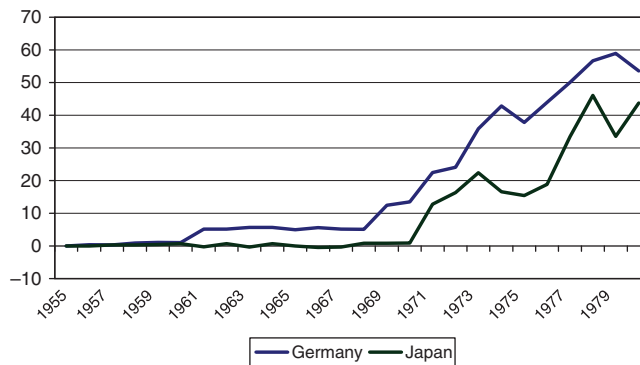

Figure 8: Germany and Japan: Cumulative currency revaluation against the dollar 1955–80, in percent

Source: IFS International Monetary Fund (2009a).

sheer size of the economic imbalance: Japan's current account surplus peaked briefly at about 4% of GDP in 1986, while China's current account surplus averaged around 10% of GDP between 2006 and 2008. Second, yen appreciation following the Plaza Accord contributed towards cutting Japan's current account surplus in half relative to GDP. Finally, one can only speculate about the counterfactual scenario had Japan not revalued. It is possible that imbalances could have become much larger and that policy was therefore effective in preventing an even greater dislocation. All in all, the Japanese experience underscores the importance of auxiliary domestic policies to help transition from export-led to domestic demand-led growth. It does not prove the ineffectiveness of currency adjustment in reducing external imbalances.

A number of important lessons can be learned from these two historical episodes. First, a nominal appreciation of the order of 40% within a few years would be no historical novelty. Many of the same questions that Chinese policy makers are raising now about the potential consequences of revaluation – such as the loss of competitiveness, a less dynamic export sector and a decline in investment growth – have been asked before. Second, the currency adjustments of the early 1970s were successful in stabilizing the external balance of Germany and Japan. Between 1975 and 1985, the German current account surplus was 0.5% of GDP on average, close to zero. While Japan's appreciation path was somewhat slower than the German one, the country continued to have moderate current account surpluses of $<1\%$ of GDP on average. Finally, an interesting insight emerges from Figure 9, which plots how unit labour costs evolved relative to the United States in these years. It is evident that only a small part of the difference in unit labour costs was corrected by wage increases ahead of productivity gains. Both Germany and Japan (like China in the past decade) were successful in limiting wage
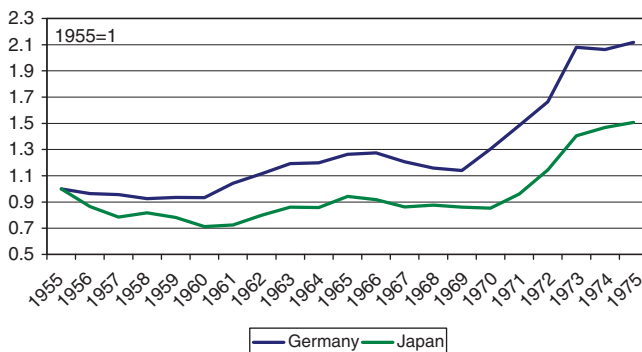
Figure 9: US dollar-based unit labour costs in Germany and Japan (relative to the United States), 1955–75

Source: BLS

increases to the pace of productivity gains, leaving competitiveness unchanged. Some limited wage pressure was visible in Germany in the late 1960s, but the large adjustments in the relative production costs and the catching up in dollar incomes occurred mainly through large exchange rate adjustments. We do not find convincing historical evidence for the adjustment mechanism of wage and price pressure that standard economic models postulate.

VII. The Case for Chinese Currency Adjustment

The Chimerican era is drawing to a close. After the bursting of the debt and housing bubbles, US household savings are rising again. Washington is buffering this necessary adjustment by running sizeable budget deficits. Public dis-saving can temporarily compensate for higher private savings to maintain the final demand, but the American consumer faces a lengthy adjustment period and will ultimately have to pay the bill for this fiscal largesse. Beijing's first response to the collapse in global demand was to loosen credit and pump money into domestic construction and infrastructure projects. In the first six months of 2009 alone the government in Beijing ordered the banks to make new loans of close to ten trillion renminbi or about 40% of GDP. If these numbers can be trusted, China is going through one of the most remarkable experiments with a countercyclical stimulus in monetary history. But while these policies may ease the transition towards a more balanced economy, a structural adjustment will still have to occur in the international economy. As long as Chinese exchange rate policy implicitly taxes consumption and subsidizes exports, surpluses will persist and a reorientation towards domestic growth will face important structural headwinds. The relative prices between the two economies will have to change substantially (Obstfeld and Rogoff 2005, 2007; Feldstein 2008). The transition to domestic demand-led growth in China will only be successful to the degree that this happens.

What are the possible objections to this argument? One is that a significant share of Chinese trade is processing trade, which could reduce the sensitivity of the trade balance to changes in the currency as imports might decline in line with exports. However, processed trade has not been behind the surge in net exports in recent years (given the high import content, its effect on net exports was relatively low). The export boom has been particularly strong in machinery and heavy industrial goods (Anderson 2007). Moreover, even the available estimates (Marquez and Schindler 2006) suggest that the impact of real appreciation would be about five times stronger on exports than on imports. Another objection is that the pass-through of the exchange rate appreciation to US consumers might be low, preventing major changes in the prices of Chinese goods in the domestic US market. Even if this were the case, however, the impact on Chinese consumers could still be large, as

foreign goods would become much cheaper in China, inducing higher demand. Finally, it has been argued that investment could decline as much as savings in response to an appreciation so that the Chinese current account surplus would remain large. But this underestimates the extent to which appreciation would also change relative prices inside China, making investment in domestic sectors more attractive than before. As a result, investment might well remain high even though corporate savings decline. Improved services (e.g. in the health sector) would also be likely to lower the household savings rate over time. In other words, currency revaluation is not only complementary to other policy measures aimed at stimulating domestic demand; it will make their success more likely.

A major exchange rate Chinese revaluation is in the American interest for at least three reasons. First and foremost, exchange rate adjustment would aid the reorientation of the US economy. Chinese currency policy effectively forces an overvalued real exchange rate on the United States. Simply put, because Beijing keeps the renminbi exchange rate artificially weak, the dollar cannot devalue against China (and other parts of Asia that shadow the renminbi) despite the large US trade deficits. This makes it impossible for the American economy to export its way out of the slump. Without an exchange rate adjustment, the United States will be forced to run expansive domestic policies if it wants to achieve full employment (Wolf 2009). In theory, to be sure, the United States could deflate to regain competitiveness against Asia, but deflation is patently out of the question for such a highly leveraged economy. Second, by allowing the United States to import demand from abroad, exchange rate adjustment would lessen the potentially dangerous reliance of US economic policies on measures to stimulate domestic demand. American fiscal policy is clearly on an unsustainable path and it is hard to judge the consequences of the financial distortions and potentially inflationary outcomes caused by zero interest rates and quantitative easing. To the extent that exports could become a meaningful source of US growth again, such highly experimental policies could be ended sooner. Finally, a Chinese exchange rate adjustment would reduce the risk of potentially grave trade frictions not only between the United States and Asia but also between Europe and Asia. Because of China's *de facto* peg to the dollar, the renminbi–euro exchange rate moves significantly in the short run as a consequence of euro–dollar moves.

A case can also be made that revaluation is in the Chinese interest (Pettis 2009). The authorities' ability to cheaply sterilize the foreign exchange interventions may be waning. In addition, a further substantial increase in the volumes of US government debt and dollars in circulation cannot be in the interest of the world's largest foreign holder of US Treasuries. After a decade of rapid reserve accumulation, policy makers in Beijing discovered in early 2009 how far their growth strategy had made them dependent on policy

choices in Washington, DC that were dictated primarily by domestic concerns (Dyer 2009). Recent Chinese statements questioning the future of the dollar as an international reserve currency (e.g. the proposal that the International Monetary Fund's Special Drawing Rights become an alternative to dollars) need to be understood in this context. The euro was supposed to offer financial markets with depth and liquidity comparable with those of the United States. But internal imbalances in the eurozone have drastically reduced the currency's attractiveness for outside investors. In theory, Beijing could diversify out of Treasuries into other fixed income assets or equities. But not many countries will accept large equity investments by the Chinese government or government-controlled companies in strategic domestic sectors. This explains why the preferred Chinese strategy at the time of writing is to acquire stakes in commodity-producing assets like mines and oilfields in comparatively poor and politically unstable countries where concerns about foreign ownership are less of a political obstacle. Yet this policy does not address the underlying problem of renminbi undervaluation.

In brief, the sooner China faces the fact that it cannot avoid sizeable losses – say about 20% of GDP in renminbi terms – on its dollar reserves, the better. These financial losses will be a modest price to pay for a development model that propelled China from third world status to being the second largest economy in the world (Subramanian 2009) and will in any case be more than compensated for by the increase in the dollar value of China's vast stock of renminbi-denominated assets. With millions of jobs lost, the US economy so far has taken a disproportionate share of the economic costs of the Chimerican divorce. It is in the interests of both sides that China play its role in the rebalancing of the world economy – to say nothing of the interests of the rest of the developed world.

VIII. Conclusion

The lesson of German and Japanese history is that exporters can live with significant exchange rate appreciation when major gains in productivity are being made. Today, as in the 1970s, sizeable changes in exchange rates are needed to rebalance the world economy. The world economy's key structural imbalance is that the second largest economy has, for more than a decade, effectively pegged its currency to that of the largest economy at a strongly undervalued rate with only minor upward adjustments. As a result of this massive financial distortion, the demand for dollar-denominated assets has been artificially inflated, which lowered US yields and helped create the macroeconomic backdrop for the recent boom and bust. For the sake of global financial stability, China's subsidization of American borrowing habits must end.

We argued in this paper that a revaluation of the Chinese renminbi is the single most important policy step needed for global rebalancing and financial stability. The historical record shows that currency revaluation can be effective in reducing external surpluses. The post-war reconstruction booms in West Germany and Japan rested on a similar combination of exchange rate undervaluation and price competitiveness, which supported corporate profits, restrained consumption and promoted savings (Eichengreen 2007). But German and Japanese currency intervention and reserve accumulation in the 1960s and 1970s were small compared with recent Chinese practice, and substantial exchange rate appreciations kept trade imbalances and financial distortions in check. We do not for a moment deny that additional domestic policy changes are also needed on both sides of Chimerica to change the relative saving and investment patterns. Revaluation is a necessary but not sufficient precondition for global rebalancing. But we also assert that the savings boom that has accompanied China's external surpluses in recent years has come from Chinese companies, not from the household sector. There are therefore good reasons to believe that excess Chinese savings were a function of real exchange rate undervaluation.

Unfortunately, the temptations to revert to business as usual are great on both sides. So long as bond yields remain low, the temptation is for the United States to rely on large fiscal deficits and money-printing as the principal remedies for slow growth. The Chinese authorities, meanwhile, are unwilling to risk the consequences of revaluation, much less a transition to convertibility, and would prefer to keep Chimerica going at the price of further increasing their holdings of dollar-denominated bonds. But this inertia risks recreating the preconditions for the last financial crisis. A renminbi revaluation would aid the reorientation of the US economy and potentially allow a quicker exit from the extreme policies currently being implemented by the Federal Reserve and the Treasury. It would also help China transition from an export-led development strategy to a more sustainable growth based on domestic demand. Historically, periodic exchange rate revaluation has been the hallmark of economic success. Indeed, it has been part of the pay-off for past economic miracles. For everyone's sake, it is time for Chinese workers to enjoy more of the fruits of their hard labour – and for Chimerica to rest in peace.

Moritz Schularick
Freie Universität Berlin
John-F.-Kennedy Institute
Lansstr. 7-9
14195 Berlin
Germany
moritz.schularick@fu-berlin.de

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