THE BENEFITS OF REVALUATION
Full revaluation of the Chinese yuan would increase U.S. GDP and employment, reduce the federal budget deficit, and help workers in China and other Asian countries

BY ROBERT E. SCOTT

For the past several years, the best economic research has shown that China needs to increase the value of its currency, the yuan, against the U.S. dollar by 25% to 30%. One year ago, China's central bank said that it would "allow the country's currency to float more freely against the dollar and other foreign currencies" (Richburg and Pomfret 2010). Since then, the yuan has inched up at a glacial pace, rising only 5.5% through June 14, 2011. Meanwhile, China has accelerated purchases of dollars and other currencies, adding $597 billion to its foreign exchange reserves in the past year, which reached $3.055 trillion in March 2011. While appearing to let the yuan float, China has actually increased its currency intervention by amassing record amounts of foreign exchange reserves to prevent meaningful appreciation of the yuan.

If the yuan (also known as the Renminbi or RMB) and satellite currencies were revalued to their equilibrium levels, U.S. gross domestic product would increase as much as $285.7 billion (1.9%), creating up to 2.25 million U.S. jobs. Although it would take 18 to 24 months to achieve these full benefits, this growth would reduce the U.S. budget deficit by up to $71.4 billion per year.

Currency manipulation is also costly for China and other Asian countries that follow China's lead. China, however, has resisted pressure to fully revalue its currency out of fear that it would reduce exports and hurt its domestic employment. This resistance means these Asian countries are suffering from rapidly rising inflation that is undermining real wages and fueling asset price bubbles; full revaluation by China and other currency manipulators, such as Hong Kong, Taiwan, Singapore, and Malaysia, would lower their domestic costs for food, oil, and other commodities, reducing inflationary pressures, and it would increase the purchasing power of their domestic workers. Revaluation is a "win-win" scenario for the global economy.

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Key findings of this report include:

- A 28.5% revaluation of the yuan/dollar exchange rate by China alone would increase U.S. GDP by $207 billion dollars. If other countries in Asia such as Hong Kong, Singapore, Taiwan, and Malaysia also revalued too, U.S. GDP would increase by $285.7 billion, or 1.9% (including the China effect). These benefits would be achieved in 18 to 24 months.

- A full revaluation by China alone would reduce the U.S. current account deficit (the broadest measure of the U.S. trade deficit) by $138 billion; if other Asian countries also revalued, then the U.S. current account would improve by $190.5 billion.

- If only China revalued by 28.5%, the growth in U.S. GDP would support 1,631,000 U.S. jobs. If other Asian countries also revalued, then 2,250,000 jobs would be created, enough jobs to increase total U.S. employment by 1.6% (over the level in May 2011).

- Creation of 2,250,000 jobs would be sufficient to reduce the U.S. unemployment rate by at least one full percentage point.

- If only China revalued, then the growth in GDP (which would increase tax revenues) and the rise in employment (which would reduce federal-safety net spending) would reduce the federal budget deficit by $51.7 billion (0.34% of GDP) per year. If other Asian countries also revalued, then the federal budget deficit would be reduced by $71.4 billion (0.47% of GDP) per year. State budgets across the country would also be improved by the growth of tax revenues and the decline in unemployment, Medicaid, and other safety net expenditures.

- Over 10 years, if sustained, full revaluation by China and other Asian currency manipulators could reduce the cumulative U.S. budget deficit by up to $621 to $857 billion. These savings could be achieved at no cost to the U.S. government.

- Revaluation by China is one of the only deficit-cutting tools available that will stimulate economic growth and job creation; other proposals for deficit reduction involving spending cuts or tax increases will reduce domestic growth and employment.

- The inflation rate in China reached 5.5% in May 2011; food and oil prices, which make up a larger share of budgets in China than in the United States, have been rising at double digit rates. Full revaluation by China and other Asian countries could lower inflationary pressures and boost real wages, reducing the threat of future asset bubbles and cooling these overheated economies. It would also rebalance growth in the global economy, helping to restore demand in the United States, Europe, and other countries where growth has slowed dramatically in the past year.
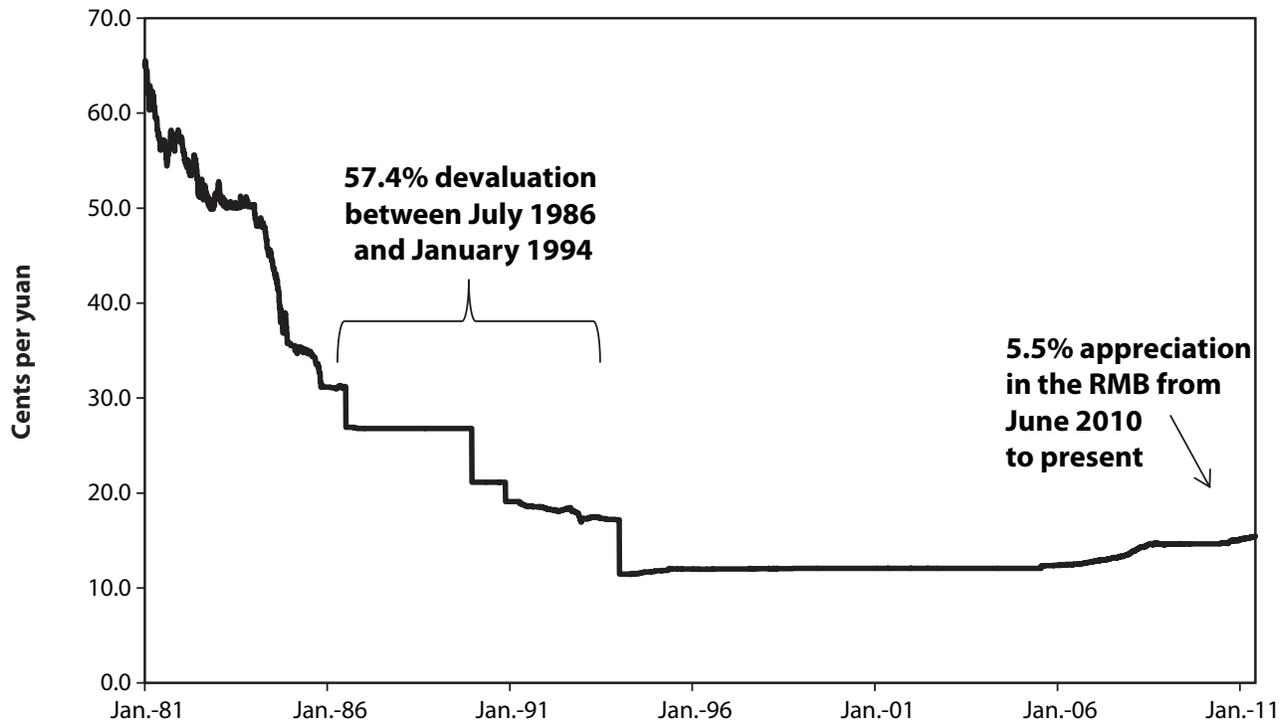
The need for currency realignment

The best estimates are that the Chinese RMB was undervalued by 25-30% in May 2011. One of the major contributors to China's phenomenal growth over the past 15 years was its decision to massively devalue the RMB in the late 1980s and early 1990s, and to tie its currency to the dollar thereafter. Between July 1986 and January 1994 the RMB was devalued by 57.4%, as shown in **Figure A**. In addition, during the late 1990s and for most of the past decade, China has sustained very low inflation rates, which further reduced its real exchange rate. China's low, fixed exchange rate made it a very attractive location to invest for multinational companies from the United States and around the world. China became the largest host to foreign direct investment in the developing world, and foreign invested enterprises were responsible for 55% of China's exports and 68% of its trade surplus in 2010, as reported by China (Scott 2011). The United States also became one of China's most important markets.

There is an extensive literature on the undervaluation of the RMB, both on a trade-weighted basis, and against the dollar. Goldstein and Lardy (2008) review the literature, noting ranges on the undervaluation of the renminbi as high as 50% (Dunaway and Li 2005), and mention their 2007 paper in which they found a 10% increase in China's real effective exchange rate to be associated with a 2.0-3.5% increase in China's trade balance, which in 2008 would suggest that the renminbi was undervalued between 30-55% relative to the dollar. Similarly, Ferguson

U.S. Dollar-Chinese RMB exchange rate, January 1981–June 2011

57.4% devaluation between July 1986 and January 1994

5.5% appreciation in the RMB from June 2010 to present

SOURCES: Author's analysis of Board of Governors of the Federal Reserve System (2011).

and Schularick (2009) use unit manufacturing costs to estimate the degree of undervaluation of the RMB relative to the dollar to be between 30-50%. Recently, Bergsten (2010) found the renminbi would need to appreciate by 25% on a trade weighted basis, or 40% to the dollar to maintain equilibrium. Subramanian (2010) estimated that the RMB was 30% undervalued on a purchasing power parity basis. Thus, there is widespread agreement in the literature that the RMB is at least 25-30% undervalued.

Beginning in 2008, Cline and Williamson (2008; 2011) have produced a series of reports on Fundamental Equilibrium Exchange Rates (FEERs) that have consistently shown that the RMB is undervalued by 24-40% (current estimate is 28%) relative to the dollar. It is important to note that Cline and Williamson's estimate of the equilibrium value of the RMB, relative to the dollar, rose from 24.2% in 2010 to 28.5% in 2011, despite the 5.5% nominal appreciation in the RMB shown in Figure A.[1] Cline and

Williamson (2011) also found that currencies in Taiwan, Singapore, Hong Kong, and Malaysia were undervalued against the dollar by 28.7% to 38.5%, indicating that these currencies were even more undervalued relative to the dollar than the Chinese RMB.

The benefits of full currency realignment

This study estimates the impacts of a 28.5% revaluation of the RMB against the dollar on the U.S. current account (the broadest measure of the trade balance), gross domestic product, U.S. employment, and the federal budget deficit. Taiwan, Singapore, Hong Kong, and Malaysia are also massively and illegally manipulating their currencies. They would also benefit from reduced inflation and an increase in the purchasing power of their workers if they revalued. Similar estimates are developed for the impact of an identical revaluation by these satellite currencies on the assumption that they follow China's lead.

This study first estimates the impact of Chinese revaluation on the U.S. real exchange rate, holding everything else constant. These estimates are developed using 2011 currency weights as estimated by the staff of the Board of Governors of the Federal Reserve (2011). It is important to note that these weights combine three key elements of the competition between U.S. and Chinese goods, including China's share of U.S. total imports and exports and also a measure of competitiveness in third country markets. This last factor is especially important—China's weight in the U.S. third country competitiveness index is higher than that of any other country in the world, including all members of the European Union combined. The overall Chinese currency weight is a weighted average of these three indexes. For 2011, China's weight in the Federal Reserve currency index was 19.871%. It is important to note that this ratio has risen significantly in the past decade: As China's share of U.S. import markets has soared, so has its role as a competitor in third country markets.[2]

Cline (2008) estimates that a 1% change in the U.S. real exchange rate results in a 0.16 percentage-point change in the current account as a share of GDP (increases in the U.S. real exchange rate result in a decline in the current account balance, and vice versa). In practice, the full effect of currency realignment is reached with a lag of 18 to 24 months. This study estimates equilibrium impacts on trade flows after this adjustment process is complete.

Given these assumptions, a 28.5% revaluation of the RMB would result in a 5.66% depreciation in the U.S. real exchange rate. The RMB revaluation would improve the U.S. current account by 0.91% of GDP, as shown in **Table 1**.[3] The International Monetary Fund (2011) estimates that U.S. GDP in 2011 will be $15.2 trillion, so the current account deficit would improve (fall) by $138 billion in 2011 (assuming instantaneous equilibrium adjustment in trade flows).

It is widely assumed that Taiwan, Singapore, Hong Kong, and Malaysia have resisted pressures to revalue in order to maintain their competitive posture vis-à-vis China. Were China to revalue, these countries would be free to revalue as well, which would help reduce inflationary pressures and increase the purchasing power of their consumers. Table 1 also estimates the impact of a 28.5% revaluation by these satellite currencies. Their total weight in U.S. currency indexes was 7.557% in 2011. A 28.5% appreciation in these currencies against the dollar would improve the U.S. current account by 0.34% of GDP, as shown in Table 1. This would improve (reduce) the U.S. current account deficit by $52.5 billion.

If both the Chinese RMB and the satellite currencies revalued together, the U.S. current account balance would improve by 1.25% of GDP, reducing the U.S. current account deficit by $190.5 billion. Changes in the trade balance contribute directly to U.S. GDP, as shown in the

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TABLE 1

Impacts of full rebalancing of the Chinese yuan on U.S. trade and gross domestic product
(based on a 28.5% appreciation of the RMB—equilibrium impacts)

Scenario	Improvement in U.S. current account deficit (share of 2011 GDP)	Change ($ billions) U.S. current account	GDP
China only	0.91%	$138.0	$207.0
Satellite currencies	0.34%	$52.5	$78.7
Total, with satellite currencies	1.25%	$190.5	$285.7

SOURCE: Author's analysis of Cline (2008) and IMF (2011) data.

National Income and Product Accounts (and discussed in the next section).

The impacts of currency realignment on GDP, employment, and the federal budget deficit

Reductions in the current account deficit will increase spending on domestic goods and expand the U.S. economy both directly (through increased exports to China and other countries or reduced imports) and indirectly, through re-spending of the wages earned by workers making these products. We use a macroeconomic multiplier for current account improvements of 1.5 to calculate the economic activity that is induced when income earned by newly hired workers and firms is re-spent throughout the economy. From this re-spending estimate we can then estimate the number of jobs associated with the new economic activity. Essentially, as manufacturing and supporting services workers are hired to produce more goods for export, or to substitute for imports from China and other countries, they will have more money to spend. For example, if they buy lunch at a neighborhood diner, then this will support jobs for wait-staff. If the newly hired waiters and waitresses then buy clothes for their kids, this will support jobs in retail establishments.

A macroeconomic multiplier of 1.5 is consistent with a range of independent estimates of the net macroeconomic effects of increased goods production—including those supplied by the Congressional Budget Office and Moody's Economy.com. This multiplier includes an implied "re-spending" multiplier of 0.5, which is consistent with estimates of private-sector re-spending surveyed by Bivens (2006). This multiplier is applied to the change in the current account to calculate the total amount of new economic activity generated by the upfront spending. (The macroeconomic multiplier assumes that there is slack in the U.S. economy, currently exemplified by the 9.1% unemployment rate in May 2011. If excess U.S. unemployment shrinks or is eliminated in the future, then the multiplier will shrink or be eliminated.)

We use the macroeconomic multiplier to translate the estimated improvements in the current account into changes in GDP. Thus, if only China revalues, then the $138 billion dollar improvement in the current account

will result in a $207 billion improvement in GDP, as shown in the last column of Table 1.[4] If the satellite countries revalue by 28.5%, the resulting $52.5 billion improvement in the current account will generate a $78.7 billion increase in GDP. If both China and the satellite economies revalue, then total U.S. GDP will increase by $285.7 billion, a 1.9% increase in U.S. GDP over 2011.

We then use the historical relationship that prevails between GDP growth and employment growth to infer that each 1 percentage-point increase in GDP corresponds to 1.2 million new jobs. This relationship between GDP growth and employment growth is also relatively constant across many macroeconomic forecasters (see CBO 2011 for the latest example).

If China alone revalues, the resulting $207 billion increase in GDP will support 1,631,000 jobs, as shown in **Table 2**. If satellite currencies also revalue, then an additional 620,000 jobs will be created. If both China and satellite currencies revalue for an overall $285.7 billion increase in GDP (shown in Table 1), then a total of 2,250,000 U.S. jobs would be created, enough to increase total U.S. employment by 1.6% over the May 2011 level (BLS 2011). While the increased growth and labor demand would likely draw some workers back into the labor force, it is likely that unemployment would be reduced by at least one full percentage point if China and the satellite currencies revalued by a full 28.5%.

The impacts of currency revaluation on the U.S. federal budget deficit are also estimated in Table 2. Based on CBO estimates of the relationship between GDP and the federal budget deficit, a 1.0 percentage-point increase in GDP would lead to a 0.375 percentage-point reduction in the federal deficit. This offset comes mostly from revenues, but also from reduced (federal) safety-net spending. It does not include any increase in state or local tax revenue.

If China alone revalued, then the resulting growth in U.S. GDP shown in Table 1 would reduce the federal budget deficit by an amount equal to 0.34% of GDP, or $51.7 billion per year. If satellite currencies revalued, the federal deficit would decline by an additional 0.13% of GDP per year, or $19.7 billion. If all of these countries revalued, then the federal budget deficit would be reduced

TABLE 2

**Impacts of full rebalancing of the Chinese yuan and satellite currencies
on U.S. job creation and federal budget deficit**
(based on a 28.5% appreciation of the RMB—equilibrium impacts)

Scenario	Jobs supported	Reduction in federal budget deficit	
		share of GDP*	*(billions of dollars)*
China only	1,631,000	0.34%	$51.7
Satellite currencies	620,000	0.13%	$19.7
Total, with satellite currencies	2,250,000	0.47%	$71.4

* Based on Congressional Budget Office estimates of the relationship between the GDP and the federal budget deficit, a 1.0 percentage-point increase in GDP would lead to a 0.375 percentage-point reduction in the federal deficit. This offset comes mostly from revenues, but also from reduced federal safety-net spending. It does not include any increase in state or local tax revenue.

SOURCE: Author's analysis of Cline (2008) and IMF (2011) data.

by 0.47% of GDP or $71.4 billion per year. State budgets across the country would also be improved by the resulting growth of tax revenues and the decline in unemployment, Medicaid, and other safety net expenditures.

Over 10 years, if sustained, full revaluation by China and other Asian currency manipulators could reduce the cumulative U.S. budget deficit by $621 to $857 billion.[5] These savings could be achieved at no cost to the U.S. government. Revaluation by China is one of the only deficit-cutting tools available that will stimulate economic growth and job creation; other proposals for deficit reduction involving spending cuts or tax increases will reduce domestic growth and employment.

Comparisons with other estimates of the benefits of RMB revaluation

Cline (2010) has estimated the impacts of RMB revaluation on China's current account surplus. He finds that a 10% revaluation of the RMB would reduce China's current account surplus by $170 to $250 billion annually, with a corresponding improvement of $22 billion to $63 billion annually in the U.S. current account balance (including satellite currency effects at the high end). Most of Cline's estimates are based on changes in China's real, trade-weighted exchange rate. Data needed to calculate the impact of a given change in the bilateral dollar-RMB

exchange rate on China's real, trade-weighted exchange rate are not included in his study. The one exception is Cline's "Example 1," which is based on the impact of currency revaluation on the U.S. real exchange rate. His estimate assumes that China has a weight of only 9.1% in the U.S. real exchange rate.[6] Unlike that study, we use current data from the Federal Reserve Board to estimate the impact of a shift in the U.S.-RMB exchange rate; the Fed's 2011 China currency weight is 19.871, more than twice as large as the parameter used by Cline (2010).

As noted above, Bergsten (2010) suggests that the renminbi would need to appreciate by 25% on a trade-weighted basis to maintain equilibrium. Applying this figure to Cline's estimate of the impact of a 10% revaluation implies that the U.S. current account would improve by $55-$157.5 billion. The current account adjustment for China estimated here (Table 1) of $138.0 billion falls within the upper end of this range, but does not exceed it.

Finally, it is important to note that the United States had a trade deficit of $278.3 billion with China in 2010. Rebalancing of China's exchange rate would reduce but not eliminate this deficit. China engages in a number of other trade-distorting practices, including price dumping, massive and targeted industrial subsidies, and extensive use of government procurement to foster development of domestic industries in order to maximize Chinese exports

through programs such as its indigenous innovation policies. Much more than exchange rate rebalancing will be required to rebalance U.S.-China trade flows.

Changing U.S.-China trade patterns

Scott (2010) estimated the number of jobs displaced by the growth of the U.S.-China trade deficit. This research has been criticized by the U.S.-China Business Council on the grounds that:

> [Scott's] 'job loss' calculation assumes that every product imported from China would have otherwise been made in the United States, which is clearly wrong… Much of what we are importing from China is replacing products from other countries, not products that we make in the United States today. (Patterson 2011)

This comment reflects a flawed understanding of the ways in which changes in exchange rates and other policy variables affect trade flows. When the real value of the dollar declines, as it did between 2002 and 2006, its most important impact is on exports. The *rate of growth* of total U.S. imports slowed, but imports did not decline in absolute value until the Great Recession in 2009. The trade deficit peaked in 2006 and declined significantly in 2007 and 2008 largely because the rate of growth of exports accelerated after the dollar declined.

If the RMB is fully revalued against the dollar, it will have three effects on trade: (1) The *rate of growth* of imports will slow; (2) U.S. exports to China will grow somewhat faster (from a very small base); and (3) The rate of growth of U.S. exports to the rest of the world will accelerate significantly. This is because China is the most important competitor for the United States in all other third country markets, even more important than Germany and all other members of the European Union combined. The effect of revaluation on exports will dominate, and is likely to generate most of the new job growth estimated above.

There is another important trend to note in the context of this discussion. The U.S.-China trade deficit is following a negative trend, after controlling for changes in real exchange rates and differences in growth rates. Cline (2010) found that the trend rate of growth in the bilateral deficit is $6.6 billion to $19 billion per year. This trend reflects, in part, the fact that productivity is growing faster in China than in the United States. As a result, in order to maintain stable trade balances, China needs to revalue its currency each year, even after it fully revalues. Estimates developed here suggest that China will need to revalue by an additional 1.4% to 3.9% per year in the future until underlying productivity growth differences between the two economies converge.

Conclusion

If China were to revalue the yuan (or Renminbi) to its equilibrium level, and satellite countries followed suit, U.S. GDP would increase as much as $285.7 billion (1.9%), creating up to 2.25 million U.S. jobs, increasing total U.S. employment by 1.6 percentage points, and reducing the U.S. unemployment rate by at least one full percentage point. This growth would reduce the U.S. budget deficit by up to $71.4 billion per year. These full benefits could be achieved within 18 to 24 months. Over 10 years, full revaluation of the Chinese RMB and other satellite currencies would reduce the federal budget deficit by $621 to $857 billion.

Currency manipulation is also costly for China and other Asian countries that follow China's lead. These countries are suffering from rapidly rising inflation which is undermining real wages and fueling asset price bubbles. The inflation rate in China reached 5.5% in May 2011; food and oil prices, which make up larger shares of budgets in China than in the United States, have been rising at double digit rates. Full revaluation by China and other currency manipulators such as Hong Kong, Taiwan, Singapore, and Malaysia could lower inflationary pressures and boost the purchasing power of their domestic workers, reducing the threat of future asset bubbles and cooling off these overheated economies. It would also rebalance growth in the global economy, helping to restore demand in the United States, Europe, and other countries where growth has slowed dramatically in the past year.

Endnotes

1. Note that inflation was 2.1 percentage points higher in China than the United States in the past year. Thus, the real value of the RMB has gained approximately 7.7%. The increase in the FEER in 2011 (Cline and Williamson 2011) largely reflects the growth in U.S. current account deficits, and projected increases in China's current account surpluses (the IMF projects that China's current account surplus will increase from 5.7% of GDP in 2011 to 6.3% in 2012 and 7.8% in 2016, assuming fixed exchange rates).

2. Between 2000 and 2011, China's overall currency weight rose from 7.881 to 19.871, an increase of 152%, and its third market competitiveness index rose from 10.03 to 23.001, an increase of 129%.

3. The 28.5% revaluation of the RMB multiplied by China's share of U.S. trade (19.871%) yields 5.66% depreciation in the U.S. real exchange rate. That appreciation causes a 5.66 x 0.16=.91 percent of GDP improvement in the U.S. current account.

4. The $138 billion improvement in the current account results in a $138 billion x 1.5 = $207 billion increase in GDP.

5. These estimates assume that there is slack in the U.S. economy (e.g. excess unemployment). If excess unemployment is reduced or eliminated in the future, then the impacts of currency realignment on the federal budget deficit would be reduced.

6. This estimate reflects the ratio of bilateral exports plus imports to total U.S. trade in 2006. Note that this term leaves out the important impact of the bilateral exchange rate on the competitiveness of U.S. products in third markets, as estimated by the U.S. Federal Reserve. In addition, the Federal Reserve's estimate of China's share in the U.S. real exchange rate index rose from 16.423% in 2006 to 19.871% in 2011, an increase of 21%. The use of current vs. historical exchange-rate weights and the inclusion of third country competitiveness effects more than doubles the impact of a revaluation of the RMB on the real dollar index.

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