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Is the Chinese Renminbi Undervalued?

The Chinese government has come under increasing criticism from both the U.S. government and some critics in U.S. industry for manipulating its currency. This is largely because of concern about China's large and growing bilateral trade balance with the United States. The most extreme view, at least in terms of the size of the purported problem and proposed remedy, is contained in a bill introduced in February 2005 that would impose a 27.5 percent tariff on Chinese goods unless China revalues, or raises the value, of its currency, the renminbi, whose basic unit is the yuan, by 27.5 percent. This figure is the midpoint of a range of estimates of how much the Chinese undervalue their currency in order to be able to make their goods cheaper in the United States and elsewhere. While the proposed legislation died with the end of the last session, it is uppermost in the minds of China critics and will continue to provide a benchmark for discussions of China's trade policy.

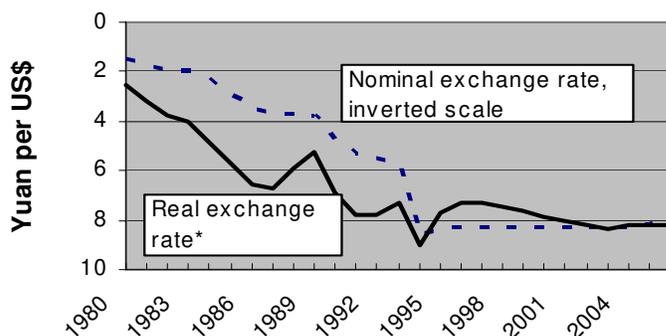
China did begin to push up the value of the yuan against the dollar in June 2005, but not by the 27.5 percent suggested by some critics. The rise in the dollar price of the yuan was only 6.8 percent from July 2005 until February 2007. It rose 3.4 percent in the first year and has risen slightly faster in the past year, up 3.9 percent in the year ending in February 2007. This is hardly a breakneck response to U.S. pressures. Moreover, while the appreciation has quickened recently, so has U.S. inflation so that the dollar prices of Chinese goods are not rising much faster than dollar prices of U.S. goods. Thus, there has been little gain in the pricing competitiveness of U.S. goods. This lack of competitiveness gains highlights the importance of what is called the real exchange rate, the observed nominal exchange rate adjusted for prices in the two countries.

The Real Exchange Rate Matters

It is the real exchange rate that affects the price competitiveness of two countries' goods, not the nominal exchange rate. China's currency could rise in value relative to the U.S. dollar, but if China's yuan prices are rising more slowly than the dollar prices of U.S. goods, China's goods could end up selling at lower dollar prices in the United States than U.S. goods do. The real exchange rate is the nominal yuan price of the dollar times the relative price level in the United States relative to China. Chart 1 shows the nominal and real exchange rates for the dollar in terms of yuan. The real exchange value is constructed using the U.S. consumer price index (CPI) divided by the CPI in China, where each is set equal to 100 in 2005. The nominal and real exchange rates are the same in 2005 when the ratio of CPIs is equal to one.

Chart 1

**The yuan has been rising for four years,
in real terms**



*Real exchange rate based on CPIs (2005 = 100)

Note that an inverted scale is used to measure the exchange rates so that increases in either line reflect an improvement in the respective value of the yuan. Since the exchange rate is the yuan price of the dollar, an increase in the value of the yuan (in dollars) means a fall in the value of the dollar (in yuan). Increases in the exchange rate, as shown, are increases in the value of the yuan and reductions in the value of the dollar, as desired, but it is the use of the inverted scale that accomplishes this. Like nearly all explanations of exchange rates and their movements, the conventional effort to make the discussion as simple as possible is somewhat complicated.

If the yuan were undervalued and fixed, as critics claim, it would be expected to appreciate in real terms through faster inflation in China than in the United States. This would occur because an under-valued yuan would accelerate China's export growth and restrict its imports, putting upward pressure on prices, wages and rates of return for its export and import-competing industries, until the cost advantage was eliminated. This would be fostered by the general inflow of dollars, which would accumulate as reserves at the central bank and support more inflationary growth of the Chinese money supply. The responses to an undervalued yuan would lead to a rise in Chinese prices relative to U.S. prices pushing up the real exchange rate for the yuan, given the nominal exchange rate.

What is the "right" yuan-dollar exchange rate?

Proponents of the view that the yuan is undervalued point to the large and persistent bilateral trade deficit that the United States has with China. There is no reason why any one country's trade with another has to balance, however. Economic theory and accounting only dictate that in the long run a country's overall current account balance with all country's will tend to balance. And even then, the "long run" for this purpose is often counted in decades. A bilateral trade balance is not evidence of an imbalance, at least in the sense that there are economic forces that would eventually eliminate it, or in the sense that it will ever have to go away or that its persistence implies excess costs or risks to either country.

International financial theory predicts that the real exchange rate of a currency is "stationary," which means that it fluctuates around its mean, with no tendency to drift off and a systematic tendency to move back to the mean if for some reason it is moved away from it. This occurs because of "purchasing power parity" (PPP), which holds that the same bundle of goods and services will tend to sell for the same price (in a given currency). As a result, the exchange rates must adjust to reflect price differences in the domestic price levels in the two countries, or, given a fixed nominal exchange rate, price levels adjust to make PPP hold. PPP rests on the ability to profitably arbitrage price differences when it does not hold.

An example of how PPP works might clarify the point. Suppose, for the sake of the argument, that PPP holds but China appreciates the nominal value of the yuan by 27.5 percent. PPP implies that such an appreciation would cause the price level in China to fall eventually by 27.5 percent relative to prices in the United States. The reason is that the nominal, and initially real, appreciation of the yuan by 27.5 percent would lead Chinese goods to rise by 27.5 percent in dollar terms and U.S. goods to fall by 27.5 percent in yuan terms. Thus the Chinese and Americans would buy more U.S. goods and fewer Chinese goods, putting upward pressure on U.S. prices and downward pressure on Chinese prices. Since the Chinese market is so small relative to the United States, most of the pressure would fall on the Chinese market. The temporary incentive to switch purchases from Chinese to U.S. goods would continue until prices in China fell by 27.5 percent relative to U.S. prices and then PPP would be restored.

Some price differences across countries could arise from taxes, transport cost or natural endowments of specialized resources. These differences in prices cannot be easily eliminated by arbitrage, so PPP may not as readily hold in these cases. Even when there are such factors, however, the real exchange rate is expected to be stationary in the long run so long as these distorting factors remain unchanged or change in a non-systematic way. But again, the long run can be very long. The real value of the yuan shown in Chart 1 appears to have a downward drift in the value of the yuan, or upward drift in the value of the dollar until 1991. This should not be surprising, however. The chart begins soon after reform and opening of the Chinese market began. Highly-centralized socialist economies attempt to control prices and hold

the prices of essential consumer goods and services at artificially low levels and to control access in order to ration them. They also control exchange rates and access to foreign exchange. In China's case it appears that the real exchange rate may have been set artificially high so that foreign demand was relatively low and domestic demand for foreign goods and foreign exchange (dollars) were rationed. As the economy opened, the real exchange rate fell. It might seem that it could take a long time for the real exchange rate to become stationary, but actually simple augmented Dickey-Fuller tests indicate that there is no significant trend and that the real exchange rate shown is stationary (ADF statistic equals -3.93, critical value equals -2.98, significance level equals 0.6 percent). Depending on the period used, it would appear that the real exchange rate has been slightly overvalued, but by no more than 4 percent in 2005. Of course, it is not possible to have much confidence in such a conclusion based on only 25 years data for an economy in such dramatic transition, but the results are surprising, powerful and suggestive.

Conclusion

U.S. policy toward China has been to exert strong pressure to get the Chinese to appreciate the yuan as part of its opening up of its foreign exchange and other financial markets to international competition. The focus is on the latter opening, but the expectation is that the currency would appreciate as many other policymakers and industry leaders hope. With a flexible, market-driven exchange rate, market participants determine the right price for a currency in real time, minute-by-minute, so that it is difficult to argue that the exchange rate is 'wrong.' Under a fixed exchange rate, such as that adopted for over 10 years by the Chinese, market pressures arising from under- or overpriced currencies do not move the exchange rate, but instead move prices in each country to eliminate any under- or overvaluation. Price rigidities suggest that this process could be much slower than exchange rate changes. In any event, theory and evidence today favor the notion that PPP and real exchange rate stationarity are the long-run determinates of the exchange rate and of international pricing relationships. The evidence suggests that either way, the yuan may be close to correctly valued. Any effort to force more appreciation could be deflationary for China.

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