

War of Currencies Recent Trends

Christian Pierdzioch^{#1}, Georg Stadtmann^{*2}, Leila Tselaoui^{#3}

#Hemut-Schmidt-University, Department of Economics, Germany

#Europa-Universität AND University of Southern Denmark

*Europa-Universität

²Stadtmann@europa-uni.de

Abstract—Currently, the term *currency war* is on the agenda of many international organizations and governments. Several factors that affected the international competitiveness of nations as well as their wealth position fueled this discussion. We use the Big Mac index as a proxy for the international competitiveness. The comparison between the U.S. and China reveals a strong undervaluation of the Chinese currency against the USD. Nevertheless, the recent loosening of American monetary policy might also cause negative effects for China: Due to the fact that the exchange rate is unilaterally fixed, changes of the nominal exchange rate will not play a major role. Instead, we focus on the implications of a higher American inflation rate on the wealth position of China as well as the impact of the American inflation rate on the Chinese counterpart (imported inflation). In a second step we highlight the implications of the artificially low exchange rate of China for the competitiveness of third parties such as for example Brazil. Due to low interest policy of the U.S., some emerging countries suffer from a deterioration of their competitiveness due to an appreciation of their currencies. Under consideration of this background it is understandable why a Brazilian politician started the discussion about a *war of currencies* and why capital controls were implemented. The article closes with a short analysis of the most recent developments such as the fixing of the Swiss currency against the Euro. [3]

Keywords—Depreciation; Competitiveness; Central Bank Intervention; Foreign Exchange Reserves; Big Mac Index

I. INTRODUCTION

During the last weeks and months, the term *currency war* has been on the agenda of many international organizations and governments. The term *currency war* can be defined as a situation in which countries devalue their currencies in an attempt to gain competitive advantages over other countries, which are then likely to retaliate by devaluing their currencies. As a result, a vicious circle of devaluations and counter-devaluations can gather steam.

When talking about currency wars, politicians and economists typically focus on the “big players” in the international monetary system, like China and the United States (U.S.). Representatives of the U.S. typically argue that the Chinese Yuan is undervalued and that the Chinese government intentionally uses this undervaluation as a strategic device to foster Chinese exports to the rest of the world.[3] Representatives of the Chinese government, in turn, argue that the recent U.S. monetary policy of *quantitative easing* is a concealed attempt to stabilize the U.S. economy by strengthening the competitiveness of American exporters at the expense of Chinese companies.[2]

Analyzing the policies of China and the U.S. is certainly of high importance to develop a deeper understanding of the international monetary system. Yet, in order to fully understand why the term *currency wars* has gained such a prominence in international policy discussions, is also important to take into account the policies and strategies of other “players”, especially Japan and Switzerland. This seems to be worthwhile because both countries started to manage actively the exchange rates of their currencies. The Japanese monetary authorities (Ministry of Finance and Bank of Japan) heavily intervened in foreign exchange markets in an attempt to depreciate the yen or stop the trend of appreciation. On September 6, 2011, the Swiss National Bank even introduced a lower floor for the exchange rate of the Swiss Franc vis-à-vis the Euro in an attempt to stop the ongoing appreciation.

In order to better understand the causes and potential consequences of these exchange rate policies, we use the Big Mac Index, constructed and published by the magazine *The Economist* (2011), to analyze the over- and undervaluation of various international currencies. Against the background of this analysis, we then discuss the policies and strategies of China and the United States, as well as the positions of Japan and Switzerland.

II. CHINA AND THE UNITED STATES

The idea underlying the Big Mac Index is that, according to the condition of purchasing power parity, a homogeneous tradable good should have, the same price at home and abroad. If prices would differ, goods market arbitrage would gather steam and any price differential would be eliminated by changes in demand and supply. As a result, if we know the goods prices at home and abroad, we can compute the equilibrium exchange rate. Afterwards one can compare the actual exchange rate with the equilibrium exchange rate to detect any under- or overvaluation. Any under- or overvaluation, in turn, should manifest itself in large current account imbalances. In fact, the current account of China is in surplus, while the current account of the U.S. notoriously is in deficit.

The question then is whether the Big Mac is such a homogeneous tradable good. On first reading, this idea seems to be rather strange as no customer who wants to buy a Big Mac in Los Angeles would compare the U.S. price with the price in Shanghai. In fact, the Big Mac seems to be a non-tradable good rather than a tradable good, indicating that the condition of purchasing power parity is not applicable at all. However, before jumping to premature conclusions one

should take into consideration that the price of a Big Mac reflects the factor prices McDonald's has to pay for the ingredients to produce a Big Mac. In other words, the prices for land (McDonald's has to build restaurants), labor (McDonald's employs shop assistants), and capital (McDonald's needs machines to produce French fries) determine the price of a Big Mac. The price of a Big Mac, therefore, can be interpreted as an overall broad price index that reflects the prices of many input factors. Of course, firms can use these factors of production also to produce many other goods, which might be tradable. If the price of these factors changes, the goods price will change as well. Any change in a country's competitiveness, as fostered by changes in the prices of factors of production, can therefore be measured in terms of changes in the price of a Big Mac. When the competitiveness of a country changes, then the price of a Big Mac should change, and the equilibrium exchange rate should change as well.[4]

Data on the Big Mac Index as for July 2011, taken from the internet page of the magazine *The Economist* (2011), suggest the following:

TABLE I
PURCHASING POWER PARITY BASED ON BIG MAC PRICES IN JULY 2011

Country	Big-Mac prices		Implied PPP of the U.S. dollars	Actual dollar exchange rate (25.07.2011)	Under(-)/over(+) valuation against the dollar, %
	In local currency	in U.S. dollars			
USA	\$ 4.07	4.07			
Brazil	Real 9.50	6.16	2.34	1.54	52
China	Yuan 14.7	2.27	3.60	6.45	-44
Japan	¥ 320	4.08	78.7	78.4	nil
Switzerland	SFr 6.50	8.06	1.60	0.81	98

Source: The Economist (2011). [3]

But how does the equilibrium exchange rate level look like? By using the price ratio p_{china}/p_{usa} with an exchange rate level of 14.7 Yuan / 4.07 \$ = 3.60 Yuan / \$, the Chinese Big Mac price would match the American Big Mac price and the *Law of one Price* would hold.

A comparison of the current exchange rate of 6.45 Yuan / \$ with the LoP equilibrium exchange rate 100 of 3.60 Yuan / \$ shows that the Yuan is undervalued by about $(3.60 - 6.45) / 6.45 = -44\%$.

In the past the exchange rate decreased steadily from the level of 8.25 Yuan/\$ (2005) to the level of 6.82 Yuan/\$ (Jul. 2008). In the period from mid 2005 to mid 2008 the Yuan was already on an appreciation path. This adjustment stopped abruptly in 2008, after the Lehman bankruptcy. For the next two years China switched back to a fixed exchange rate system in consequence of the outbreak of the financial crisis.

III. BROADENING THE SCOPE: THE ROLE OF OTHER COUNTRIES WITHIN THE CURRENCY WAR

Again the Big Mac index for the analysis of competitiveness: A Brazilian Big Mac costs 9.50 Real or 6.16\$. Nevertheless, the American Big Mac costs only 4.07 \$. The competitiveness of Brazil is lower in comparison to the US. This overvaluation has increased from 2010 to 2011 even further: The exchange rate decreased from a level of 1.77 Real/\$ (July 21th, 2010) to a level of 1.54 Real/\$ (July 25th, 2011) which deteriorated the Brazilian competitiveness.

An important determinant of the appreciation of the Real is the loose monetary policy of the Fed: One aspect is that the currency pair Real/Dollar is used at the moment strongly for so-called carry trades. Finance investors take a loan at a lower interest rate in the US dollar and put the money – after exchange in the foreign exchange market – in Real with a higher interest rate. The interest differential between both leading interest rate is currently more larger than 10 percent points. Therefore, increase in demand for Real and supply of dollar cause the appreciation of the Real.

It is also interesting to study the relative competitiveness between China and Brazil: A strong Real relative to the Dollar and a weak Yuan/Dollar relationship imply a much too strong Real compared to the Yuan. The Brazilian Big Mac is by approx. 150 % more expensive than the Chinese counterpart. By fixing its exchange rate at a very low relative to level, China does not only improve its competitiveness, including Brazil, the U.S., but also (indirectly) against other countries. Taking these aspects into account it is understandable why a Brazilian politician started the public discussion about a currency war. In this light one can also understand the why countries invoke capital controls introduction of capital controls. By this measure, Brazil tries to reduce the amount of foreign capital pressing into the country.

IV. EFFECTS OF QUANTITATIVE EASING II ON THE US.– CHINA RELATIONSHIP

The purchase of U.S. government bonds by the Federal Reserve led to an increase of the monetary base by another 600 billion\$ (quantitative easing II). With this decision, the Fed has taken on the displeasure of China. Often, the devaluation of the dollar and the resulting improvement of American competitiveness are regarded as the cause of resentment. However, before jumping to conclusions one should take into account that the dollar has devaluated, against some other currencies, while the exchange rate against the Chinese Rembinbi is still fixed.

So where does the anger come from? To understand this one must examine the impact of the monetary expansion on American goods prices: A rise of the monetary base causes – in case that the money multiplier is constant – an expansion of money supply. If the velocity of money is constant, the monetary impulse will lead in the medium term to a price increase. Therefore, US inflation could rise. But why does this bother the Chinese? At least two aspects have to be considered: [13]:

1. The Chinese hold American securities, denominated in US dollars. With a price of 1 \$ per U.S. good the Chinese get 100 goods for a 100 \$ bond. Nevertheless, if American inflation leads to a doubling of goods prices so that price

increase towards a level of 2 unit of the good, the Chinese will receive only 50 units of the good when they sell off their 100 \$ bond! The real value of the securities held by China melts down like snow in the sun.

2. In a fixed exchange rate system, one also has to consider the problem of imported inflation: Due to the fixed exchange rate system, China must buy dollar in the foreign exchange market, so that their dollar reserves rise. This implies that at least in the first step the Chinese money supply in the circulation increases which can increase the prevailing inflationary pressure in China. One possibility to neutralize the effect on money supply is to reduce the domestic component of money supply: The Chinese central bank would have to sell within the scope of open market operations Chinese bonds to collect the extra money again.

Accounting for these two aspects, it becomes understandable that the Chinese are really angry! This can be seen from the actions of the Chinese rating agency before the G20 summit in November 2010, when they downgraded U.S. government securities from AA to A+ [5]. Considering that China is sitting on mountain of American securities, this downgrading had the potential to deteriorate the value of the Chinese investments in U.S. government securities. It, thus, seems that the Chinese are really angry!

V. INTERVENTIONS IN FOREIGN EXCHANGE MARKETS: IN JAPAN AND SWITZERLAND

In addition to the relationships discussed, it is also important to have a look at Switzerland and Japan. The central bank of both countries tried to influence the exchange rate by foreign exchange market interventions. The direction of intervention was the same: Purchases of foreign currencies to strengthen the foreign currency and to weaken the home currency. However, the only difference is that, while the MoF/BoJ intervened against the US Dollar, the Swiss national bank intervened against the Euro.

For example Switzerland intervened heavily during the time period 2010 to 2011. Nevertheless, they were not able to stop the appreciation trend¹ and introduced a lower floor of 1.2 SFR/EUR on September 6, 2011. [11]

Switzerland's National Bank (SNB) increased their reserves of foreign currency (in this case EUR) by an incredible amount of SFr 138.5 billion from January 2010 till May 2010. The SNB intervened in the currency markets through swap operations, through which it acquired Euros and dollars in exchange for Swiss francs, thus boosting the overall supply of francs in the market. Current reserves are now CHF 232bn or 43% of GDP. [7]

¹The recent literature on central bank intervention use high frequency data to study the impact of interventions on the exchange rate. One common result is that the effects have a very short life and disappear a few hours after the interventions took place. Frenkel et al. suggest therefore, to use the label "effects" instead of "effectiveness" in the context of the impact of the central bank intervention. The term "effectiveness" seems to be inappropriate, because it cannot be the target of the central bank to intervene the exchange rate only for short time windows. [12]

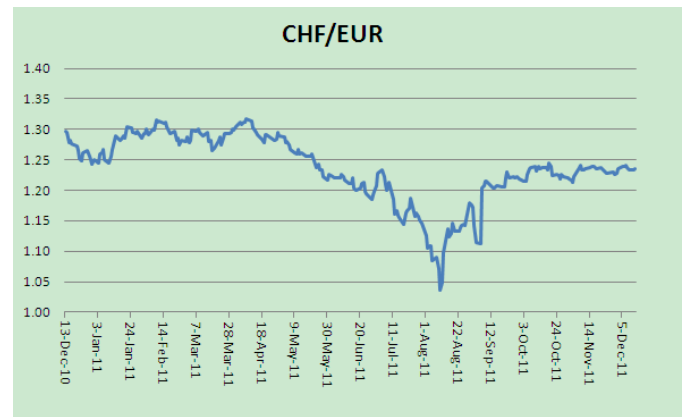


Fig. 1 Exchange rate between Swiss Francs and Euros from 2010 till 2011

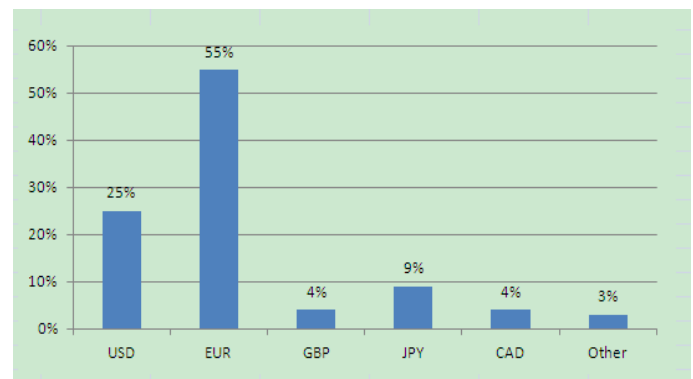


Fig. 2 Foreign Exchange Reserves of Switzerland 30th September 2011. Other: AUD, SEK, DKK, SGD, NZD. [10]

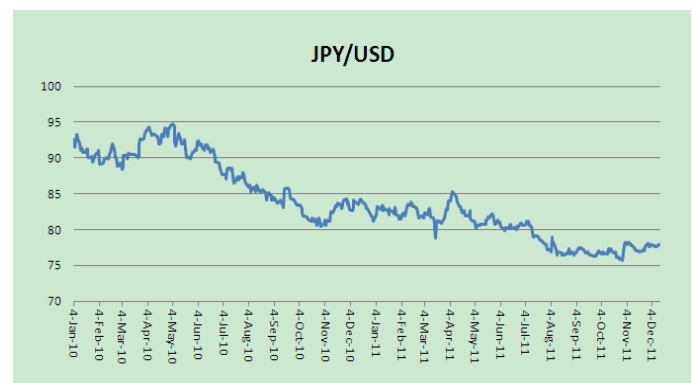


Fig. 3 Exchange rate between Japanese Yen and U.S Dollar from 2010 till 2011

The Japanese Ministry of Finance intervened together with the Bank of Japan at the middle of September, 2010 with the record sum of 2000 billion yens. But this intervention was not the last one: Due to an unbroken appreciation pressure another record intervention followed in September 2011. [8]

Tokyo sold billions of yen to weaken the currency few days before summit of the Group of 20 leading economies in Cannes. Total amount of foreign exchange intervention operations for the period from July 28, 2011 through August 29, 2011 was ¥ 4,512.9 billion (\$58bn). The Yen has risen 41 per

cent against the dollar and 46.9 per cent against the euro since the beginning of the 2008. [9]

A persistent rise in Yen threatens with shifting production outside Japan. Due to this not only unemployment will rise, also growth of economy, mainly based on exporters, will decrease. [1]

Intervention not supported by other countries had only a limited and temporary effect on the exchange market. In order to weaken Yen, Japan has also introduced a \$100bn credit facility for Japanese companies to invest abroad. [8]

VI. CONCLUSION

If it comes to a devaluation race, this is accompanied most probably by an inflation race. Other retaliatory measures could also be used so that the war of currencies could potentially end up in a trade war. Nevertheless, it does not automatically end up in this way! Up to now we just talked about "the Americans" or "the Chinese". However, one has to consider that many American enterprises invest directly in China. For example, Apple's iPads and iPhones are produced in China and are delivered to Europe, without going through the USA. A feature of the international trade is that it takes place within multinational corporations. These companies have a strong interest in free trade and would tend to oppose above-mentioned restrictions.

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Christian Pierdzioch is Professor of Monetary Economics at the Helmut Schmidt University Hamburg (Germany). His research interests include monetary economics, dynamics macroeconomics, international economics, financial economics, and political economics. His research has been published in the Journal of International Money and Finance, the Journal of Empirical Finance, the Journal of Macroeconomics, and in other academic journals.



Prof. Dr. Georg Stadtmann received his doctoral degree from WHU – Otto Beisheim School of Management, and is currently affiliated with the European University Viadrina in Frankfurt/Oder (Germany), where he leads the chair for macroeconomics. His research focuses on international macroeconomics, models of heterogeneous agents, central bank intervention and expectation building in financial markets. He is also affiliated to the University of Southern Denmark (SDU, Odense Denmark).



Leila Tselaury is a Ph.D. candidate at the Europa University Viadrina in Frankfurt/Oder (Germany) and works as a research assistant at the chair of macroeconomics. She focuses in macroeconomic models of the open economy (NOEM) and DSGE-modelling.