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Still on China's Exchange Regime: The Euro and Its Role as An Anchor Currency

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Abstract

This study will demonstrate, through an econometric model in time series, if and how the Chinese *basket peg* has changed in relation to the weight that the European single currency holds within it. Specifically, utilizing Frankel's (1994) econometric model, as revisited by Mele (2010) enriched by Kalman's filter, our objective is to verify if the Eurozone crisis has affected the inner balance of the Chinese basket-peg, swaying it from the Euro towards a more favorable dollar. This research could be of great insight in predicting the effect of future crisis', as a shift is already noticeable in our time series study spanning from 2010 till present day.

Keywords: Exchange Rate, China, Econometric ARMAX model, International currency

1. Introduction

The international economic system of the XXI century has been characterized by a global imbalance, where on the one hand there has been a deceleration of growth rates of GDPs in both the United States and Europe, whilst on other the other hand there has been an unhindered development of the so-called BRIC countries, which has allowed high growth rates for the global economy as a whole. However, in a system distinguished for its growth, brought about by the globalization process and reinforced by creative finance, numerous tension have emerged, and subsequently been transformed into what is commonly defined as "crisis'". Specifically, since 2010, a new fiscal and financial crisis has affected the Eurozone.

When confronted with data originating by both the OECD and the IMF (2011) on a probable recession of Eurozone countries, it is necessary to question whether the successes that the Euro has achieved in aspiring to become an international currency will be lost in facing the European Debt Crisis. In detail, the functions of an international currency are closely linked in regimes in which other currencies are tethered to a key currency, so that it is able to become a unit of account for the system. This would suggest that in the past eight years the Euro's weight and presence as an official reserve has increased proportionally to its utilization as an anchor currency in multiple-currency baskets, where, up until now, the Dollar was a key player.

Although ample research, amongst which Frankel and Chinn (1994), Eichengreen (2006), Wei (2007), Ogawa and Yoshimi (2008, 2009) and Mele (2010), achieved important results in analyzing the Euro as an anchor currency, second only to the Dollar (especially with reference to the currency regime in China post 2005), the fiscal crisis of the EMU brings us to believe that at an international level the Euro is losing its role as an anchor currency.

This paper will demonstrate, through an econometric model in time series, if and how the Chinese *basket peg* has changed in relation to the weight that the European single currency holds within it.

2. The Euro as An International Currency: The Case of Anchor-Peg Regimes

Since the '60s, the Dollar has carried out tehe predominant "unit of account" role on an international level, both in industrialized countries as well as in the so-called developing world.

The escalation of the American sub-prime financial crisis, with its possible inflationist repercussions (due to accommodating monetary policies, attempted to assuage the crisis, but also to the chronic deficit of the current account of the United States' Balance of Payment, which has allowed for countries such as China to amass great surplus'), allowed for the American currency, over time, to become a destabilizing factor for those economies that utilized the Dollar as an anchor currency. Subsequently, countries such as Russia, Kuwait and Brazil have abandoned their Dollar-peg currency systems, in favor of greater flexibility vis-à-vis new international currencies.

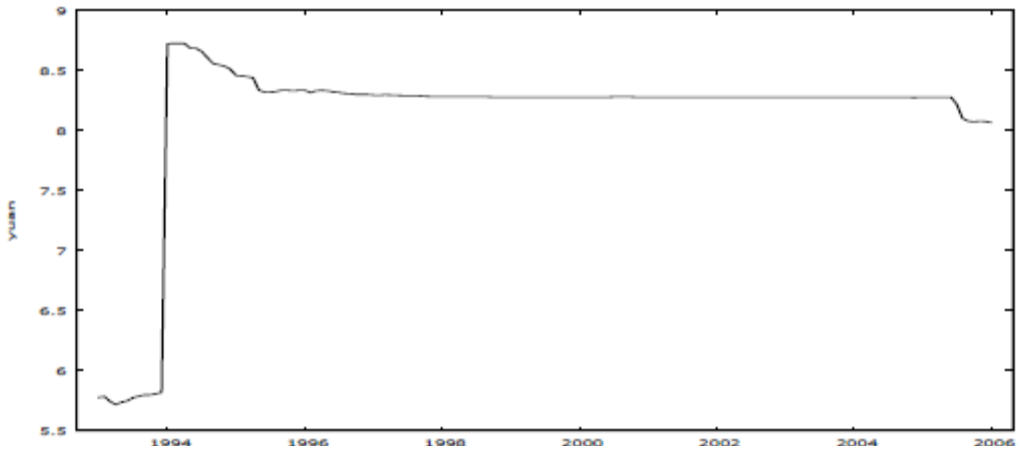
Countries that belonged to the so-called periphery of the area of influence of the Dollar, have, since 2002, shown an increased interest in the Euro as the currency unit of account, abandoning Dollar-peg regimes in favor of basket-peg regimes, where along-side the Dollar, the European currency has found increasing importance. Cobham (2007), in his time series analysis (which covered a period from 1999 till 2006), highlighted how 33% more countries had chosen the Euro as an anchor as opposed to the Dollar. Furthermore, according to his research, those countries that had, during those years, opted for Dollar-peg regimes had done so with levels of correlation below 0,50.

As pertaining to the case of Asian countries, Ogawa and Yoshimi (2008) demonstrated, through an econometric model introduced by Frankel (1993), that the weight of the Euro had augmented in numerous basket-peg systems. This was the case, for example, of Brunei, Singapore and Thailand. The two economists also established that, though to a lesser degree, this was also the case for Malaysia and Taiwan.

In general, it was evident that the correlation between the Asian currencies and the Euro had increased, at the expense of the American currency, although the Dollar still remained the main reference currency for the area.

3. The Application Of An Econometric Model for the Chinese Exchange Rate Regime

The Renminbi (RBM), legal tender for the People's Republic of China, has been tightly linked to the American Dollar with a reference value to the fixed exchange rate of 8.28 Renminbi to the Dollar, (fig.1).



Source: our econometric processing with Stata and Gretl. Ver. 1.8.4 software on RBA data

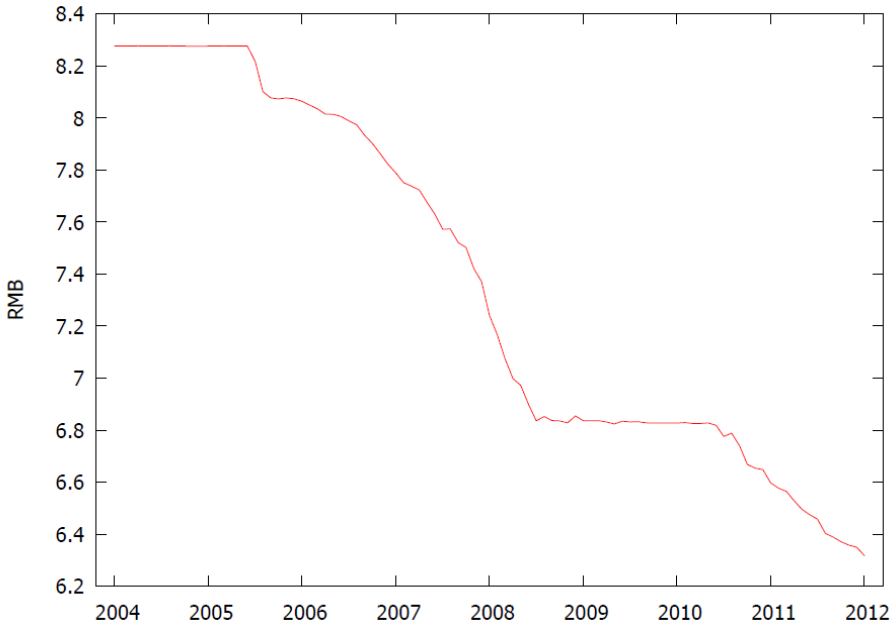
Figure 1. Progress of the Chinese relative to the American Dollar 1993-2006

On the 21st of July, 2005, in response to the international debate regarding the fact that the Chinese currency was excessively undervalued (therefore favoring national exports), the Chinese Central Monetary Authority declared the revaluation of the Renminbi to an exchange of 8.11 Renminbi to the American Dollar. It also brought about the adoption of a new

exchange rate regime focused on the partial withdrawal of the Dollar, in favor of an exchange rate based on a basket of international currencies.

The decision to abandon the Dollar-peg exchange rate system, which had thus far permitted for inflation control in low income China, could be interpreted as the first step towards a fluctuating exchange rate regime. This allowed the Chinese authorities to pursue a double objective: external equilibrium and monetary sovereignty. This would have not been possible with a de facto link to a foreign currency.

Since 2006, the Chinese have registered a rise in the value of the RBM, in regards to the Dollar. This can be considered a consequence deriving from the reduction of the weight of the American Dollar in favor of other currencies present in the Chinese basket peg, (fig.2).



Source: our econometric processing with Stata and Gretl. Ver. 1.8.4 software on RBA data

Figure 2. Progress of the Chinese Renminbi relative to the American Dollar 2004-2012

With reference to the Asian area, and particularly the Chinese exchange rate regime, various empirical analyses have been conducted, from the nineties till today, with the aim of understanding if the Chinese governing authorities (and other Asian countries) had in fact adopted a basket-peg regime.

Following Frankel and Wei's (1994) econometric model, other economists, such as Shan (2005), Ogawa (2006), Eichengreen (2006), Yamazaky (2006), Yoshimi (2008) and Zeleis (2009), favored this approach and obtained interesting results. This econometric model was preferred to others, such as the partial market equilibrium models or the computable general equilibrium models (which have been used by the Centre d'Etudes Prospectives et

d'Informations Internationales and the Bank of International Settlements), because the empirical data has always proven it to be more accurate.

However, though all using the Frankel and Wei methodology, the above-mentioned studies differ in number of observations and in characteristics used (such as OLS, ARMA, and ARCH). Nonetheless, the all presented the Renminbi as the dependent variable, while utilizing, as regressors, the summation of the exchange rates of the three or more currencies in the basket with the addition of a dummy currency (the Swiss franc), so as to check the presence of variations in the weight of the currencies used in the basket. The model used can therefore be exemplified as:

$$\Delta \ln y_{RBM/k} = \alpha + \beta 1 \Delta \ln e_{USD/FRsv} + \beta 2 \Delta \ln e_{JPY/FRsv} + \beta 3 \Delta \ln e_{EURO/FRsv} + \mu t \quad (1)$$

Taking into consideration a time series from the month of December 2006 to the month of March 2008, almost all of the works analyzed share the method of estimation used in Frankel and Wei's approach. A review of these works illustrates how, though officially unlinked, the Chinese currency still maintains significant ties with the American currency.

It is relevant to point out that even if they are formally present in the basket, the other currencies do not emerge as statistically significant, as demonstrated by the p-values (figs. 3, 4, 5).

**** Levels of significance 1%;** Levels of significance 5%*

	2006	2007	2008
dollar	1,005***	0,973***	0,972***
euro	0,006	0,01	0,003
yen	-0,023	-0,019	0,026
const.	0,00**	0,000***	0,001**
obs.	61	63	64
R^2	0,95	0,94	0,97

Figure 3. Chinese Evolution Basket peg 2006-2008 Frankel

**** Levels of significance 1%;** Levels of significance 5%*

	2005	2006
dollar	0,9998***	1,004***
euro	0,0001	0,0166
yen	0,0002	-0,004
won	-0,0003	0,0220*
const.	0**	0**
R^2	1	0,9982

Figure 4. Chinese Evolution Basket peg 2005-2006 Ogawa

**** Levels of significance 1%;** Levels of significance 5%*

	2009
dollar	0,9809***
euro	0,008
yen	-0,007
pound	0,0085
const.	0,001
R^2	0,9979

Figure 5. Chinese Basket peg 2005 – Zeileis

Most econometric research carried out to verify the concrete weight of the various currencies in the Chinese basket generally concurs in asserting an almost exclusive role to the Dollar. However, through an alternative approach to Frankel's model, Mele (2010) demonstrated how, on the contrary, the weight of the Euro within the Chinese basket-peg was progressively increasing.

Even though Frankel's approach is preferable to other econometric models, its simple implementation would misrepresent the real term results by sustaining a strong tie only to the American Dollar. This would not take into consideration how the Euro has grown in the course of these last few years as an intermediary for exchanges, becoming a medium both in the real market, as well as in the capital market. The Euro has thus become the second most important currency, whose weight can be registered also in the Chinese basket peg (as will be demonstrated below).

But why does this role of the Euro appear limited when utilizing Frankel's econometric model? An explanation could be hidden in the model itself: not in its formulation – which can be considered genuinely original and economically plausible – but rather in the method of estimation used.

In particular, each variable – even the dummy variable itself – could be subject to non-stationary trends, as well as to autocorrelations between the explanatory variables. Therefore, compelled by the need to analyze the actual weights of the currencies considered in the Chinese basket, Mele estimated Frankel's regression with a regressive technique in a time series employing a Kalman's filter. The regression used can therefore be exemplified as:

$$\Delta d.\ln y_{RBM/FRsv} = \alpha + \beta 1 \Delta d.\ln e_{USD/FRsv} + \beta 2 \Delta d.\ln e_{JPY/FRsv} + \beta 3 \Delta d.\ln e_{EURO/FRsv} + \mu t \quad (2)$$

Whose time series break down for each explanatory variable is:

α 0,t= α0,t-1+ŋ0,t

β1,t= β 1,t-1+ŋ1,t

β2,t= β2, t-1+ŋ2,t

β3,t= β 3, t-1+ŋ3,t

	coefficient	*std.err.*	*t*	*p-value*	
Const	0,00087	0,00085	1,093	0,2742	
phi_1	0,7806	0,02626	37,33	5,50E-305	***
theta_1	-0,8729	0,0581	-15,02	5,80E-51	***
d_l_dollar	0,81317	0,0148	63,37	0,000	***
d_l_yen	0,00062	0,0012	0,4969	0,6193	
d_l_euro	0,3991	0,0192	1,91	0,0501	**

**** Levels of significance 1%;** Levels of significance 5%*

From the results of the regression, it is possible to observe that the Dollar is significantly present in the Chinese basket peg, with a co-efficient value equal to 0.81. However, also the Euro acquired notable relevance, strengthening its position not only in reference to the other currencies officially declared to be part of the Chinese basket, but especially in comparison with the American Dollar. The third currency analyzed, the Yen, did not show significant signs of change within its currency position in the Chinese basket peg.

4. The Euro and the Chinese Basket Peg in the Era of the European Crisis

It will therefore be demonstrated, by utilizing the econometric time series methodology enriched by Kalman's filter, whether Mele's (2010) analysis on the weight of the Euro in the Chinese basket has undergone negative variations as a consequence of the EMU crisis. Specifically, it is interesting to attest if certain factors, such as the depreciation of the Euro to the Dollar in the summer of 2011 or Greece's risk of default, could lead the Chinese authorities to re-entrust the Dollar with a pre-eminent role, so as to create a sort of unofficial Dollar-peg. This hypothesis is guided by the positive macroeconomic data released in January 2012, which highlighted the decrease of American unemployment and the revival of the American stock markets, which could renew the United States' presence as a stable reference point.

4.1 The Results

Armax Model: from January 1st, 2010 till January 20th, 2012

Estimate carried out with the use of Kalman's filter

Standard errors based on exact MV

Dependent Variable: RMB

Adj-R-square: 0,8546

Akaike's criterion: *-727,5478*

Schwarz's criterion:-720,4125

Hannan-Quinn: *-726,4782*

Observation: 180

p-value *(0,000)* *(0,000)* *(0,000)* *(0,008)*

$$\Delta d.ln y_{RBM/FRsv} = 0{,}00147^{***} + 0{,}9132\ \Delta d.ln e_{USD/FRsv}{}^{***} + 0{,}102\ \Delta d.ln e_{EURO/FRsv}{}^{***} + 0{,}0021\ \Delta d.ln e_{JPY/FRsv}{}^{***} + E \quad (3)$$

**** Levels of significance 1%*

The results obtained through the elaboration of data using STATA version 11 **-** with a dataset constructed at intervals of 5 days- clearly demonstrate, in the time series taken into consideration, how the role of the Euro in the Chinese basket has drastically decreased. In this period the value of the coefficient resulting from Mele's (2010) research decreased from 0,399 to 0,102. Contemporaneously, the weight of the Dollar increased from 0,813 to 0,913, a value that results into an exceedingly strong tie to the Dollar – almost a Dollar-peg.

Furthermore, it is also interesting to note the role of the Japanese currency, which in the analysis of 2010 did not appear significant in its p-value. On the contrary, in the updated data of this analysis, a significant role emerged for the Yen, even though limited to a value of 0,002.

The precision of the econometric approach utilized is aided by the absence of a correlation between the variables and the adaptability of the independent variables in explaining the dependent variable. latter is visible through the recorded adjusted R-square value of 0,854. Even the information criteria theorized by Akaike (1974, 1976), Schwarz (1978) and Hannan-Quinn (1979) seem to conform with the model, since their readings seem quite similar.

5. Conclusions

Since the end of the Gold Standard, the American Dollar has been considered the successor to gold as a medium for international exchange. This currency has, in a brief time span, with the aid of the seigniorage theory, inundated the globe and become the principle currency reserve of the world. The success of the Dollar, however, did not live up to expectations when Triffin's paradox became a reality. This occurred when it became apparent that it was impossible to guarantee, in the long term, the convertibility of the Dollar at the fixed parity price of 35 US$ per ounce, as established by the Conference of Bretton Woods.

Following the Nixon declaration, there was a collapse of the international monetary system based on fixed exchange rates with the Dollar. This allowed the currency exchange markets to fluctuate, uncommitted to a pre-imposed Dollar-gold rate.

Although the end of the Bretton Woods system did put an end to exchanges based on gold, it certainly did not eliminate the effects of the Dollar on the international markets: both in

currency exchange, goods, as well as in the financial markets. However, this result is due to the fact that the US Dollar has become an international currency. It was the only currency that, according to economic theory, was capable of doing so. It is for this reason that, even after the fall of the Bretton Woods system, the international globalized economic system has continued to use the Dollar as its reference currency.

Nevertheless, if on the one hand the Dollar continues to registers successes in the currency exchange markets, a new project originating from the old continent was about to present the international economic system with a new reference currency: the Euro. This new currency was, in the course of a few short years, supposed to provide investors with a choice and offer a better way to allocate one's savings (both private and public).

The successes of the new currency were many, and in rapid succession. There were numerous documents, already in the first years since the Euro was introduced, that attested to the fact that it abided by all the criteria that allow for a national currency to become international. The only postulation that still today is not fully satisfied is the fact that it is indeed too young, if compared to the Dollar or the Pound.

Nonetheless, for the first time, it was recorded that due to various factors, many of the global exchanges were increasingly occurring utilizing the Euro instead of the Dollar. These circumstances, paired with the rapid appreciation of the Euro over the Dollar, created for the EMU's currency a sense of international confidence.

If there was, on one hand, the growing trust in the European currency, brought about by numerous countries (as, for example, the BRICs), on the other hand, it was apparent that the United States could not suffer such a pronounced depreciation for a long period of time. Faced with the sub-prime financial crisis and the existence of twin deficits, the United States of America have become aware of the necessity to become again a benchmark for the economic markets. Not only the monetary and financial markets, but especially in the foreign exchange market. And to achieve this goal, it was necessary to re-equip the American economy with a Dollar-hegemony, so as to make it the only strong international currency.

The current situation of the Eurozone, trapped in a fiscal crisis and surrounded by a lack of confidence in its financial markets, is profoundly changing the characteristics and the future of the Euro. This includes whether to utilize it as an anchor currency, in particular, for Asian economies.

Whether the EMU economy can revive and the Euro can become an international currency are influenced by specific cyclical positions, by the policies pursued by the US and the EMU, and (increasingly so) by the weight of external resources (in the European case) and external liabilities (in the case of the U.S. states and China). Yet, it is not simple to predict how these forces will influence the Euro, the Dollar and the international exchange rate system. It is only possible to affirm that, as the analysis establishes, the negative effect of the crisis in the Eurozone has been registered in the Chinese basket-peg, to the benefit of U.S. currency, the Dollar.

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