
A NEW YUAN OR A NEW MONETARY SYSTEM

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Abstract: The research area of the present study is the Chinese yuan (renminbi). The research subject is the evolution of the Chinese yuan from a national to a global reserve currency. The paper tests the proposition that the rise of the Chinese currency is a sign of deep and qualitative changes in the international monetary system. The aim of the study is to analyse and track the evolution in the current situation in the international monetary system, in order to highlight the factors and the reasons for the rise of the Chinese yuan and to find indications of the direction of the future development of the system as a whole.

Keywords: China, Chinese yuan, reserve currencies, international monetary system, foreign-exchange reserves.

JEL: F31, O24

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Introduction

In popular culture, there is an expression that is believed to originate from an ancient Chinese maxim. It is: "May you live in interesting times." The meaning is clear - interesting times are never calm and safe. For better or worse, today we indeed live in interesting times. It will not be wrong to say that the modern economic and political system of the world was built not so long ago, but also not so recently – in the years after World War II. However, several economic crises in the recent years, the events on the political and economic scene give us a reason to ask if we are not witnessing a general re-adjustment of that system, which currently can be called US – centric. In the currency sphere this centricity is expressed in the dominant position of the US dollar as a currency for making international payments¹, the formation of for-

¹ Radkov, R., Zahariev, A. *Mejdunarodni finansi*. V. Tarnovo, Abagar, 2015.

eign exchange reserves, as well as a basis for pegging the exchange rates of other currencies.

In the field of international finance one of the main indications of change, and obviously one of the hottest topics in the recent years is the rise of the Chinese currency. This rise is marked by several events. Among them, the most significant are the forthcoming adding of the Chinese yuan to the SDR basket (announced by IMF on 13.11.2015, effective from 01.10.2016) and Russia's acceptance of yuan instead of US dollars as payments for oil exports to China (June 2015).

As for the future development of the situation, we can develop two alternative "scenarios" as suggested by the title of this study. These scenarios are now pretty clearly outlined in research and the media. Under the first scenario, the inclusion of the Chinese yuan as a reserve currency of the IMF is simply an act of recognition of the importance² of the Chinese economy at present, but it is not indicative of a qualitative change in the structure of the international monetary system. The second scenario is more extreme and indicates a radical change in the current international monetary system the Chinese yuan rapidly displacing the dollar as the first and the most important international reserve currency³. On this basis, it is interesting to analyse the events and to make an attempt to forecast the future of the international monetary system and the place of the renminbi in it.

In this light, **the research area** of this study is the Chinese yuan (renminbi). The **research subject** is the evolution of the Chinese yuan from a national to a global reserve currency.

The study tests **the thesis statement** that *the rise of the Chinese currency is a sign of quality and profound changes in the international monetary system*.

The purpose of the study is to analyse and track the evolution of the current situation in the international monetary system, and to make an attempt to highlight the causes and the reasons for the rise of the Chinese yuan as well as to look for indications of the direction of the future development of the system as a whole.

In the light of thus formulated scientific parameters, the first part of the study makes a parallel retrospective analysis: of the development of the international monetary system, the Chinese economy and the Chinese cur-

² An opinion of Timothy Adams, the president of the Institute of International Finance and a former undersecretary at the US Federal Reserve: "IMF Approves Reserve – Currency Status for China's Yuan" <http://www.bloomberg.com/news/articles/2015-11-30/imf-backs-yuan-in-reserve-currency-club-after-rejection-in-2010>

³ **Eichengreen**, B. Number One Country, Number One Currency? / Barry Eichengreen // *The World Economy*, New Jersey, 2013, N 4, p. 363-374.

rency - the renminbi. The second part presents the research methodology with application of Frankel and Wei⁴ multiple regression in two modifications. The method is tested in the third part and relevant conclusions are drawn. The empirical part of the study focuses in two directions. The first one investigates the exchange rates of the countries of the BRICS group, on the one hand, and the exchange rates of the main reserve currencies and the Chinese yuan - on the other. According to the resulting regression coefficients for the Chinese yuan and their change in different periods, the impact on those currencies is assessed and conclusions are drawn about the actual presence of the Chinese currency in the foreign exchange reserves of these countries. If the results of the empirical analysis show that this level is high and/or rising rapidly, we can arrive at the conclusion that the thesis statement is confirmed. The second direction is an attempt to analyse and assess the significance of the results from the first direction by applying identical methodology to study the changes in the exchange rate of the Chinese yuan itself.

1. The international monetary system and China – the long way to each other

The current state of the international monetary system is the result of two main stages of development. The first stage is the so-called Bretton Woods system of fixed exchange rates or the gold standard established after the Second World War (more accurately at the conference in Bretton Woods in 1944). This is when the dominant position of the dollar was established, on the basis of a number of economic, institutional and political conditions.

The second stage began with the collapse of the Bretton Woods system and the inability of the US to further support the convertibility of the dollar against gold ("The Nixon Shock" 1971) and was marked by the conference in Kingston, Jamaica (1976), important results of which were the demonetization of gold and the establishment of a system of floating exchange rates.

As a new element, added to the modern international monetary system we can highlight the introduction of the single European currency **Euro**, which has quickly become the second most important international reserve currency after the US dollar and ahead of the Japanese yen and the British pound.

At the time of the events described, China experienced its own upheavals, which in scale were comparable, if not more spectacular, than the

⁴ Frankel, J., Wei, S.-J. Yen Block or Dollar Block? Exchange Rate Policies of the East Asian Economies // *Macroeconomic Linkage: Savings, Exchange Rates, and Capital Flows*, NBER-EASE, 1994, N 3, p. 295.

global ones. First, China was in a permanent war situation between 1911, when a civil war against the last imperial dynasty broke out, and 1949, when the Chinese Communist Party came into power. That was when the real modern economic history of China began and since then has passed through several stages, which can be grouped into two major periods.

The first period was the era of Mao between 1949 and 1978. It consisted of the following stages: 1) the post-war reconstruction (1949-1952); 2) the first five-year plan (1953-1957); 3) the "Great Leap Forward" (1958-1960) that became "the Great Leap Famine"⁵; 4) the stage of overcoming the imbalances created by the 'Great Leap Forward "(1961-1965); 5) the period of the "Cultural Revolution" (1966-1976); 6) the period of readjustment that followed the death of Mao and the "Cultural Revolution" period (1976-1978). Although it is almost impossible to summarize in a few sentences the spirit and the results of economic development in this first big period and its stages, we can say that it was characterized by a number of "high tides" and „low tides“ and significant diversity in policy and objectives. The main focus was industrialisation, agriculture often being neglected to such an extent that produce was not sufficient to satisfy even domestic demand. However, as Zhu⁶ noted, during this period the Chinese economy managed to account for an average annual growth of GDP per capita of 3% (according to Brandt, Ma and Rawski⁷ it was 4%). Moreover, in the cited study, the author brings evidence that the boom after 1978, contrary to the popular opinion, was due not so much to newly made capital investments, but more to labour productivity improvement through measures such as changing the system of economic incentives. Therefore, objectively, this period was important for the consolidation of China and provided the basis for its economic power today.

The modern period of the development of China started in 1978 and from the policy of "reform and opening" under the guidance of leaders like Deng Xiaoping. Among these reforms as the most significant we may highlight the decentralisation (fiscal and not only), the reform in the agricultural sector (internationally known as "a household responsibility system"⁸), the

⁵ Paraphrased from Xiaodong Zhu "The Great Leap Forward became The Great Leap Famine", вж. **Zhu**, Xiaodong. Understanding China's Growth: Past, Present, and Future. // *Journal of Economic Perspectives*, 2012, N 4, p. 103.

⁶ Ibid.

⁷ **Brandt**, L., Ma, D., Rawski, T. From Divergence to Convergence: Reevaluating the History Behind China's Economic Boom. // *Journal of Economic Literature*, 2014, N 1, p. 45.

⁸ http://www.china.org.cn/features/60years/2009-09/16/content_18534697.htm. 24.04.2016.

dual-track⁹ system in the non-agricultural sector and the strategy to "grasp the large and let go of the small"¹⁰. In the financial sphere we can highlight two important processes. One of them consisted in the gradual development of a two-tier banking system in which the People's Bank of China gradually transferred all commercial operations to the newly established "big four" banks¹¹. This way financing of the economy was done not through central grants but through these state-owned banks.¹²

The second line of development was related to the building of the capital market, which was marked by the establishment of stock exchanges in Shanghai and Shenzhen (1990). The capital market in China saw a rapid developed in the next years, but it supposedly still has long way to go in areas such as transparency¹³ of the information provided by the publicly listed companies, the percentage of the funds allocated in comparison to the banking sector, etc. All this created a new system of economic incentives which undoubtedly had a positive effect on productivity. When we add to this the intentional export orientation of China, it seems a little easier to explain the boom after the reform.

The most significant and relevant to the topic of the study, however, was the monetary and especially the foreign exchange policy. In the planned economy before the reforms, the foreign exchange rate was pegged to a currency basket¹⁴ and was characterised as overvalued. There are several important factors to analyse after the start of the reforms. The first one is the so-called foreign exchange retention system¹⁵ - a system in which the export

⁹ An interim stage between the centralized and the market-based system of pricing and production. Businesses follow a central plan with fixed quantities and selling prices, but they are allowed to sell any excess at market prices.

¹⁰ "Grasping the large, letting go of the small" – a strategy of decentralization of the economy, where the state monitors and "holds" key sectors of the economy, leaving the minor ones in private hands. This system is particularly important to explain the success of China, because it means that in an environment of decentralization of the economy the government makes substantial investments in key sectors.

¹¹ **Allen**, F., Qian, J., Qian, M. China's Financial System: Past, Present, and Future (March 28, 2007). Достъпно на SSRN: <http://ssrn.com/abstract=978485> or <http://dx.doi.org/10.2139/ssrn.978485>

¹² **Brandt**, L., Ma, D., Rawski, T. From Divergence to Convergence: Reevaluating the History Behind China's Economic Boom. // *Journal of Economic Literature*, 2014, N 1, p. 45. ; p. 98

¹³ **Lindbeck**, A., An Essay on Economic Reforms and Social Change in China. // *World Bank Policy Research Working Paper Series*, 2006. Достъпно на: SSRN: <http://ssrn.com/abstract=942159>

¹⁴ **Si**, W. Evolution of RMB Exchange Rate Regime. (2014) // <http://ssrn.com/abstract=2543400> or <http://dx.doi.org/10.2139/ssrn.2543400>

¹⁵ Ibid.

companies were not required (as they used to be before) to submit all the collected foreign currency, and were allowed to buy back part of it according to the official exchange rate. Another important factor was the system of dual exchange rate – an official exchange rate for non-trade transactions and another one – the Internal Settlement Rate (ISR) for trade-related transactions¹⁶. This system was abandoned in 1985 and all transactions began to be carried out at the official rate, though the dual rate was reintroduced in 1986 after the establishment of special economic zones in which it was possible to trade currency freely at negotiated rates, the so-called swap-centres (formally referred as Foreign Exchange Adjustment Centres). This system created a lot of disturbances due to imperfect communication and arbitration between swap-centres and the resulting multiple exchange rates, but it also allowed for a smooth transition to a market mechanism¹⁷.

With the sharp decline of the market-based exchange rate, the official fixed exchange rate turned out to be highly overvalued. Under this pressure, in 1994 the responsible authorities in China devalued the official exchange rate and merged it with the market-based.

Between 1994 and July 2005, the Chinese yuan was pegged to the US dollar at a rate of 8.28 CNY / 1 USD. On July 21, 2005 the rate was revalued by 2.1% to 8.11 CNY / 1 USD and China officially switched to a managed floating exchange rate regime. Si (2014) gives a detailed chronology of the events of the recent history of the exchange rate of the Chinese yuan and the US dollar and other currencies (see. Table. 1).

Among the events described, we must highlight several important ones as well as add some that are not mentioned. We mean the incremental widening of the floating band of the Chinese yuan exchange rate against the US dollar, first by $\pm 0.3\%$ to $\pm 0.5\%$ (2007), then by $\pm 0.5\%$ to $\pm 1\%$ (2012) and finally by $\pm 1\%$ to $\pm 2\%$ (2014).

Another important sub-period was September 2008 - July 2010, in which the yuan was again de facto pegged to the USD to mitigate the effects of the global financial and economic crisis. Subramanian and Kessler display graphically 4 periods in the development of the exchange rate of CNY since 2005 (see. Fig. 1).

¹⁶ **Huang**, H., Wang, S. Exchange rate regimes: China's experience and choices. // *China Economic Review*, 2004, N 15, p. 336

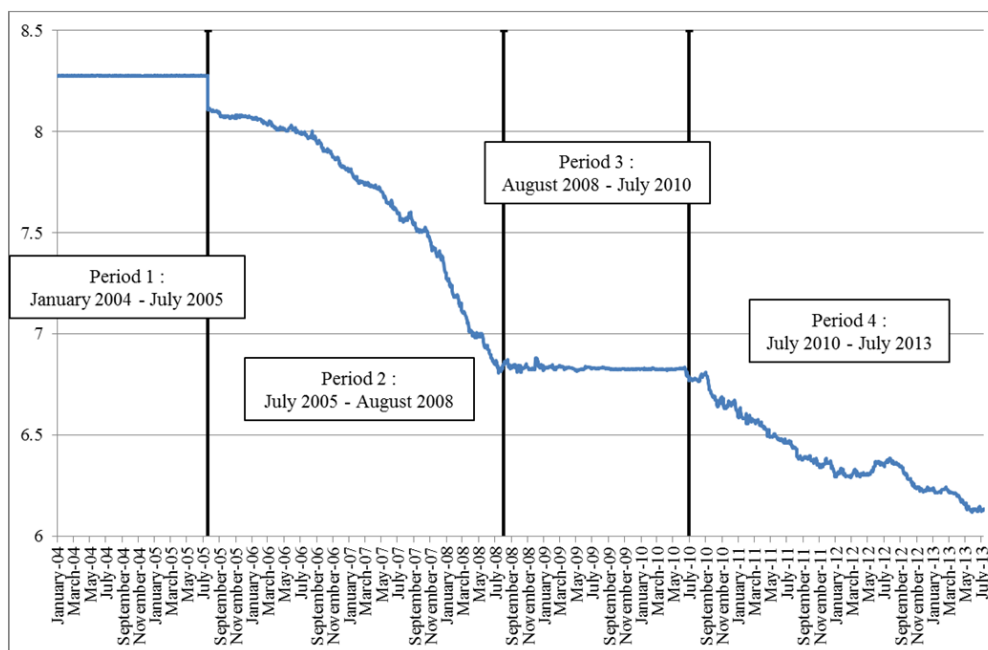
¹⁷ Ibid.

Table 1. Chronology of the events in the recent history of CNY

Year.	Event
2005	April: The China Foreign Exchange Trade System (a division of the People's Bank of China) began trading in euro
	July: PBoC switched to a regime of managed floating of the yuan, based on market supply and demand and linked to a currency basket (the currencies that comprised the basket were officially announced later). The exchange rate against the dollar was adjusted to 8.11 CNY / 1USD and the band of the fluctuation margins of the exchange rate against currencies other than the dollar was expanded from $\pm 0.3\%$ to $\pm 1.5\%$.
	September: The band of the fluctuation margins of the exchange rate against currencies other than the dollar was expanded to $\pm 3\%$.
2006	January: The China Foreign Exchange Trade System was authorized by the PBoC to publish the exchange rate of RMB to USD, EUR, JPY and HKD.
2007	May: PBoC expanded the RMB-USD daily trading band from $\pm 0.3\%$ to ± 0.5
2010	August: The launch of the CNY-RMT interbank foreign exchange trading
	September: The launch of the CNY-RUB interbank foreign exchange trading
2011	November: The foreign exchange trading between the RMB and the Australian dollar (AUD/CNY) and the Canadian dollar (CAD/CNY) was introduced on the interbank foreign exchange market
	December: The foreign exchange trading between the RMB and the Thai baht (CNY/THB) was introduced on the interbank foreign exchange market
2012	April: PBoC expanded the RMB-USD daily trading band from $\pm 0.5\%$ to $\pm 1\%$
	June: The launch of the JPY-CNY interbank foreign exchange trading
2013	November: The start of the real direct trading between RMB and AUD
2014	March: PBoC expanded the RMB-USD daily trading band from $\pm 1\%$ to $\pm 2\%$
	March: The launch of the NZD-CNY interbank foreign exchange trading
	June: The launch of the GBP-RMB interbank foreign exchange trading

Source: Si, W. Op. Cit. (with changes)

Figure 1. Periods in the development of the CNY exchange rate after 2005



Source: Subramanian and Kessler, Op. Cit.

Two other important events that can be added, are the above mentioned adding of the Chinese yuan to the SDR basket (announced on 13.11.2015, effective as from 01.10.2016) and Russia's acceptance of yuan instead of US dollars as payments for oil exports ("petrodollars", a decision from June 2015).

If we expand the horizons of the events that have affected the development of the international monetary system and the parallel evolution of the Chinese yuan, trying to find their crossing point, apart from the above described events we can also mention the formation of the BRICS group¹⁸. The first formal meeting of the group was in 2008 in Yekaterinburg, and the first formal summit was on June 16, 2009. What is more important is that in terms of territory and demography and growth BRICS is one of the largest economic groups in the world¹⁹. All this forms the argument for exploring the

¹⁸ The BRICS group –Brazil, Russia, India, China and South Africa.

¹⁹ The member countries account for 26 percent of the world's land, 42 % of the world's population and generate 27% of the global GDP (data from <http://en.brics2015.ru/26.04.2015>); According to the Brazilian website(<http://brics.itamaraty.gov.br/about-brics/economic-data> 26.04.2015) the countries from the group (excluding South Africa) have 18% of global GDP, which exceeds the forecast by Goldman Sachs in 2001, 14.2% (The term BRICs was coined by Jim O'Neill from Goldman Sachs in 2001 in a report on the growth potential of the four countries). For the years 2001 to 2011 the share in world exports of the countries from the group doubled from 8% to 17%. Their total exports increased by 500% against 195% for the world. These data evidence the growth potential of the group.

degree of penetration of the Chinese yuan in the BRICS group. The main argument is the assumption that if the RMB actually has the potential (and the corresponding ambition of the Chinese authorities) to replace the dollar as the global reserve currency, this will happen in the BRICS group first. To the reasons that give ground to expect a recent significant change in the positions of the yuan, as well as of the international monetary system at the same time (despite its very short history as a freely tradable currency) we may point out a phenomenon, which extant literature labelled "a tipping point"²⁰.

Based on the above we may make the interim conclusion that the formulated thesis statement requires the application of a wide range of analysis and evaluation of processes and factor effects. Therefore, using the adopted methodology we aim to select arguments and data of key influence on the current state of the global monetary system, which allows the development of a scenario for the direction of the future development. More precisely, if we find out that the level of "penetration" of CNY among the BRICS countries is stronger than the expected benchmark share of CNY in the 2016 SDR basket, then the reported increase of this level by dates will support the conclusion for a firm trend to increase the influence of the Chinese yuan.

2. Methodology and research sample

The basic logic followed in this study is to trace and analyse the share of the Chinese yuan in international reserves for the countries of the BRICS group chronologically and compared to the rest already established international reserve currencies (USD, EUR, JPY, GBP). If there is a tendency to increase the weight of the Chinese yuan and to reduce the weight of the rest currencies (the USD mostly), especially after certain points in time (i.e. after November 2015, when it was announced that the yuan would be included in the SDR basket), it can be assumed and argued that the international monetary system is actually seeing a fundamental adjustment.

There is a conventional model in extant literature how to determine the proportion of different reserve currencies in the foreign exchange reserves of a country²¹. It was proposed in 1994 by Frankel and Wei in a research paper

²⁰ Lee, J.-W. Will The Renminbi Emerge as an International Currency? // *The World Economy*, 2014, N 1, p. 42. The author uses a model to describe the demand for a currency worldwide, which is structured to reflect the phenomenon of "a tipping point", which is the threshold of the share, a currency holds in global reserves. After crossing this threshold, the demand for this currency is speeded up, i.e. it starts faster to acquire a larger share.

²¹ It should be borne in mind that although it is not explicitly stated in extant literature, the Frankel-Wei model is primarily used to identify a specific regime of regulation or the actual weights of the currency basket for currencies that are known a priori to be

on the role of the Japanese yen in exchange rate regimes of Southeast Asia, and later, in 2007²², also used by the two authors to study the (de facto) yuan exchange rate regime of China. The model is a multifactor regression in which the analysed currency is a dependent variable and is on the left side of the equation, while and the reserve currencies are on the right side:

*Formula 1. The Frankel-Wei Model*²³

$$\Delta \log \left(\frac{x}{CHF} \right) = \alpha_0 + \alpha_1 \Delta \log \left(\frac{USD}{CHF} \right) + \alpha_2 \Delta \log \left(\frac{EUR}{CHF} \right) + \alpha_3 \Delta \log \left(\frac{JPY}{CHF} \right) + \alpha_4 \Delta \log \left(\frac{GBP}{CHF} \right) + u$$

where:

- $\Delta \log \left(\frac{x}{CHF} \right)$ - is the first logarithmic difference in the exchange rate of currency (x) per Swiss franc;
- $\Delta \log \left(\frac{USD}{CHF} \right)$, $\Delta \log \left(\frac{EUR}{CHF} \right)$, $\Delta \log \left(\frac{JPY}{CHF} \right)$, $\Delta \log \left(\frac{GBP}{CHF} \right)$ - the first logarithmic difference in the exchange rate of the reserve currencies per CHF;
- $\alpha_1, \alpha_2, \alpha_3, \alpha_4$ – regression coefficients, the values of which are in fact the weights in the currency basket, to which the currency of a country is pegged.

If the aim is to study the influence of the Chinese yuan on the currency x , then the right side of the equation shall also include the parameter $\Delta \log \left(\frac{RMB}{CHF} \right)$ ²⁴.

Here, the Swiss franc is used as the numeraire currency. Other studies also use a number of other currencies, such as the New Zealand dollar (see Kawai and Pontines), SDR, etc. The numeraire currency in analytical terms - is essential to overcoming the problem of multicollinearity resulting from

pegged to a currency basket, or at least that they are somehow regulated. Thus its application for the currencies of the sample of this study may turn out to be problematic. As it is stated below, this problematic application of the model is partly confirmed.

²² **Frankel**, Jeffrey, and Shang-Jin Wei. 2007. Assessing China's Exchange Rate Regime. *Economic Policy* 22, no. 51: 575–614.

²³ **Kawai**, M., Pontines, V. Is there really a renminbi bloc in Asia?: A modified Frankel–Wei approach. // *Journal of International Money and Finance*, 2016, p. 72

²⁴ N.B.: Throughout in this text the codes RMB and CNY are used as interchangeable.

high correlation between two or more of the independent variables. For example, multicollinearity is a problem namely in the research on the Chinese yuan, because of the high correlation between the yuan and the US dollar (a normal consequence from the pegging of the CNY to USD for long periods of time, see Table 1). Kawai and Pontines point three ways to remedy the issue. The first is to use the US dollar as the numeraire currency. This approach removes the impact of the dollar movements on the yuan, but also removes the US dollar from the right side of the equation. Its weight in this case is $1 - (\alpha_1 + \alpha_2 + \alpha_3 + \alpha_4)$, assuming that that all coefficients sum up to 1.

The other two approaches are to choose periods of relative flexibility of one of the currencies against the other, or to „purge” the USD component (and of the rest reserve currencies in case of a currency basket) from the movement of the yuan, by first regressing the exchange rate movements of the CNY in the exchange rate movements of the USD and to replace the CNY in the second, and main regression, with the residuals from the first.

Kawai and Pontines make a critical analysis of the three methods and choose another one, also offering a modified two-step approach:

Formula 2. Kawai-Pontines modified two-step approach

Step 1: Removing the movement of the USD and the rest reserve currencies from the movement of the Chinese yuan

$$\Delta \log \left(\frac{RMB}{NZD} \right) = \phi_0 + \phi_1 \Delta \log \left(\frac{USD}{CHF} \right) + \phi_2 \Delta \log \left(\frac{EUR}{CHF} \right) + \phi_3 \Delta \log \left(\frac{JPY}{CHF} \right) + \phi_4 \Delta \log \left(\frac{GBP}{CHF} \right) + w$$

Step 2: Including the residuals from the regression from step 1 in the main regression to estimate the influence of the RMB in currency basket of the currency x

$$\Delta \log \left(\frac{x}{NZD} \right) = \gamma_0 + \gamma_1 \Delta \log \left(\frac{USD}{NZD} \right) + \gamma_2 \Delta \log \left(\frac{EUR}{NZD} \right) + \gamma_3 \Delta \log \left(\frac{JPY}{NZD} \right) + \gamma_4 \Delta \log \left(\frac{GBP}{NZD} \right) + \gamma_5 \hat{w} + v$$

The notation is the same as in equation 1, except that NZD is used as a numeraire currency, α is replaced by γ , and \hat{w} are the residuals from the regression in Step 1. The last operation in Step 2 is to subtract the residuals \hat{w} from both sides of the equation:

$$\Delta \log \left(\frac{x}{NZD} \right) - \hat{w} = \gamma_0 + \gamma_1 \left[\Delta \log \left(\frac{USD}{NZD} \right) - \hat{w} \right] + \gamma_2 \left[\Delta \log \left(\frac{EUR}{NZD} \right) - \hat{w} \right] + \gamma_3 \left[\Delta \log \left(\frac{JPY}{NZD} \right) - \hat{w} \right] + \gamma_4 \left[\Delta \log \left(\frac{JPY}{NZD} \right) - \hat{w} \right] + \nu$$

It is important to clarify how the results of this approach are interpreted. As with the basic Frankel-Wei model, the regression coefficients are the weights of each of the reserve currencies in the currency basket. It is assumed that if we include all currencies that influence the movement of the analysed currency, they will completely describe its movements and the sum of the coefficients will be equal to 1. Therefore, the weight of the Chinese yuan in the case will equal $1 - (\gamma_1 + \gamma_2 + \gamma_3 + \gamma_4)$.

Kawai and Pontines give further evidence for the superiority of their method to the Balasubramaniam-Patnaik-Shah model²⁵ and to the Frankel-Wei standard model, which is why in the next paragraph we have first used their model, and then the basic model. The models are applied to the four currency pairs RUB / NZD, BRL / NZD, INR / NZD and ZAR / NZD. The sample studied comprises daily values (total 2,794 observations) of the exchange rates and covers the period 20.07.2005-05.04.2016.²⁶

3. Results from the empirical analysis

3.1. The Kawai-Pontines approach

The studied period is divided into sub-periods: for the method of Kawai and Pontines it is divided into two-year sub-periods with overlapping of one year. The model has also been applied for the entire period. We have also applied the model for 2016 only to detect any increase in the value of the yuan after the announcement of the International Monetary Fund. In Step 1 of Formula 2 from the changes of the Chinese yuan we have removed only the influence of the dollar with one regression for the entire period. The results by years (see Tables 2, 3, 4 and 5) show a sustainable low coefficient of determination R^2 for the South African rand and Brazilian real. Regarding the Rus-

²⁵ Balasubramaniam, V., Patnaik, I., Shah, A., // Who Cares about the Chinese Yuan? NIPFP Working Paper, 2011, N 89. New Delhi: National Institute of Public Finance and Policy.

²⁶ Sources: www.investing.com; <http://www.bankofengland.co.uk/Pages/home.aspx>

sian ruble we observe a high coefficient in the first years of the sample, which reduces dramatically after 2012. The highest significant weights are obtained for the Indian rupee, which is consistent with reported results from earlier studies. Table 6 presents the results for the entire period. It also shows that statistically the best results are obtained for the Russian ruble and Indian rupee.

Regarding the main outcome of interest – the values and the changes in the obtained coefficients, we can say that for the entire sample of currencies and years, high and sustained statistical significance showed above all the coefficients of the US dollar, followed by those of the euro and to a lesser extent of the Japanese yen. The rest coefficients are assessed as unstable, incl. the negative ones, which in the context of the chosen method questions the economic logic of the dependency. Another important point is that there is no increase in the CNY coefficient in the expected years.

Table 2. First-step results for the Russian ruble (RUB) ²⁷

		2006-2007	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	2016
const	Parameter	0.0002	-0.0003	-0.0004	-0.0001	-0.0001	-0.0001	-0.0002	-0.0013	-0.0014	0.0001	0.0022
	P-value (F)	0.0161 **	0.0072 ***	0.3996	0.8604	0.7859	0.8202	0.2504	0.0228 **	0.0626 *	0.9107	0.2833
USD	Parameter	0.6339	0.5611	0.6279	0.7244	0.5861	0.4452	0.2926	0.6718	0.8982	0.8306	0.9191
	P-value (F)	1.99e-141 ***	4.48e-074 ***	1.58e-017 ***	2.94e-017 ***	1.06e-024 ***	1.76e-012 ***	2.10e-08 ***	2.47e-05 ***	2.88e-06 ***	2.76e-05 ***	0.0296 **
EUR	Parameter	0.3280	0.5220	0.3636	0.1883	0.2893	0.4301	0.4353	0.1035	0.0025	0.0108	-0.0055
	P-value (F)	2.97e-033 ***	4.21e-064 ***	8.84e-07 ***	0.0183 **	4.15e-010 ***	5.23e-016 ***	9.73e-016 ***	0.5345	0.9875	0.9462	0.9907
JPY	Parameter	0.0151	-0.0250	-0.0323	-0.0879	-0.1194	-0.2079	-0.1403	-0.2316	-0.7311	-0.7871	-0.7415
	P-value (F)	0.2848	0.1643	0.5236	0.1481	0.0036 ***	6.07e-06 ***	9.57e-06 ***	0.0138 **	1.46e-05 ***	2.33e-05 ***	0.0379 **
GBP	Parameter	0.0092	-0.0343	-0.0406	-0.0407	0.0505	0.1357	0.1566	0.1178	0.3244	0.5096	0.5426
	P-value (F)	0.6877	0.1500	0.5179	0.5776	0.3507	0.0456 **	0.0092 ***	0.4811	0.1074	0.0091 ***	0.1561
CNY	Parameter	0.0138	-0.0238	0.0814	0.2160	0.1936	0.1968	0.2559	0.3384	0.5060	0.4361	0.2853
	P-value (F)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
regression	Akaike	-5281.5420	-4630.5110	-3305.1820	-3288.1790	-3986.4390	-4001.5150	-4169.3830	-3067.4170	-2798.7160	-1801.6370	-365.3904
	R-square	0.9600	0.9253	0.5010	0.3443	0.5807	0.5215	0.4779	0.0980	0.0930	0.1388	0.1566
	DW	2.4548	1.7398	2.6003	2.5038	1.8843	1.8669	1.9418	2.0388	2.0292	2.0404	2.4046
	P-value (F)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0051
Number of observations		T=522	T=523	T=522	T=522	T=521	T=521	T=521	T=522	T=522	T=329	T=68

²⁷ The statistical significance for the Chinese yuan is not presented because in the method the coefficient is obtained not directly from the model, but by subtracting the sum of the coefficients for the other currencies from 1. To estimate the significance of the coefficient for CNY we need to test it separately.

Table 3. First-step results for the Brazilian real

		2006-2007	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	2016
const	Parameter	0.0003	0.0002	0.0002	0.0005	0.0000	-0.0005	-0.0005	-0.0004	-0.0007	-0.0004	0.0019
	P-value (F)	0.3306	0.6637	0.6994	0.2887	0.9589	0.1345	0.0881 *	0.2036	0.1017	0.5046	0.1630
USD	Parameter	0.7246	0.6847	0.7181	0.7772	0.6015	0.3817	0.4895	0.6192	0.4123	0.4366	0.5162
	P-value (F)	9,41e-015 ***	7,06e-010 ***	1,65e-013 ***	1,94e-021 ***	5,53e-013 ***	4,82e-06 ***	7,79e-09 ***	0.6192	0,0006 ***	0,0034 ***	0,0640 **
EUR	Parameter	0.3962	0.2034	0.0143	0.0057	0.2713	0.2779	0.2947	0.0854	-0.0582	0.0999	0.5056
	P-value (F)	0,0024 ***	0,0697 *	0,8837	0,9394	7,70e-05 ***	6,30e-05 ***	0,0006 ***	0,4155	0,5619	0,4086	0,1116
JPY	Parameter	-0.3006	-0.4384	-0.3115	-0.2714	-0.3011	-0.0945	-0.0422	-0.0460	-0.2325	-0.4930	-0.7186
	P-value (F)	3,43e-05 ***	9,75e-09 ***	4,83e-06 ***	2,85e-06 ***	1,20e-06 ***	0.1218	0.4075	0.4358	0,0268 **	0,0004 ***	0,0029 ***
GBP	Parameter	-0.1959	0.1955	0.1452	0.0476	0.1149	0.1850	-0.0221	0.0153	0.4691	0.5354	0.2626
	P-value (F)	0,0945 *	0,0503 *	0,0834 *	0,4906	0.1568	0,0421 **	0.8202	0.8840	0,0002 ***	0,0003 ***	0.2987
CNY	Parameter	0.3758	0.3549	0.4339	0.4409	0.3134	0.2499	0.2801	0.3261	0.4093	0.4212	0.4342
	P-value (F)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
regression	Akaike	-3591.1430	-3132.4400	-3004.1720	-3347.8980	-3564.2900	-3695.7810	-3671.8920	-3551.0070	-3286.6980	-1984.3610	-421.3008
	R-square	0.2563	0.1546	0.1728	0.2598	0.3079	0.3429	0.2505	0.2019	0.1535	0.1692	0.2096
	DW	2.0223	2.3306	2.3782	2.5838	2.4634	2.1478	2.1919	2.2244	2.2334	2.1765	1.9303
	P-value (F)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0008
Number of observations		T = 521	T = 523	T = 523	T = 522	T = 521	T = 521	T = 522	T = 522	T = 522	T = 329	T = 68

Table 4. First-step results for the Indian rupee

		2006-2007	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	2016
const	Parameter	0.0002	-0.0001	-0.0003	0.0001	-0.0003	-0.0005	-0.0004	-0.0003	-9,01459e-05	-1,76482e-05	0.0004
	P-value (F)	0.1674	0.5327	0.3114	0.7332	0.2962	0,0701 *	0.1596	0.2779	0.5449	0.9203	0.2954
USD	Parameter	0.8213	0.8572	0.8245	0.8206	0.6601	0.6028	0.7237	0.8622	0.9104	0.8898	0.8747
	P-value (F)	1,08e-072 ***	4,34e-059 ***	3,79e-064 ***	1,49e-055 ***	1,87e-024 ***	2,11e-016 ***	2,11e-019 ***	3,15e-029 ***	5,59e-083 ***	2,93e-067 ***	4,21e-017 ***
EUR	Parameter	0.0477	0.1667	0.0878	0.0809	0.0669	0.0988	0.2426	0.0661	-0.1132	-0.1388	-0.1877
	P-value (F)	0.3873	0.0005 ***	0.0433 **	0.0688 *	0.1942	0.0957 *	0.0022 ***	0.3854	0.0006 ***	5.26e-05 ***	0.0351 **
JPY	Parameter	0.0052	-0.0708	-0.0489	-0.1194	-0.1365	-0.1539	-0.1285	-0.0878	-0.0994	-0.0907	-0.0767
	P-value (F)	0.8658	0.0272 **	0.1039	0.0005 ***	0.0033 ***	0.0034 ***	0.0066 ***	0.0410 **	0.0039 ***	0.0162 **	0.2388
GBP	Parameter	0.0835	0.0382	0.0357	0.0035	0.0376	0.1201	0.0081	0.0014	0.1550	0.2017	0.3178
	P-value (F)	0.0933 *	0.3675	0.3377	0.9309	0.5398	0.1244	0.9283	0.9854	0.0002 ***	6.68e-07 ***	2.41e-05 ***
CNY	Parameter	0.0422	0.0087	0.1009	0.2144	0.3720	0.3323	0.1541	0.1581	0.1472	0.1330	0.0718
	P-value (F)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
regression	Akaike	-4483.243	-4027.615	-3851.184	-3897.966	-3856.371	-3854.047	-3752.840	-3884.628	-4452.250	-2845.371	-595.3603
	R-square	0.8359	0.8044	0.7638	0.6494	0.4531	0.4158	0.3704	0.4480	0.7829	0.8563	0.9043
	DW	2.2011	2.0734	2.2086	2.4834	2.6876	2.5614	2.0590	1.9646	2.0558	2.0121	2.0580
	P-value (F)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Number of observations		T = 521	T = 523	T = 523	T = 522	T = 521	T = 521	T = 522	T = 522	T = 522	T = 329	T = 66

Table 5. First-step results for the South African rand

		2006-2007	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	2016
const	Parameter	-0.0005	-0.0002	0.0001	0.0005	-0.0002	-0.0006	-0.0007	-0.0005	-0.0004	-0.0003	0.0011
	P-value (F)	0.1118	0.6821	0.9217	0.2365	0.5709	0,0741 *	0,0314 **	0.1025	0.2049	0.5221	0.4426
USD	Parameter	0.2642	0.7604	0.6365	0.4456	0.2282	-0.0447	-0.0345	0.2507	0.3130	0.2721	0.3272
	P-value (F)	0,0042 ***	1,53e-012 ***	9,28e-011 ***	2,31e-09 ***	0,0025 ***	0.6129	0.6676	0,0033 ***	0,0002 ***	0,0156 **	0.2574
EUR	Parameter	0.8072	0.7384	0.4803	0.2363	0.2856	0.3713	0.3549	0.2013	0.1053	0.0423	-0.3284
	P-value (F)	1,62e-09 ***	2,01e-011 ***	1,59e-06 ***	0,0008 ***	7,19e-06 ***	6,23e-07 ***	1,75e-05 ***	0,0251 **	0.1380	0.6438	0.3199
JPY	Parameter	-0.4027	-0.7839	-0.5492	-0.2007	-0.1120	-0.1242	-0.0576	-0.0469	-0.1862	-0.2175	-0.1035
	P-value (F)	5,03e-08 ***	8,82e-025 ***	6,85e-015 ***	0,0002 ***	0,0486 **	0,0572 *	0.2396	0.3530	0,0122 **	0,0393 **	0.6707
GBP	Parameter	-0.0094	-0.0323	-0.0686	-0.0224	0.0241	0.1807	0.1750	0.1000	0.2902	0.4011	0.4490
	P-value (F)	0.9371	0.7368	0.4197	0.7286	0.7481	0,0631 *	0,0616 *	0.2665	0,0012 ***	0,0004 ***	0,0915 *
CNY	Parameter	0.3406	0.3173	0.5009	0.5412	0.5742	0.6168	0.5621	0.4950	0.4778	0.5021	0.6557
	P-value (F)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
regression	Akaike	0.2310	-3172.4100	-2988.4100	-3415.3390	-3645.3870	-3626.9590	-3713.0600	-3714.6210	-3648.1290	-2167.7050	-415.2342
	R-square	0.2310	0.2107	0.1385	0.1554	0.1454	0.1144	0.1164	0.1416	0.2033	0.1792	0.0559
	DW	1.8571	2.1471	2.2536	2.2815	1.9721	1.8654	1.9544	2.1863	2.0109	1.9196	2.0087
	P-value (F)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1065
Number of observations		T = 521	T = 523	T = 523	T = 522	T = 521	T = 521	T = 522	T = 522	T = 522	T = 329	T = 68

At this stage the obtained results rather do not give grounds to confirm the assumption formulated in the thesis statement of the study. The instability of the coefficients and the presence of negative values which are at the same time of statistical significance, raise doubts about the suitability of the chosen model.

Table 6. First-step results for the four currencies for the entire period

		RUB	BRL	INR	ZAR
const	Parameter	-0.0003	-8.86E-05	-0.000134658	-0.000303288
	P-value (F)	0.0893 *	0.6196	0.1557	0,0700 *
USD	Parameter	0.6482	0.621855	0.794071	0.304724
	P-value (F)	3.10e-065 ***	8,16e-056 ***	1.52e-264 ***	6,40e-017 ***
EUR	Parameter	0.2424	0.11997	0.0781115	0.353504
	P-value (F)	7.01e-011 ***	0,0019 ***	0.0001 ***	3,61e-022 ***
JPY	Parameter	-0.1036	-0.261216	-0.0658585	-0.279869
	P-value	0.0001 ***	3,11e-020 ***	1.09e-05 ***	7,51e-026 ***
GBP	Parameter	0.0498	0.134728	0.0480033	0.0886561
	P-value (F)	0.1928	0,0008 ***	0.0237 **	0,0179 **
CNY	Parameter	0.1631	0.3847	0.1457	0.5330
	P-value (F)	N/A	N/A	N/A	N/A
regression	Akaike	-19150.5100	-18900.25	-22615.67	-19282
	R-square	0.3325	0.202312	0.661866	0.128915
	DW	2.1502	2.255488	2.302096	2.067339
	P-value (F)	0.0000	5.50E-143	0.00E+00	3.74E-87
Number of observations		T = 2936	T = 2936	T = 2936	T = 2936

This gives grounds prior to making a categorical conclusion to test another variant thereof and to pay more attention to the main regressor of interest, and namely the Chinese yuan.

3.2. Application of the Balasubramaniam-Patnaik-Shah/ Subramanian-Kessler approach

The above results from the application of the Kawai-Pontines approach give reason to use another approach before making general conclusions. In particular, we work in two directions. First, in Step 1 of the regression described in Formula 2, we go deeper into the changes in the exchange rate on the yuan itself. For this purpose the long period 20.07.2005-05.04.2016 is divided into sub-periods that correspond to the periods in the classification of Subramanian and Kessler²⁸. Then the changes in the yuan are

²⁸ N.B.: The logic of the division of the stages in the development of CNY and the first step of the regression is not described in detail here. It will be described in a separate paragraph below because it provides important results of its own that shed light on the final results of the study.

regressed, not only against the dollar, but against the 4 major reserve currencies – USD, EUR, JPY, GBP.

Table 7. Second-step results for the Russian ruble

Period		2	3	4	5	6	
From - to		21 July 2005 - 31 July 2008	1 August 2008 - 30 June 2010	1 July 2010-14 January 2014 (bottom)	15 January 2014 -June 2015	1 July 2015- April 2016	Entire period
const	Parameter	0.0001	-0.0004	-0.0002	-0.0012	-0.0004	-0.0003
	P-value (F)	0,0204 **	0.3990	0.2341	0.1955	0.7076	0,0915 *
USD	Parameter	0.6077	0.6853	0.4398	0.8078	1.0637	0.6406
	P-value (F)	1,68e-203 ***	2,76e-017 ***	1,12e-028 ***	0,0008 ***	6,61e-06 ***	5,35e-058 ***
EUR	Parameter	0.3735	0.3062	0.3599	0.2453	-0.3174	0.2510
	P-value (F)	1,15e-065 ***	5,01e-05 ***	4,70e-022 ***	0.2595	0.1194	9,18e-011 ***
JPY	Parameter	0.0114	-0.0644	-0.1161	-0.6407	-0.7398	-0.1033
	P-value (F)	0.3388	0.2369	1,64e-05 ***	0,0034 ***	0,0005 ***	0,0002 ***
GBP	Parameter	-0.0065	-0.0417	0.1270	0.1212	0.6134	0.0608
	P-value (F)	0.7145	0.5275	0.0041 ***	0.6520	0,0048 ***	0.1241
CNY	Parameter	0.1372	0.5096	0.1717	1.5401	0.4092	0.5634
	P-value (F)	0,0084 ***	0.3995	0.1669	0,0426 **	0.3455	6,61e-05 ***
regression	Akaike	-7901.5210	-3098.0810	-7240.6870	-1975.8270	-1143.9200	-18098.8400
	R-square	0.9476	0.4724	0.5401	0.0698	0.2121	0.3280
	DW	2.4717	2.5654	1.8922	2.0200	2.0979	2.1525
	P-value (F)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Number of observations		T = 791	T = 499	T = 924	T = 380	T = 200	T = 2794

Table 8. Second-step results for the Brazilian real

Period		2	3	4	5	6	
From - to		21 July 2005 - 31 July 2008	1 August 2008 - 30 June 2010	1 July 2010-14 January 2014 (bottom)	15 January 2014 -June 2015	1 July 2015- April 2016	Entire period
const	Parameter	0.0004	0.0000	-0.0004	-0.0005	-0.0003	-0.0001
	P-value (F)	0.1598	0.9882	0.0812 *	0.2653	0.7181	0.4210
USD	Parameter	0.7644	0.7719	0.4618	0.4066	0.5037	0.6254
	P-value (F)	3.68e-025 ***	6.60e-013 ***	2.95e-016 ***	0.0014 ***	0.0136 **	2.03e-052 ***
EUR	Parameter	0.3428	0.0234	0.2572	0.0050	0.1446	0.1089
	P-value (F)	0.0005 ***	0.8156	1.22e-06 ***	0.9654	0.4192	0.0062 ***
JPY	Parameter	-0.3123	-0.3632	-0.0667	-0.0263	-0.6498	-0.2628
	P-value (F)	1.32e-07 ***	8.64e-07 ***	0.0862 *	0.8193	0.0005 ***	1.85e-019 ***
GBP	Parameter	-0.1434	0.1236	0.0799	0.3412	0.4662	0.1352
	P-value (F)	0.1043	0.1619	0.2122	0.0168 **	0.0148 **	0.0009 ***
CNY	Parameter	0.0537	-0.5507	0.2990	-0.0475	0.3778	0.2250
	P-value (F)	0.8339	0.4965	0.0968 *	0.9057	0.3229	0.1217
regression	Akaike	-5376.2530	-2806.7590	-6554.8900	-2459.2740	-1194.7070	-17927.1700
	R-square	0.2462	0.1560	0.3233	0.1740	0.1261	0.1950
	DW	2.0887	2.4421	2.1840	2.1982	2.2392	2.2596
	P-value (F)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Number of observations		T = 791	T = 499	T = 924	T = 380	T = 200	T = 2794

Table 9. Second-step results for the Indian rupee

Period		2	3	4	5	6	
From - to		21 July 2005 - 31 July 2008	1 August 2008- 30 June 2010	1 July 2010-14 January 2014 (bottom)	15 January 2014 - June 2015	1 July 2015- April 2016	Entire period
const	Parameter	0.0000	-0.0001	-0.0004	-0.0001	0.0000	-0.0001
	P-value (F)	0.9856	0.7599	0.0514 *	0.6739	0.9244	0.1441
USD	Parameter	0.8364	0.8243	0.6555	0.9039	0.8953	0.7900
	P-value (F)	4.52e-123 ***	2.31e-051 ***	4.42e-036 ***	1.90e-057 ***	1.70e-043 ***	3.72e-240 ***
EUR	Parameter	0.0395	0.0942	0.1528	-0.0518	-0.2246	0.0816
	P-value (F)	0.3275	0.0431 **	0.0013 ***	0.2285	6.83e-07 ***	0.0001 ***
JPY	Parameter	-0.0057	-0.0657	-0.1224	-0.0869	-0.0676	-0.0667
	P-value	0.8124	0.0524 *	0.0005 ***	0.0434 **	0.1331	1.76e-05 ***
GBP	Parameter	0.1074	0.0100	0.0369	0.1238	0.2622	0.0548
	P-value (F)	0.0032 ***	0.8070	0.5235	0.0201 **	5.56e-08 ***	0.0124 **
CNY	Parameter	0.3226	1.0449	0.3153	0.1292	0.2630	0.3539
	P-value (F)	0.0023 ***	0.0056 ***	0.0524 *	0.3881	0.0053 ***	5.95e-06 ***
regression	Akaike	-6777.8840	-3573.6640	-6744.7250	-3208.4420	-1757.6840	-21405.8000
	R-square	0.8234	0.7221	0.4034	0.7497	0.8628	0.6545
	DW	2.1334	2.3825	2.3369	2.0880	1.9936	2.3043
	P-value (F)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Number of observations		T = 791	T = 499	T = 924	T = 380	T = 200	T = 2794

Second, the thus obtained residuals are included in the second stage regression by periods which are also in accordance with the above-mentioned periods. Third, the residuals in Step 1 have not been removed on the left and the right side of the equation in Step 2 as in the Kawai and Pontines approach. This gives a direct estimate of the share of CNY as a regression coefficient. The results can be seen in Tables 7, 8, 9 and 10.

The results do not differ significantly from those achieved with the Kawai-Pontines approach. Again we have sustainable high and statistically significant coefficients mainly for the US dollar. At the same time we have obtained sufficiently high values of R^2 only for the Indian rupee and Russian ruble and only for the sub-period from 21.07.2005 to 31.07.2008. This means that for the rest currencies the model does not give unequivocal results. An argument in the same direction is the presence of high coefficients for the CNY in periods for which we know that its exchange rate was pegged to the US dollar, which makes no economic sense. In some cases the sum of the coefficients is above 1 which also does not sound logical. All these results do not confirm the formulated thesis statement, and namely, that we may register a growing influence of the Chinese yuan in respect of currency reserves of the countries of the BRICS group, which in turn is to be taken into account as an indication of a change in the world monetary system.

Table 10. Second-step results for the South African rand

Period		2	3	4	5	6	
From - to		21 July 2005 - 31 July 2008	1 August 2008- 30 June 2010	1 July 2010- 14 January 2014	15 January 2014 -June 2015	1 July 2015- April 2016	Entire period
const	Parameter	-0.0003	0.0004	-0.0006	0.0000	-0.0008	-0.0003
	P-value (F)	0.2346	0.5683	0.0175 **	0.9057	0.2680	0.1000 *
USD	Parameter	0.4104	0.5804	0.0594	0.1822	0.4030	0.3507
	P-value (F)	5.23e-09 ***	8.62e-09 ***	0.2983	0.0335 **	0.0162 **	1.03e-020 ***
EUR	Parameter	0.5128	0.4655	0.3167	0.1939	-0.113624	0.3288
	P-value (F)	1.00e-07 ***	1.29e-06 ***	7.35e-09 ***	0.0129 **	0.4399	9.03e-019 ***
JPY	Parameter	-0.4565	-0.4748	-0.0689	-0.0480	-0.2435	-0.2969
	P-value (F)	5.23e-015 ***	1.89e-011 ***	0.0853 *	0.5360	0.1072	6.61e-028 ***
GBP	Parameter	0.1283	-0.0697	0.1121	0.2675	0.3254	0.0721
	P-value (F)	0.1360	0.4051	0.0893 *	0.0056 ***	0.0379 **	0.0568 *
CNY	Parameter	0.1190	0.0481	0.1457	0.2416	0.3123	0.1759
	P-value (F)	0.6339	0.9501	0.4320	0.3722	0.3199	0.1921
regression	Akaike	-5415.4260	-2860.2060	-6499.6220	-2758.0620	-1273.3370	-18347.4400
	R-square	0.1885	0.1286	0.1163	0.2234	0.0932	0.1257
	DW	1.8835	2.2770	1.9816	2.1286	1.8636	2.0759
	P-value (F)	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000
Number of observations		T = 791	T = 499	T = 924	T = 380	T = 200	T = 2794

However, the results do not give a definite proof to reject the thesis statement either, they are rather indefinite. The reasons for this may be various. First – the application of ineligible methodology. The literature seems to lack an explicit definition that the methodology of Frankel and Wei is applicable only and solely for currencies that are subject to regulation. Moreover, it is used to study currencies that are clearly not in a regime of regulation²⁹. Therefore it is appropriate to seek still another reason for the inability to establish stable results. It is logical to seek the cause in the regressors used and especially in the Chinese yuan, which is of main interest. Moreover, as noted, the coefficients for the US dollar and the euro and to a lesser extent for the Japanese yen have shown a consistent relevance and logical values. On this basis, we focus our attention more on the state of the yuan after the year 2005.

3.3. Analysis of the foreign exchange rate regime of the RMB for the period of study

The basis for research in this paragraph is the periodization of the development of the exchange rate of CNY, proposed by Subramanian and Kessler³⁰. For the purposes of this study, we have further developed the

²⁹ Bermúdez, C. De facto exchange rate regimes and inflation targeting in Latin America: Some empirical evidence from the past decade // *EconoQuantum*, 2014, N1, p. 31

³⁰ Subramanian, A., Kessler, M. The Renminbi Bloc Is Here: Asia Down, Rest of the World to Go? // Working Paper 12-19, Washington, DC: Peterson Institute for International Economics, 2012, Доступно на: <https://www.piie.com/publications/interstitial.cfm?ResearchID=2241>. 25.04.2016.

periodization (see. Fig. 2). We have added to the periodization of Subramanian and Kessler the limit of 15.01. 2014 when the value of the dollar hits the bottom and (subjectively) a trend towards devaluation of the CNY sets off. Another time limit added is June 2015 for the reasons explained above. The data are divided into a corresponding number of periods and the dependence of the Chinese yuan on the four main reserve currencies is analysed using Frankel and Wei regression. The results are interesting, especially in comparison with the officially declared policy on the exchange rate of CNY (see Table 11). According to the official data, the rate of the Chinese yuan is firmly pegged to the US dollar until July 20, 2005. This is confirmed by the regression (the regression coefficient for the USD is exactly 1.00, and the rest cannot be calculated, which means that the exchange rate of CNY is 100% determined by the movements of the USD).

However, in the next period, the Chinese yuan was "unpegged" from the dollar and pegged to a basket of currencies, while allowing a wider deviation. Data show that actually the coefficients for the euro and the Japanese yen are significant. The coefficient for the euro, however, is negative, which makes no economic sense. What is more interesting in the case, however, is that the coefficient of the dollar is ≈ 0.9636 , which means that the dollar continues to dictate almost 100% of the movements of the Chinese yuan.

Figure 2. Periods in the development of the exchange rate of the CNY after 2005. (adapted by the author)

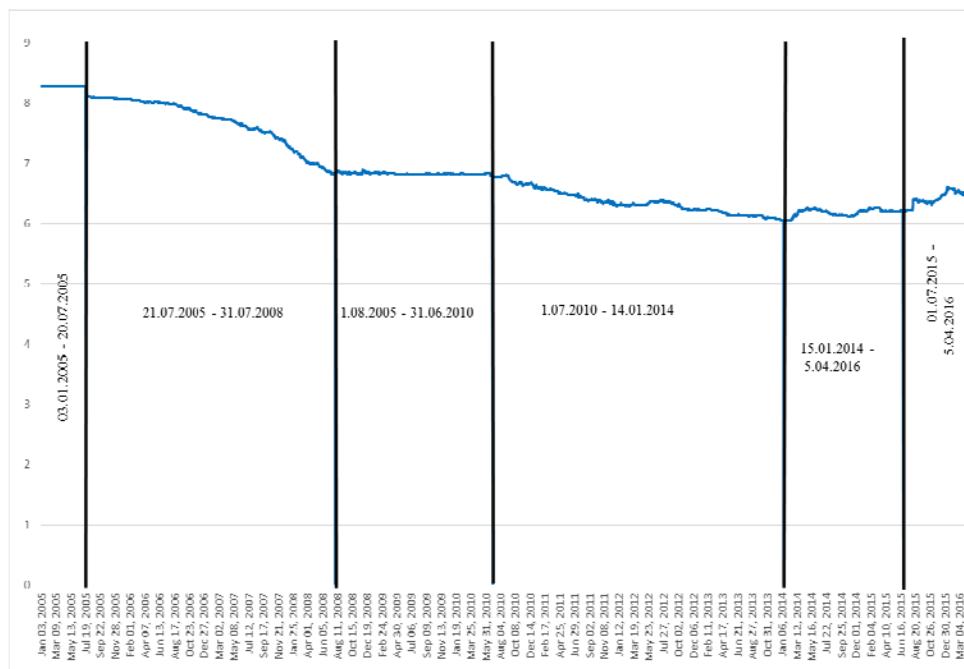


Table 11. Analytical results for the regime of the Chinese yuan

Period		1	2	3	4	5	6	
From-to		1 January 2005 - 20 July 2015	21 July 2005 - 31 July 2008	1 August 2008 - 30 June 2010	1 July 2010 - 14 January 2014 (bottom)	15 January 2014 - June 2015	1 July 2015 - April 2016	Complete from 21.7.2005
const	Parameter	0	0.000249	0.000019	0.000122	-0.000065	-0.000183	0.000088
	P-value (F)	NA	7,63e-010 ***	0.604800	0,0037 ***	0.304800	0.258200	0,0003 ***
USD	Parameter	1	0.963589	0.996482	1.000020	0.990641	0.952147	0.985713
	P-value (F)	NA	0,0000 ***	0,0000 ***	0,0000 ***	3,47e-196 ***	6,89e-063 ***	0,0000 ***
EUR	Parameter	0	-0.037891	-0.003821	0.000734	-0.010177	-0.049323	-0.012522
	P-value (F)	NA	0,0055 ***	0.493100	0.939400	0.492700	0.143400	0,0157 **
JPY	Parameter	-1,87670e-013	0.049742	-0,00317286	-0,00835045	0.019779	-0,0140607	0.005868
	P-value (F)	NA	1,78e-09 ***	0.434000	0.241400	0.182500	0.683300	0.119300
GBP	Parameter	0.00	-0.001230	0.007707	0.002306	-0.002932	0.045583	0.007669
	P-value (F)	NA	0.920200	0.116900	0.844300	0.872900	0.201900	0.148900
regression	Akaike		-8495.7090	-5691.4660	-9690.2170	-4017.3320	-1864.4900	-29318.3200
	R-square	1	0.9784	0.9964	0.9733	0.9681	0.9249	0.9797
	DW		1.7314	2.3392	2.3466	1.8908	1.6732	1.9659
	P-value (F)		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Number of observations		T = 142	T = 791	T = 499	T = 924	T = 380	T = 200	T = 2794

The next period is from 1 August 2008 to July 2010, in which it is known that the yuan was again pegged to the USD, but probably not as strictly as before. Here the regression results confirm that the actual situation is such - the coefficient of USD is 0.99.

Very interesting is the next period (1.07.2010-14.01.2014), when even the chart suggests that the rate of the CNY against the dollar deviates towards appreciation. The regression results indicate, however, that the yuan is actually still 100% dependent on USD (coefficient ≈ 1.00). The situation is similar in the next two periods, incl. until today. The conclusion that can be drawn is that despite the seeming "unpegging" of CNY from the US dollar the exchange rate of the Chinese currency is still influenced very strongly in practice almost entirely, by that of the dollar.

Therefore it can be assumed that this is the reason, at least partly, for the insignificant and unstable coefficients derived from the analysis in paragraphs 3.1. and 3.2. They include as regressors the residuals of the first stage regression of CNY against the USD, which residuals should describe the independent behaviour of the Chinese yuan. The above results indicate, however, that we observe almost no independent behaviour of the Chinese yuan.

* * *

Based on the above empirical and practical results we can draw the following conclusions:

- The values of the coefficient of determination for the four tested currencies, except for the Indian rupee, are low for most of the investigated period. It can be concluded that the methodology of Frankel and Wei

does not explicitly give good results for foreign exchange reserves of countries that do not apply a strict regime of regulation of the exchange rate. The model definitely gives better results for currencies which are known to be in a regulated exchange rate regime, but we need to establish exactly what the regime is. This calls for further studies to test other models and to deepen the preliminary analysis on the official regimes applied to the tested currencies.

- The unstable and statistically insignificant coefficients of the Chinese yuan do not allow us to draw an unequivocal conclusion about its influence as a reserve currency in the surveyed economies from the BRICS group and thereby assess its potential to be a global reserve currency. A possible explanation for these results is the still too high dependency of the CNY exchange rate on the USD, which in practice means that the yuan does not exhibit any independent behaviour.

This result has important implications for the overall conclusions of the study, the purpose of which is to test whether the Chinese yuan has the potential to change the current structure of the international monetary system, displacing the dollar from its role as a major reserve currency. The results show that for the moment we cannot prove such an assumption. Moreover, assuming that the current exchange rate of CNY is consciously maintained in still high dependence on the US dollar and this at supposedly undervalued condition, it can be assumed that the Chinese authorities are conducting a policy of "mediation" between the world and the dollar at that instead of offering the world economy a real alternative to the dollar, they intentionally provide a price-modelled payment unit also perceived as "the cheaper" dollar.

That is why the general question - when the yuan will become a real alternative to the dollar – is still to be answered. It is logical and economically justified for this to happen only when the yuan acquires behaviour and value of its own based on its real purchasing power, i.e. it reflects the potential and the characteristic features of the Chinese economy. This is definitely related to the establishment of a true floating exchange rate regime of the CNY. However, there is another consideration of a more social nature. The dollar is currently the preferred global reserve currency and this is so not without a reason³¹. Yes, "the road" was paved by the events after World War II, but it held its top position due to the internal economic stability and strength of the US economy and not least to the high internal purchasing power of the population, leading to high consumption. China has a long way to go to create a true middle class, which will generate the necessary domestic consumption to balance the strong dependence of the Chinese economy on exports. However, it should be borne in mind that the scale of the Chinese economy is to some

³¹ For details on the macro-financial aspects and the economy-currency relations see **Zahariev., A.** Globalniyat valuten pazar i rezervnite valuti – makrofinansovi aspekti. // Almanah nauchni izsledvaniya. SA „D. A. Tsenov“, Svishtov, 2015, s. 119.

extent the scale of the speed of developments, so we can always expect surprises. Still, let us not forget that it was China that gave us the very concept of paper money.

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