The Analysis and Forecast of RMB Internationalization on One Belt and One Road

YU Jianqiu[a],*; CAO Zhe[a]

[a] Anhui University of Finance & Economic, Bengbu City, Anhui Province, China.
* Corresponding author.

Abstract

With the development of Chinese economic rapidly, the internationalization of RMB is on the top agenda. As for the glorious pattern of foreign trade in modern China, the One Belt and One Road is becoming the best stage for RMB shining. This passage use the statistics of RMB cross-border payments from 12/2013 to 03/2015 to forecast the total amount of RMB cross-border payments based on the grey prediction model and judge which detailed items have more effect on the RMB internationalization in OBAOR based on the fuzzy comprehensive evaluation model. Finally, we give some advices to the government based on our results of model.

Key words: The RMB internationalization; One belt and one road; The grey prediction

INTRODUCTION

People discovered the disadvantages of the Bretton Woods System when they faced with the outbreak of sub-prime crisis in Europe and America in the initial of the 21 century. More and more developed and developing countries appeal to change the existing international currency system. As the second economy entity in the world, the proportion of the foreign exchange provided by China in the world's foreign exchange is lower than the proportion of the GDP of China in the GDP of the whole world dramatically. The statue of the power of the economy is not consistent with that of currency. Therefore, professors all over the world call for the RMB internationalization. We are supposed to find out a stimulation which can compel to realize the RMB internationalization.

The national development and reform commission, the ministry of foreign affair, and the department of commerce publish the "the prospect and action of compelling the silk road economy band and marine silk road in the 21th century", which claims the economy corridor that involves in 44 hundreds million people, across China, Asia, and Europe the three economy sphere is on the phase of construction. The construction of the economy corridor and trade path cannot stand without money. People start to cooperate in finance in many ways, such as loan from banks, granted by banks, and the Asia infrastructure bank, and many new established international finance institution. People is about to aggregate money together, and set a bridge which attribute to finance. Meanwhile, the stage is verified to be the best choice of realizing the RMB internationalization, establishing the "RMB area" and we regard RMB as the center currency.

1. LITERATURE

In the late 1980s, the economist Hu Dinghe published his essay "the discovery of the RMB internationalization", which indicates the beginning of territorialization and internationalization of RME. After that, Zeng Xianjiu, Jiang Boke and many other professors also started to research on this field, analyzing the availability and necessity of RMB internationalization, which is the basis of the deepen of theory. After Chinese reform and open up, China has attributed to international economists' interests

to RMB internationalization due to Chinese increased economy power. In 1999, the Germany journal "mirror" demonstrated that there is only USD,EUR, and RMB left in the world and they play dominate roles in their areas respectively after 20 years. The research on RMB internationalization boosts extremely with the development of the statue of China in the 21st century. Many professors spared no effort on the research, such Li Qiansheng, Lu Qianjin, Guan Tao and Wang Yafan and so on so forth. In addition, the international currency research laboratory has been publishing "the report on RMB internationalization research" for each year since 2012.

2. THE PRESENT SITUATION ANALYSIS OF THE VOLUME OF RMB CROSS-BORDER PAYMENT

It is obvious that the RMB cross-border settlement business has got great progress in the number and the scale of settlement since it started in the June in 2009. As we can see from the Table.1 that the scale of 2014 is 65000 hundreds million. The data from Society for Worldwide Interbank Financial Telecommunication (SWIFT) shows that the occupancy of RMB in the world is 2.17%, which is the fifth payment currency. The utilization ration of RMB in Asia comes to 40%, the America is 32%, Europe is 31% and the Middle East and Africa is 26%.

Table1
The Utilization Ratio of RMB in the World

Area	Asia	America	Europe	the Middle East and Africa
The utilization ratio of RMB	40%	32%	31%	26%

When it comes to the market share of the payment in the top 10 RMB offshore central countries and areas (from the Figure 1), HongKong has the most payment volume among all countries and areas, which occupies 72.8%. China mainland is 5.2%, British and Singapore are 3.0% and 2.6% respectively. However, America and French are only 1.9% and 1.4%, which are in the last place in the top 10 countries and areas.（Statistic source: Society for Worldwide Interbank Financial Telecommunication (SWIFT) and RMB report）.

According to the countries and areas involved in "one belt and one road", we can conclude that the occupancy of the payment of RMB cross-border around "one belt and one road" country is 90.9%.
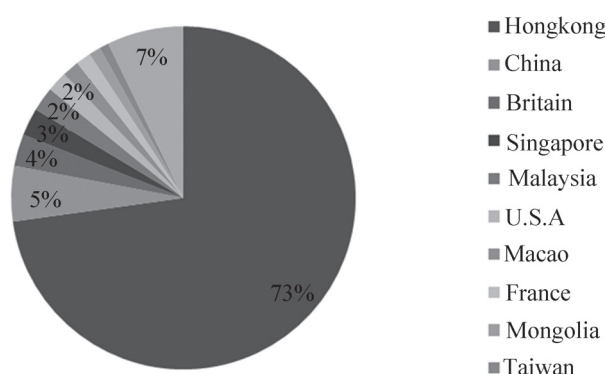

Figure 1
The Top 10 Offshore RMB Central Countries and Areas and Correspondent Payment Market Share

3. THE FORECAST OF THE VOLUME OF PAYMENT OF RMB CROSS-BORDER IN "ONE BELT AND ONE ROAD"—BASED ON GREY FORECAST MODEL

Differential equations are a kind of math equation that describe social economy system and dynamic characteristic of the process in life science. However, the grey forecast model is a systematic differential equation, using the knowledge of differential fitting to forecast and estimate future statistics. The grey forecast model is consistent with the time variable trait of RMB cross-border payment. As a result, we get the data in 15 months ranging from Nov. 2013 to Mar. 2015 to anticipate and check the volume of RMB cross-border payment in "one belt and one road".

3.1 Grey Forecast Model

3.1.1 The Examination and Process of Statistics
We set the reference array as
$$x^{(0)} = (x^{(0)}(1), x^{(0)}(2), x^{(0)}(3)\ldots, x^{(0)}(n))$$
Calculate the ratio of the array
$$\lambda(t) = \frac{x^{(0)}(t-1)}{x^{(0)}(t)} \in (e^{-\frac{2}{n+1}}, e^{\frac{2}{n+1}}) \qquad (t=2,3,\cdots,n)$$

After the initial calculate and checkout, we find that $\lambda(k)$ are in $(e^{-\frac{2}{n+1}}, e^{\frac{2}{n+1}})$. So date doesn't need to be translation transformation, which means we can use model GM(1，1) to start the grey forecast.

3.1.2 The Establishment of the *GM*(1,1) Model
We accumulate the initial array $x^{(0)}$, recorded as $x^{(1)}$
$$x^{(1)} = (x^{(1)}(1), x^{(1)}(2), x^{(1)}(3)\cdots x^{(1)}(n))$$

Equalization the array $y^{(1)}$

$$y^{(0)}(t) = 0.5x^{(1)}(t) + 0.5x^{(1)}(t-1) \quad t = 2,3,....,n$$

Set the matrix

$$X_N = \begin{pmatrix} x^{(0)}(2) \\ x^{(0)}(3) \\ \vdots \\ x^{(0)}(n) \end{pmatrix} \ 与 \ B = \begin{pmatrix} -y^{(0)}(2) & 1 \\ -y(0)(3) & 1 \\ \cdots & \cdots \\ -y(0)(n) & 1 \end{pmatrix}$$

Calculate

$$\hat{u} = \begin{pmatrix} \hat{a} \\ \hat{b} \end{pmatrix} = (B^T B)^{-1} B^T X_N$$

Finally we get the forecast value

$$\hat{x}^{(1)}(t+1) = (x^{(0)}(1) - \frac{b}{a})e^{-at} + \frac{b}{a} \quad (t = 1,2,\cdots,n-1)$$

Reduce the data

$$\hat{x}^{(0)}(t+1) = \hat{x}^{(1)}(t+1) - x^{(1)}(t)$$

3.2 The Anticipation of the Volume of RMB Cross-border Payment in "One Belt and One Road"

If the 12-month volume of RMB cross-border payment is multiplied by the ratio that "on belt and one road" 90.0% occupied, we can get the final value as the value of RMB cross-border payment in "one belt and one road". The specific answer is in the Table 2.

Table 2
The Anticipation of "One Belt and One Road" RMB Cross-border Payment from Apr. 2015 to Mar. 2016

Period	2015.04	2015.05	2015.06	2015.07
RMB cross-border payment	5,745.79	5,221.30	5,766.70	5,360.37
Period	2,015.08	2,015.09	2,015.10	2,015.11
RMB cross-border payment	5,700.34	6,203.02	6,745.69	6,652.06
Period	2,015.12	2,016.01	2,016.02	2,016.03
RMB cross-border payment	6,897.49	6,961.12	7,192.01	7,155.65

If we add the initial data on it, we can draw the changing curve ranging from Jan. 2014 to Mar. 2016 as Figure 2 ("one belt and one road" RMB cross-border payment value. unit: hundreds million).

We discover that the average of the sum of the relative difference is 0.0927 by estimating and checking the existing years' estimated values, which is smaller than 0.1. According to the forecast principle , the differential fitting forecast is in high quality.
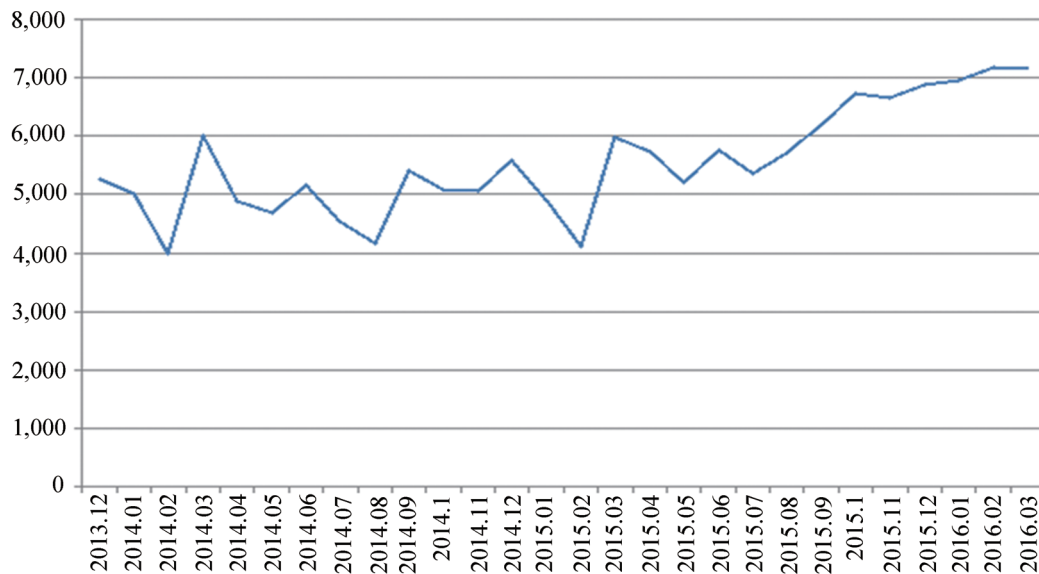

Figure 2
The Anticipation of "One Belt and One Road" RMB Cross-border Payment from Apr. 2015 to Mar. 2016

4. THE ANALYSIS AND ANTICIPATION OF THE RMB CROSS-BORDER SPECIFIC PAYMENT ITEM IN "ONE BELT AND ONE ROAD"—BASED ON FUZZY COMPREHENSION EVALUATION MODEL

The specific items of RMB cross-border payment include commodity trade settlement, business trade, external direct investment and internal direct investment. We select four specific payment items in "one belt and one road" by multiplying the ratio coefficient and transforming them. After that, we analyze the data from Jan, 2014 to Mar. 2015, set the objective weight and calculate the comprehensive F value. We can judge the important degree of the specific items respectively.

4.1 Fuzzy Comprehension Evaluation Model

4.1.1 Ideal Strategy

$$u = (u_1^0, u_2^0, u_3^0, ..., u^0)$$

$$u_1^0 = \begin{cases} \max\{a_{ij}\} & \text{if } a_{ij} \text{ is profitindex} \\ \min\{a_{ij}\} & \text{if } a_{ij} \text{ is cost index} \end{cases}$$

4.1.2 Establish Relative Different Fuzzy Matrix R:

$$\underset{\sim}{R} = \begin{pmatrix} r_{11} & r_{12} & \cdots & r_{1\,15} \\ r_{21} & r_{22} & \cdots & r_{2\,15} \\ \vdots & \vdots & & \vdots \\ r_{41} & r_{42} & \cdots & r_{4\,15} \end{pmatrix}$$

$$r_{ij} = \frac{|a_{ij} - u_i^0|}{\max\{a_{ij}\} - \min\{a_{ij}\}}..$$

4.1.3 According to Different Time Spot and Different Relative Different Fuzzy Matrix R, We Set the Weight Which Can Evaluate Indexes $\omega_i (i = 1,2,\cdots,5)$

We can know it as below by the variation coefficient

$$v_j = \frac{s_j}{\overline{x}_j}, \quad \omega_j = \frac{v_j}{\sum\limits_{j=1}^{15} v_j}$$

Set comprehensive evaluate model

$$F_i = \sum_{j=1}^{15} \omega_i r_{ij}$$

If $F_t < F_s$, the No.t strategy is better than the No.S.

4.2 The Rank of the Importance of Specific Items

4.2.1 Give Up Dimension

We cannot observe the internal logic and rules among these statistics because of the big difference in the absolute value. So we are supposed to give up dimension in all statistics and sum up every months' data. After that, dividing the consequence we get by the sum. Thus, the consequence becomes a relative value and much more reliable than before.

4.2.2 Importance Degree Ranking

We can get the matrix R, variation index V and the weight W by calculating the trade payment, service business, and external direct investment ranging from Dec. 2013 to Mar.2015. The consequence is in the Table 3 as below.

Table 3
F Values in Specific Items

Items	Service and else	External direct investment	Internal direct investment	Commodity trade
F value	0.55072973	0.541042846	0.495614797	0.459063557

We rank it according to the value of F, and service is the biggest and the external direct investment and internal direct investment are subsequent. It shows that in the "one belt and one road", service has the greatest impact on the RMB cross-border trade settlement, the next are external direct investment and internal direct investment.

Finally, the smallest impact comes from commodity trade. Although there exist the difference in ranking, the four F value are close. Therefore, when it comes to the influential degree, they have differences but not as much as we think.

CONCLUSION AND SUGGESTION

Combined with the prediction of the total RMB cross-border payments used the grey prediction model and the macro status analysis of the RMB in the "One Belt and One Road", The number of OBOR cross-border RMB payments will continue to rise steadily in the next year, which along with the development of Chinese constant attention and all kinds of financial services, including four big commercial Banks in the countries, the silk road fund, the establishment of Asian infrastructure construction bank, etc. For the coming year, the government should focus on broadening the OBOR mutual harmony communication channels, increasing RMB loans and foreign currency investment quota; We should continue to push the currency swap agreement from the national level, reach a consensus in RMB as a trade settlement, further improve and enlarge the construction of the offshore RMB market, improve the RMB backflow mechanism and promote the capital and financial items open.

For specific projects, the OBOR RMB trade settlement by the results of fuzzy comprehensive evaluation model, the service industry and other details get the highest value F among the four subsidiary projects. In the process of import and export trade, therefore, should focus on strengthening services using the RMB for trade, the government should develop some related reward policies, including increasing the share of RMB foreign services; For the second (foreign direct investment) and third (foreign direct investment) projects, it can be considered from two aspects, part one is from the angle of perspective of domestic companies to foreign investment, the government should encourage enterprises to increase the intensity of the RMB direct investment, perfecting the financing service, settlement service of form a complete set, simplify the review process and improving efficiency; Part two is considered the angle of the perspective of foreign investment, Chinese government is not only to support domestic enterprises to use RMB to invest in the foreign country , but also provide convenience for foreign companies using the RMB to foreign investment channels by taking some stimulus, such as the central bank to provide preferential policies of the currency exchange , the state-owned Banks reduce the investment loan interest rate threshold and so on. Only this way the RMB can run in circulation from country to country; As for trade in goods, the number four F value , also cannot ignore because of the small gap of the other three. The government should reward the import enterprises in OBOR area use RMB as the settlement currency, trying to keep the trade deficit, allowing the RMB to flow along

the country, Only this way can we truly make them hold RMB, accelerating the pace of RMB internationalization.

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