RESEARCH OF FACTORS AFFECTING THE CROSS-BORDER RMB INVESTMENT AND FINANCING

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Abstract

The operation of cross-border settlement with RMB was in full swing since 2011. the cross-border RMB investment and financing projects increased gradually, it is of practical and important significance for the internationalization of RMB. Based on the theoretical analysis of the factors that may influence the cross-border RMB investment and financing, and the existing literature, we choose the gross domestic product (GDP) and the RMB exchange rate as main variables, and make an empirical analysis of the cross-border RMB investment and financing with the PARCH model. The results show that the stability of RMB's value has a relatively large impact on the cross-border RMB investment and financing. And then, we recommend the relevant policies.

Keywords: Cross-border, investment and financing, settlement

Introduction

Cross-border investment and financing means capital flows globally. The cross-border RMB investment and financing can be divided into two categories, one is about institutions within the territory of China in the onshore yuan market raise funds and use the funds beyond China; another is the institutions within and beyond the territory of China raise funds of yuan in the offshore yuan market, and then use directly or will transfer the funds to use in the territory of China. That will lead to the expansion of the institutions' business scale; reduction of the cost of financing; and an increase in income of investment.

Research in China

Wang yong (2006) analyzed the path of cross-border flow of RMB and the following economic effects. Then, he suggested some policies about how to strengthen the management of cross-border RMB flowing.

Li Jing (2007) found that the cross-border flow of RMB brought obvious benefit to China and other neighboring countries since 2000, but the potential financial risk, which is serious, needs to be guarded against and dissolved in time.

Wang Yuanlong (2009) stated the goal, principle, content and approach about reforming of international financial system, which was suggested by the G20 leaders. He believed that the reform of the international financial system will lead to higher request to the internationalization of RMB and the establishment of the international financial center in China. So we need to find strategies to ensure the steady development of the two things.

Research institute in Tianjin University (2010) described the situation and existing defects of the development of the international financial system, and forecasted the trend of the development. Besides, they suggested some strategies for China's participating during the reform of the international financial system and the development of international financial centre in China, etc.

Zhang Jianjun (2010) said, the cross-border RMB investment can help the investment and capital circulation in China, and promote the balance of payments of China. Additionally, the cross-border RMB investment will improve the international competitiveness of Chinese enterprises, so as to create favorable conditions for making yuan convertible.

Hu Xiaolian(2010) analyzed and discussed the cross-border RMB trade financing, project financing, cases and business related to guarantee in detail.

Research group of headquarters of the people's bank of China in Shanghai (2011) argued the problems arise during the operations of cross-border RMB trade finance, which include unenlightened currency hedge tools, imperfect laws and regulations , and the lack of proper tools to mitigate risks, etc.

On the background of analyzing the theories of valuation and substitution of currency, Zhang Yuanjun(2011) constructs regression model about the RMB cross-border flows, and analyzed the factors that may have any effect on the RMB cross-border circulation between Russia and China.

Xu Mingqi (2011) makes a comment of all kinds of different views about changes in international financial system after the outbreak of the financial crisis, and discusses the possibility of the reform of international financial regulation, etc. Meanwhile, he points out that it is the best time to adjust the international financial system.

Li Jing (2011) points out that the further operation of the cross-border RMB trade settlement will meet challenges; further opening financial

markets and improving the RMB exchange rate formation mechanism are needed.

Liu Yuefei and Li Xiaolin (2011) proposed the main bottlenecks of RMB's "going out", in which the inadequate source of offshore yuan and narrow investment channels are included.

Chen Xinyan etc. (2012) estimate the offshore yuan stock by linear fitting out of the money demand function in the territory of China, and find that the stable long-run equilibrium relationship between that business of cross-border RMB settlement and the offshore saving stock of RMB.

With the dynamic stochastic general equilibrium model, research group in the Branch of the people's bank of China in Guangzhou (2012) analyzes the optimal path that the cross-border RMB investment and financing influences residents and enterprises' behavior. It turns out that the cross-border investment and financing has greatly improved the economic welfare.

Research in other countries

Research on cross-border investment and financing in foreign countries mainly focused on motivation and significance.

Vernon (1968) argues that the main reason that lead to the international currency cross-border investment and financing is developing of the overseas production market. But Milward (1968) thinks that the capital output's driving of product delivery is supposed to be the main reason. Mundell (1994) and Madison (2001) point out that the cross-border investment and financing with one kind of currency is the first step of internationalization of this currency.

Frankel (1958) research has shown that cross-border investment and financing is useful for obtaining strategic resources. Then, Floud (1994) and Madison (2001) propose that the cross-border investment and financing with one kind of currency is of great importance in improving the international status of this kind of currency. BEA (2008) and Nguyen (2008) point out that the cross-border investment and financing is helpful to obtain income of investment and seigniorage.

In addition, Harris' study (1991) of foreign direct investment from the view of overseas acquisitions has shown that there is more cross-border investment in labor-intensive industries.

Claudia (2007) analyzes the cross-border direct investment by using extensibility gravity model. He proposes that economic scale, the distance between countries, and whether the capital is in abundance are the main factors influencing the cross-border direct investment.

Kwok - Chiu Fung (2011) found that the main areas that the business of foreign direct investment concentrates are East Asia, Pacific, Latin

America, and Eastern Europe. They point out that coordination, as well as political and financial factors, is important factor that lead to the success of foreign direct investment.

IMF (2010) assesses the positions of foreign assets and liabilities in small financial centers, and puts forward effective pattern of bilateral cross-border investment.

Generally speaking, research on the cross-border RMB investment and financing, which is abroad is rarely involved in foreign countries, is relatively few in China. The existing literature analyzed the related theory about significance and the factors that may influence of cross-border investment and financing. But all the results are not systematized. At the same time, there is very little empirical research about the cross-border RMB investment and financing. This article will combine the present development of RMB with the related theory together, and build appropriate empirical model to analyze the main factors that may influence cross-border investment and financing. And the results will help to put forward some effective policies that will lead to the steady development of the cross-border investment and financing, which is of great importance in construction of Shanghai international financial center.

Analysis the factors that may influence cross-border investment and financing

Since 2008, the state council of China made a series of strategic deployment on promoting the cross-border RMB trade settlement. On April 8, 2009, meeting of the standing committee of the state council made formal decision, and Shanghai, Guangzhou, Shenzhen, Dongguan and Zhuhai were chosen as pilots to carry out the cross-border RMB trade settlement. In 2010 through the 12th five-year plan outline, which has been let through in2010, put forward clearly that, more using of cross-border RMB will lead to the convertibility of the RMB capital account step by step. And that is of great significance in the expansion of cross-border RMB investment and financing. With expansion of the cross-border RMB trade settlement in more and more cities, demand for the cross-border RMB financing rose, as well as the continuous development of cross-border RMB investment and financing, the gradually expanded scale, and more innovation in channels and methods of investment and financing. Currently, there are mainly four types of cross-border RMB investment and financing mode: (1) institutions outside China raise funds in the offshore market, and invest with the funds in China; (2) domestic institutions in China raise funds in China, and invest the funds to areas outside China; (3) domestic institutions in China raise funds in the offshore market, and invest with the funds outside China; (4) banks within

the territory of China finance in the territory of China, and support credit financing to the offshore market.

Usually, it is a long way for a currency to be one kind of international trade settlement currency. During the process, many factors will be closely related. For example, if the economy in the currency issuing country is powerful; if the financial market in the currency issuing country is mature enough; if the country's trade goods is competitive in the world market; if the country's share in world trade market is great; and so on. With all these conditions, the currency may be internationally recognized, and becoming an international trade settlement currency.

In addition, most countries would be used to one kind of cross-border settlement currency. That means, if a country has accepted one kind of currency as the cross-border settlement currency, then the country will not change the currency for a very long time. Except for some extreme cases, like the great change of the economy or the financial market in the currency issuing country, the country will not change the currency for settlement. And that helps to ensure the convenient between both parties in trade.

Therefore, this paper chooses China's gross domestic product and the RMB exchange rate as the main factors affecting the cross-border RMB investment and financing. The results will help to ensure the steady development of the cross-border RMB investment and financing, and to maintain the stable operation of China's economy, as well as the stability of the value of RMB.

Establishing the model

The aim of empirical research in this paper is to analyze major factors affecting the cross-border RMB investment and financing. It's only four years from the initialization to pilots until extending the business to the whole country. So the time series that need to be used in the empirical process may be have the problem of autocorrelation, and the conditional variances of the disturbance in the equation may depend on its previous value. In this case, ARCH model is a one of the good choices for empirical research. Another thing, in the capital market, there is a downward movement of the assets, which is usually accompanied by a moving up, which is stronger than their exercise level. And this is an important feature of many financial assets. In the face of such feature, Tayor (1986) and Schwert (1989) put forward the GARCH model based on the standard deviation. GARCH model is a kind of asymmetric ARCH model, what the model simulate is not variance but the standard deviation, the impact of a sharp shock on conditional variance is smaller with GARCH model than with the standard ARCH model. Based on this theory, Ding (1993) goes further with the GARCH model, and put forward the PARCH (Power ARCH) model. The

basic form of conditional variance equation in PARCH model can be expressed as follows:

$$\sigma_t^\delta = \omega + \sum_{j=1}^{q} \beta_j \sigma_{t-j}^\delta + \sum_{i=1}^{p} \alpha_i \left(|u_{t-i}| - \gamma_i u_{t-i} \right)^\delta \qquad (1)$$

Where $\delta > 0$, $|\gamma_i| \leq 1$ when $i = 1,2,...,r$, $\gamma_i = 0, r \leq p$ when $i > r_\circ$ In this equation, δ is a variable of the power, and it's standard deviation is not a set value, but to be estimated. δ is used to assess the degree of the impact that the shock influence the conditional variances. γ is used to capture the asymmetric effect from order 1 to order r of parameters. Assumptions and methods of PARCH model is appropriate for research of investment. Therefore, this article will use PARCH model for empirical analysis. Set total amount of the cross-border RMB investment and financing as RCI_t, China's gross domestic product as GDP_t, the RMB exchange rate as E_t.

Data Description

        In the empirical analysis of this paper, we have three variables, they are RCI_t (the cross-border RMB investment and financing), GDP_t (China's gross domestic product), E_t (RMB exchange rate). Since the business of cross-border RMB settlement started from April 2009 in some pilots, and was expanded to the whole country in 2011. Because of the possibility of acquiring the data with the same timeline, we select monthly data of each variable from July 2009 to December 2012.

        The sample we use in this paper is the total value of bonds settled with RMB in Hong Kong area. This sample does not describe all the cross-border RMB investment and financing, indeed. However, until now the business of the cross-border RMB investment and financing focus Hong Kong mainly, and total value of bonds settled with RMB is the most important part of the cross-border RMB investment and financing. Therefore, it does make scene to use total value of bonds settled with RMB in Hong Kong area as the substitute of total amount of the cross-border RMB investment and financing.

        The growth and slide of China's gross domestic product, which reflect macroeconomics situation in China, affect the expansion of RMB cross-border investment and financing to some extent. In order to ensure the validity of empirical research, we use the method of quadratic function to transit quarterly GDP data into monthly data.

        The RMB exchange rate is an important index reflecting the stability of the value of RMB. Usually, the price of the dollar is selected in the empirical research as the RMB exchange rate. However, in the study of the cross-border investment and financing, an integrated exchange rate which can be used for adjusting relative price levels in international trade between

China and some other countries. Therefore, we use real effective exchange rate index of RMB in the empirical analysis. This index, which includes 61 countries such as Japan, South Korea, Australia and the United States, can measure the value of the RMB more accurately.

Stationary tests

To ensure the validity of the regression results, we have to test the stationary of sample series first; the verification results are shown in Table 1. These results shows that the sample series selected are stationary series. As a result, the sample sequence can be used in the empirical analysis.

Table1   Results of the stationary test

Variable	t-Statistic	Prob.*	10% level
$\ln(RCI_t)$	-2.80720	0.07	-2.61743
$\ln GDP_t$	-6.18376	0.00	-2.61743
$d\ln(E_t)$	-4.30486	0.00	-2.61743

Linear regression

Before the empirical analysis with the PARCH model, we need to set up a linear equation and do the regression analysis. Since the amount of RMB cross-border investment and financing and China's gross domestic product are measured in RMB, and the real effective exchange rate index is a kind of index, we consult the gravity model of Claudia (2007), and set linear equation set as follows:

$$\ln(RCI_t) = c + \ln(GDP_t) + d\ln(E_t) \qquad (2)$$

$\ln(RCI_t)$ refers to logarithms of RCI_t, $\ln(GDP_t)$ refers to logarithms of GDP_t, $d\ln(E_t)$ refers to difference of logarithms of E_t, t presents each monthly period, t=1,2,3, … . The linear regression results are shown in Table 2.

Table 2 Results of linear equation regression

Variable	Estimated value	Standard Error	t-Statistic	Prob.*
C	-11.7889877	3.556254649	-3.315000995	0.001988
$\ln GDP_t$	3.056742903	0.778708524	3.925400593	0.000342
$d\ln(E_t)$	16.33930841	15.2592837	1.070778205	0.290851
R^2	0.335101167			
F-Statistic	9.827769919			
Prob.*	0.000349731			

From the results we can see that, the estimated value of coefficient of $\ln GDP_t$ and C parameter estimates have passed the inspection under the 1% significant level. In addition, the value of R^2 is 0.33, and the P value of the equation is 0.00, this indicates that regression results of the equation are good. Next, we need to find if a conditional heteroscedasticity, which is named as ARCH effect, exists in the residuals of the regression equation.

Test of ARCH effect

Because of the flag effect that the impact of macroeconomic indicators for the cross-border RMB investment and financing, we choose first order delay to test the ARCH effect in the regression equation, the results are shown in Table 3, which tells the significant ARCH effect in the residuals of the regression equation.

Table 3 regression equation of the ARCH effect test results

F-Statistic	18.3293863	Prob.*	0.000117051
R^2	13.10854497	Prob.*	0.000293952

PARCH model to estimate

In order to eliminate the conditional heteroscedasticity, we use PARCH model to estimate the regression equation again, the results are shown in Table 4.

Table 4 Estimation results in PARCH model

	Estimated value	Standard Error	Z-Statistic	Prob.*
C	-11.72307	2.886015	-4.062028	0.0000
$\ln GDP_t$	3.061770	0.627902	4.876193	0.0000
$d\ln(E_t)$	6.237981	11.62344	0.536673	0.5915
	Variance Equation			
C(4)	0.163495	0.216077	0.756649	0.4493
C(5)	0.251335	1.234003	0.203675	0.8386
C(6)	0.889712	4.616047	0.192743	0.8472
C(7)	-0.735697	0.318635	-2.308901	0.0209
C(8)	2.039574	1.239634	1.645303	0.0999
R-squared	0.299295	Mean dependent var		2.182755
Adjusted R-squared	0.155032	S.D. dependent var		0.509431
S.E. of regression	0.468279	Akaike info criterion		1.167552
Sum squared resid	7.455711	Schwarz criterion		1.498537
Log likelihood	-16.51860	F-statistic		2.074653
Durbin-Watson stat	0.319185	Prob(F-statistic)		0.073651

From Table 4, under 1% significance level, estimates of the constant term and $\ln GDP_t$ have passed the inspection. P value of F-statistic of the

Equation is 0.07, which suggests that the overall fitting of the equation is good.

From the point of the size of the regression coefficient, the estimated value of coefficient of China's gross domestic product is smaller than that of the RMB real effective exchange rate index. Gross domestic product (GDP) presents the macroeconomic situation of the whole country, and the real effective exchange rate index of RMB measures the stability of the value of yuan, so the size of the regression parameters show that the effect of macro economy on the cross-border RMB investment and financing is smaller than that of the stability of RMB's value.

Test the ARCH effect again

Despite of the logic results of estimation of the regression equation under PARCH model, we still need to analysis the regression equation and find if there is ARCH effect of residual error under PARCH model again. Results are shown in Table 5.

Table 5 New results of ARCH effect test

F-Statistic	0.557790	Prob.*	0.459631
R^2	0.578126	Prob.*	0.447048

Under the PARCH model, the F value of the regression equation and R^2 value are 0.56 and 0.56, the corresponding P value is more than 0.44, which indicates that the residual sequence of the regression equation accept the hypothesis and there is no ARCH effect.

In general, the results of empirical analysis, which is close to the theory, shows the rationality of empirical model set in this paper for the cross-border RMB settlement of financing and investment. But the factor, which may have some effect of the cross-border investment and financing, includes the macro economy situation as a whole, the stability of the value of RMB, and investment confidence of entrepreneurs, etc. Due to the data and the unity of the frequency, we take some related factors in this paper. Additionally, it's only a few years time for the business of the cross-border investment and financing, the related empirical research started only for a short while. Therefore, for the related research of the cross-border RMB investment and financing, there is still a long way.

Conclusion

The business of the cross-border RMB investment and financing is an important step to the internationalization of the RMB.

First of all, the business of cross-border RMB investment and financing is the necessary strategic measure to improve the international status of RMB, and the objective requirement for the cross-border RMB

trade settlement. Additionally, the business of cross-border RMB investment and financing is also an urgently need for reducing the risk of currency mismatch in foreign assets and liabilities.

Secondly, a trend of diversification among countries of the international current reserve is forming currently, the amount of cash flow in foreign-related enterprises in China is rising, and the onshore and offshore market pattern of RMB has been forming gradually, have created a nice macro environment for expansion of the business related to the cross-border RMB investment and financing in China and abroad.

Thirdly, in order to achieve sustainable development of the cross-border RMB investment and financing to, we have to ensure the profitability, safety and liquidity of the cross-border RMB investment, and reducing the cost of cross-border RMB financing, which is of the most importance. Business of the cross-border RMB investment and financing mainly depends on Chinese multinational enterprises and Chinese financial institutions.

According to our theoretical and empirical results, we have suggestions for the expansion of Business of the cross-border RMB investment and financing as follows: bonds and other financial instruments issued by Chinese multinational enterprises in the offshore market should be supported; establishing overseas financial company by Chinese multinational companies should be allowed; establishing accounts of RMB by domestic banks as members of Chinese multinational enterprises overseas should be allowed. All these strategies will help to carry out various business of the cross-border RMB trade settlement gradually.

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