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OFFSHORE RENMINBI TRADING: FINDINGS FROM THE 2013 BIS TRIENNIAL CENTRAL BANK SURVEY

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Abstract

Using foreign exchange transaction data reported in the Triennial Central Bank Survey by the Bank for International Settlements, we find that offshore renminbi (RMB) trading activity is affected by both the host economy's characteristics and its link with China. For instance, the occurrence of offshore RMB trading is determined by the economy's GDP, stage of financial development and free trade agreement with China. When an economy hosts offshore RMB trading, the trading volume is affected by the size of its foreign exchange market, equity market capitalisation, as well as the bilateral link with China through foreign direct investment flows.

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1. Introduction

Since the launch of economic reform in 1978, China has been consciously revamping its economic structure to promote growth and integrating into the global economy. The accomplishment is quite astonishing. In about three decades, China has transited from a closed economy afflicted by inefficiencies to the largest trading nation and, by some measures, the largest economy in the world. The status of China's currency, the renminbi (RMB), however, is not commensurate with the country's global economic prowess.

As part of its financial liberalisation strategy, China has strengthened its efforts to promote the use of its currency overseas. Similar to its other reform measures, China has taken a gradual approach in seeking the RMB's global status. In preparing for using its currency overseas, China in 2003 assigned in Hong Kong the first RMB clearing bank outside Mainland China, and started the offshore RMB business there.[1]

In the midst of Global Financial Crisis, China broadened its policies encouraging the use of its currency for cross-border transactions. Various measures, including the scheme of cross-border trade settlement in RMB, the bilateral local currency swap arrangement, the development of the Dim Sum bond market, and the RMB qualified foreign institutional investor scheme, have been quite effective in introducing the RMB to the global financial market. Indeed, according to the data provided by SWIFT, the Society for Worldwide Interbank Financial Telecommunication, the global use of the RMB has surged in the past few years. The ranking of the RMB in the league of world payments currency by value advanced from being the 17th most commonly used currency by the end of 2011 to the top five currency in November 2014 (SWIFT, 2012, 2016). Since then, the RMB has generally retained the rank of fifth most commonly used currency.

Anecdotal evidence suggests that offshore RMB markets can play an important role in advancing the currency's global status. The US dollar is a case in point; the extensive network of markets for offshore dollar transactions underpins the prominence of the dollar in the global monetary system. Hong Kong,

[1] Despite Hong Kong being politically part of China, its economy is segregated from Mainland China and is a *de facto* offshore market for RMB transactions.

which benefited from its unique relationship with China, has enjoyed first mover advantage in developing its offshore RMB businesses. The potential of the nascent offshore business has not been ignored by other financial centres, which are eager to compete for a piece of action (Strauss, 2014 and Romann, 2015). At the same time, it is of China's interest to set up a global offshore RMB network to facilitate the global uses of the RMB.

Despite China's clear intention of seeking the RMB's global status, it has not given up capital controls and has maintained a tight grip on its currency. To a large extent, China has closely monitored and managed the scale and scope of offshore RMB activities and China's policy plays a significant role in nurturing the use of the RMB overseas.

Against this background, we study factors that affect offshore RMB trading activity. Since China actively implemented policies to promote cross-border uses of the RMB, there are studies on, say, the prospects and implications of a globalised RMB, and the interactions between onshore and offshore RMB exchange rates. The focus of this exercise is on what contributes to the activity of offshore RMB trading, which is related to offshore RMB business opportunities.

We anticipate there are both pull and push factors that include economic attributes of the host economy and China's preferences that affect the development of an offshore RMB centre. Our exercise will shed some insights into factors that are relevant for policy-making on developing an offshore RMB centre and to attract RMB business to the centre.

For instance, some economic attributes of an economy can influence offshore RMB trading activity in its financial centre. The economic attributes considered in this study are the size of GDP, real GDP growth rate, the turnover of the foreign exchange market, the equity market capitalisation, the size of the international bond market and the stage of financial development captured by the Financial Development Index (2012).

Moreover, it is anticipated some economic and political links with China, specifically the size of the bilateral local currency swap arrangement, the bilateral trade and bilateral foreign direct investment

(FDI) with China, the presence/absence of a free trade agreement and a political partnership agreement with China, can affect offshore RMB trading activity at the 52 financial centres.

In general, there is a paucity of data on offshore RMB trading that is typically conducted in over-the-counter markets. Our empirical exercise draws upon relevant data from the 2013 Bank for International Settlements (BIS) Triennial Central Bank Survey. It is arguably the most comprehensive source of information on global foreign exchange trading (Bank for International Settlements, 2013). In the next section, we offer a brief discussion of offshore RMB markets and describe the BIS data. We also present the results based on the Tobit qualitative response specification, and the Heckman two-step procedure, which separately considers the presence and volume of offshore RMB trading. Some concluding remarks are provided in Section 3.

2. Offshore RMB

2.1 The Nascent Offshore RMB Network

Hong Kong, given its well-developed financial sector and unique political link with China, was chosen as a testing ground of offshore RMB businesses. Although Hong Kong is legally an integral part of China, there are specific rules and procedures instituted to segregate the two economies and, in particular, regulate RMB movements between their borders.

By February 2004, selected financial institutions in Hong Kong were allowed to conduct a defined set of RMB businesses. After the 2007-8 global financial crisis, China has gradually broadened and deepened the offshore RMB activity. In July 2010, the trading of spot and forward RMB and RMB-linked structural products in Hong Kong was officially endorsed (Hong Kong Monetary Authority, 2010). Because the RMB traded in Hong Kong (or later overseas in general) is not subject to China's capital control rules and regulations, market practitioners labelled it the CNH rather than the usual RMB's trading symbol CNY. Nonetheless, CNY remains the only official ISO currency code used internationally (SWIFT, 2011).

Since then, various policies and RMB-denominated investment products that promote global uses of the RMB have been introduced. Financial centres around the world have recognised the growth potential of transactions in RMB, and have made efforts in attracting offshore RMB businesses. Offshore RMB trading is quickly spreading to different parts of the global financial market.

The RMB is not fully convertible and is subject to effective capital controls.[2] China's endorsement is crucial for financial centres overseas to set up the infrastructure and to acquire the liquidity for their offshore RMB businesses. At the same time, to promote the RMB's global status and acceptance, China is strategically building a network of offshore RMB centres across different geographic locations and time zones.[3] By 2015, China had assigned an offshore RMB clearing bank in about 20 offshore RMB centres, listed in Appendix I.[4]

2.2 The BIS Data on Offshore RMB Trading

The Triennial Central Bank Survey conducted by the Bank for International Settlements provides extensive information on the size and structure of global foreign exchange and OTC derivatives markets. BIS started the survey program in the 1980s and, since then, has expanded and enhanced the country and data coverage from survey to survey. In its 2013 survey, BIS revamped its coverage of emerging market currencies, including the RMB.

Central banks and other authorities in the 53 jurisdictions participated in the 2013 triennial survey, which took place in April 2013. For convenience, we use the terms "jurisdiction" and "financial centre" interchangeably, without any legal implications. The survey shows that, driven by the expansion of its trading offshore, the RMB is the ninth most actively traded currency and is among the emerging market currencies experiencing significant increases in their trading volumes. Specifically, the average RMB daily forex turnover in the global market surged from US$29.2 billion, that can be underestimated, in 2010 to US$119.6 billion in 2013 (Bank for International Settlements, 2013).

[2] See, for example, Ma and McCauley (2008) and Cheung, Steinkamp and Westermann (2016).

[3] This strategical consideration is well recognised in the study and two proxy variables, namely time zone and distance from Beijing, have been explored in empirical investigation. However, these two variables are insignificant and, for brevity, they are not reported in the empirical results in this paper.

[4] The bilateral local currency swap arrangement and the RMB qualified foreign institutional investor scheme are considered as two other important symbolic endorsements of an offshore RMB market.

Excluding China, which has a domestic RMB market, the remaining 52 jurisdictions display a dispersed pattern of offshore RMB trading. Of these 52 jurisdictions, 17 reported zero RMB trading activity or did not provide the information.[5] After going through the raw data, we interpreted that the RMB trading of this group of 17 jurisdictions, which represent almost one-third of financial centres in the survey, is practically very close to zero and, thus, treated them as so in the following empirical analyses. In general, the offshore RMB trading is left-skewed with a few jurisdictions, for example, Hong Kong, London, and Singapore on the right tail of the distribution. The skewed distribution shows offshore RMB businesses are at their early stage of development, which tends to be dominated by first movers.

The surge in offshore RMB activity has generated interest in tracking the development of the nascent offshore RMB market, the policies that will promote and attract offshore RMB businesses, the prospects and implications of offshore RMB markets and the interactions between onshore and offshore RMB exchange rates.[6] Empirical analyses on factors that contribute to the presence and activity of offshore RMB trading, however, are limited. In the following subsections, we present some empirical evidence on these factors based on the data from the 2013 Bank for International Settlements Triennial Survey.

2.3 A Qualitative Response Approach

Offshore RMB activity has registered significant growth since the inception of the CNH market in Hong Kong. The diffusion of RMB trading across geographical locations to some extent is constrained by, for example, the time it requires to build up the liquidity pool, and set up the necessary infrastructure at the market level and in corporations. As noted in the previous subsection, there are financial centres that did not report their offshore RMB trading data in the 2013 Bank for International Settlements Survey. We treat these as censored observations and, thus, study the offshore RMB trading using the following

[5] The entries of these 17 jurisdictions are either "0", which means a value close to zero or "…", which implies either a nil value, not reported, not shown for reasons of confidentiality, not meaningful, or not applicable.

[6] A sample of these studies include Batten and Szilagyi (2013), Chan (2016), Chen and Peng (2010), Cheung (2015), Cheung and Rime (2014), Li, Hui and Chung (2012), Ding, Tse and Williams (2014), Eichengreen (2013), Eichengreen and Kawai (2015), Frankel (2012), Funke, Shu, Cheng and Eraslan (2015), Hong Kong Monetary Authority (2016), and Zhao, *et al*. (2013).

specifications[7]

$$ORT_i^* = \alpha_0 + \alpha_1 X_{1,i} + u_i, \quad (1a)$$

and

$$ORT_i^* = \alpha_0 + \alpha_1 X_{1,i} + \alpha_2 X_{2,i} + u_i; \quad (1b)$$

for i = 1, …, N. where ORT_i^* is the theoretical latent variable of the offshore RMB trading volume which is censored from below at zero, $X_{1,i}$ and $X_{2,i}$ are vectors containing two groups of explanatory variables, and N is the number of jurisdictions in the sample. The estimation is carried out under the standard Type I extreme-value distribution assumption.[8]

The observed offshore RMB trading variable ORT_i, used in the following exercise, is defined by $ORT_i = ORT_i^*$, if $ORT_i^* > 0$, and $ORT_i = 0$ if ORT_i^* is censored. The data is drawn from the 2013 Bank for International Settlements Survey. To facilitate comparison across financial centres of different sizes, the trading volume data is normalised by the gross domestic product (GDP) of the economy in which the financial centre is located.

The vector $X_{1,i}$ includes variables that represent the economic attributes of the economy in which the financial centre i is located. The variables considered are the size of GDP, real GDP growth rate, the turnover of the foreign exchange market, the equity market capitalisation, the size of the international bond market, and the stage of financial development captured by the Financial Development Index (2012) compiled by World Economic Forum. The sizes of the foreign exchange market, equity market and international bond markets are normalised by the respective economy's GDP. In essence, these variables are meant to capture the economic strengthen and the financial sector status of a potential host centre. Definitions of this data and that used in the rest of the exercise are given in the Appendix III.

The vector $X_{2,i}$ comprises variables that quantify links with China. The variables include the size of the bilateral local currency swap arrangement that provides a liquidity backstop to the offshore market, the

[7] The list of financial centres with non-censored and censored RMB trading data is shown at Appendix II.

[8] The Type I extreme-value distribution function, also known as the log Weibull distribution function, is given by F(w) = exp[-exp(-w)].

bilateral trade with China normalized by the host's total trade, bilateral FDI flows with China normalised by the host's total FDI flow, the presence/absence of a free trade agreement with China, and the political partnership agreement with China. In addition to trade and direct investment interactions, it is expected that the currency swap arrangement, which has direct implications for offshore market activity and political-related institutional arrangements like free trade and political partnership agreements factors, can affect China's attitude towards the establishment of an overseas RMB trading centre.

In passing, we noted that we explored the roles of other factors, including the assignment of a local offshore RMB clearing facility, the time sequence of the signing of bilateral swap arrangements, the legal system of the financial centre, time zone and the geographic distance from China (Beijing to be specific). We do not discuss them here for brevity as they did not display significant effects in preliminary analyses.

The effects of economic attributes described by (1a) are presented in Table 1. Individually, the two GDP-related variables are statistically insignificant. Of the three variables related to financial markets, the sizes of the foreign exchange market and the equity market, but not that of the international bond market, tend to have a positive implication for hosting offshore RMB trading (Columns 3 and 4). Also, the negative estimate of the financial development index coefficient indicates that an established financial sector in general is associated with a high level of offshore RMB trading (Column 6).[9] These significant results are largely in line with expectations.

The last column in the Table (Column P) gives the parsimonious representation that includes only the statistically significant economic attributes when (1a) is estimated. The parsimonious representation includes three statistically significant variables; namely the GDP growth rate, the foreign exchange market, and the equity market. In the presence of other variables, the GDP growth rate is statistically significant but with a negative coefficient estimate. There is no obvious reason why an economy with a low growth rate will conduct a high level of offshore RMB trading. One possibility is that the estimate is driven by the artefact that the GDP growth rate is negatively correlated with GDP, which is used to

[9] The larger the financial development index, the less developed the financial sector.

normalise offshore RMB trading. The Financial Development Index, on the other hand, becomes insignificant in the presence of other variables in the parsimonious regression. Possibly, the information embedded in the index that is relevant for offshoring RMB trading is captured by the foreign exchange and equity market variables. The three significant variables yield a pseudo R-squares estimate of 0.417, accounting for about 40% of the total variation.

To what extent do links with China contribute to offshore RMB trading? The results of estimating (1b) are presented in Table 2. Individually, only one of the five relationship variables in $X_{2,i}$ is statistically significant (Columns 1 to 5). The bilateral FDI flow enhances offshore RMB trading (Column 3). The role of FDI flow is affirmed by the parsimonious specification presented under Column P. Controlling for the GDP growth rate, the foreign exchange market, and the equity market, the offshore RMB trading is mainly affected by FDI interactions.

Given China's well-advertised scheme of cross-border trade settlement in RMB, it is a bit unexpected to find the bilateral trade variable is insignificant. One possible cause is that the bilateral trade variable has a rather high degree of co-movement with bilateral FDI flow (correlation coefficient of 0.75). The insignificant estimate suggests that the information relevant for explaining offshore RMB trade is well captured by the FDI variable.

The estimated pseudo R-squares estimates in Tables 1 and 2 suggest that the marginal explanatory power of the FDI variable is not too large. For the parsimonious specifications, the marginal explanatory power of the FDI variable is 0.046 out of 0.463 (Column Ps, Tables 1 and 2).

2.4 The Presence and the Trading Volume

The findings in the previous subsection affirm that offshore RMB trading is determined by both the host market's characteristics and its relationship with China. While most of the results are intuitive, they are subject to an implicit assumption that the identified factors have same effects (sign and magnitude) on the presence and the level of offshore RMB trading. To shed further insight, we consider the presence and the volume of offshore RMB trading as two separate events. Specifically, we investigate whether

the presence and the offshore RMB trading volume are affected by similar factors with similar intensities.

For the occurrence issue, we consider the following specifications:

$$BORT_i = \alpha_0 + \alpha_1 X_{1,i} + u_i, \quad (2a)$$

and

$$BORT_i = \alpha_0 + \alpha_1 X_{1,i} + \alpha_2 X_{2,i} + u_i; \quad (2b)$$

for *i* = 1, …, *N*. The binary qualitative response variable $BORT_i$ assumes the value of 1 when the latent counterpart ORT_i^* is not censored, and the value of 0 when censored.

To study the determinants of the level of offshore RMB trading, we use the following regressions:

$$ORT_i^* = \alpha_0 + \alpha_1 X_{1,i} + \rho Mills_i + u_i, \quad (3a)$$

and

$$ORT_i^* = \alpha_0 + \alpha_1 X_{1,i} + \alpha_2 X_{2,i} + \rho Mills_i + u_i; \quad (3b)$$

for *i* = 1, …, N_1, in which only N_1 non-censored ORT_i^*'s are included. $Mills_{it}$ is the inverse Mills ratio derived from (2a or 2b) and is included to control for potential biases arising from excluding censored data. If $\rho Mills_i$ is zero, then the effects of $X_{1,i}$ and $X_{2,i}$ on the offshore RMB trading volume do not depend on corresponding results from estimating (2a) and (2b). Technically speaking, equations (2a, b) and (3a, b) constitute the so-called Heckman two-stage estimation procedure.[10]

2.4.1 Presence

Table 3 presents the results of estimating (2a). The size of the economy (log GDP) is significant by itself and in the parsimonious representation (Columns 1 and P). The variables on financial market conditions appear to contain overlapping information about the presence of offshore RMB trading. While the equity market, international bond market and financial development index factors are each individually significant, only the financial development index is statistically significant when all these variables are included in the same regression. The parsimonious specification (Column P) that has two

[10] See Heckman (1979). The inverse Mills ratio in (3a, b) is given by the ratio of the probability density function over the cumulative distribution function estimated from the corresponding (2a, b), which includes both censored and non-censored RMB trading activity variables. Intuitively, the ratio captures the effect of truncating the sample and is included to control for selection biases in the second stage regression, which uses only observations associated with non-censored observations.

significant variables, the size of the economy and the stage of financial development captured by the financial development index, describes the data quite well and yields a decent goodness of fit measure of pseudo R-squares of 0.599.

Both the economy size and financial development index variables retain their statistical significance in the presence of the relationship variables in $X_{2,i}$ (Table 4). The existence of a free trade agreement is the only link with China that has an implication for the presence of offshore RMB trading. The free trade agreement variable exhibits a significant positive effect under both Columns 4 and P. Again, the increase in the pseudo R-squares estimate from 0.599 to 0.678 (Column Ps, Tables 3 and 4) suggests that the marginal explanatory power of the significant relationship variable is not large.

In summary, the take-off of offshore RMB trading is affected by the host country's economic size and stage of financial development, and its free trade agreement with China.

2.4.2 The Volume

Conceivably, once a host country has started its offshore RMB trading, the business scale will be affected by the size of its foreign exchange market, its cross-border transactions with China, and the policy support received. Table 5 presents the effects of the host's economic characteristics on the volume of offshore RMB trading as described by (3a).

While the two GDP-related variables display different effects, individually, the log GDP variable is significant while the GDP growth is not (columns 1 and 2). However, the opposite is true under the parsimonious specification (column P). For the three financial markets, the international bond market is insignificant while the foreign exchange and equity markets are significant. Individually, the equity market variable yields a large adjusted R-square estimate of 0.84. The financial development index gives coefficient estimates of different signs under columns 6 and P. The estimate of the index variable has an unexpected sign in the presence of other financial market variables, which is a phenomenon that can be caused by the positive correlations between the index and the two other financial market variables.

Among the host market characteristics, the parsimonious specification identifies four of the six variables in $X_{1,i}$ as significant determinants, and these four variables together explain almost 90% of variations in the offshore RMB trading volume. Nevertheless, two significant factors, namely the GDP growth rate and the financial development index, have a negative sign and a positive sign respectively, that is counter-intuitive. We speculate that the unexpected signs are results of correlations among these explanatory variables and the small sample size used in regression.

The results of estimating (3b) are presented in Table 6. Similar to the results in Table 2, the FDI variable is the only relationship variable that is significant when it is added individually to the regression and in the parsimonious representation (columns 3 and P). The other relationship variables do not add marginal explanatory power for the volume of offshore RMB trading. The host country characteristics included in the parsimonious representation in Table 5 remain statistically significant in Table 6. Relatively speaking, the host country characteristics contribute more to the explanatory power than the relationship variables. The inclusion of the FDI variable increases the adjusted R-square estimate marginally; from 0.896 to 0.919 (Tables 5 and 6, columns P).

In passing, we note that the Mills ratio ($Mills_i$) is statistically significant under the parsimonious representation in Table 5 but not in Table 6. If the insignificance is not caused by insufficient information in the small sample, then the estimation of 3(b) is not affected by the selection process given by (2b).

2.4.3 Discussions

By sequentially analysing the presence of offshore RMB trading and, conditional on its presence, the trading volume, the Heckman two-stage framework adopted in the previous subsection allows different factors to play different roles in these two stages of the event. The flexibility allows a sharp inference of interactions between variables. The results in the previous section attest to the possibility that the presence of offshore RMB trading and its trading volume can be driven by different factors. For instance, the presence is mainly driven by the size of the host economy, the stage of financial sector

development, and the presence of a free trade agreement, while the trading volume is affected by the host economy's growth rate, foreign exchange market size, equity market capitalisation and its FDI flows with China.

How do the results from the single stage and Heckman two-stage analyses compare? The parsimonious specifications in Tables 2, 4, and 6 in general give comparable but not identical determinants of offshore RMB trading. The noticeable differences are a) the factors that determine the presence of offshore trading reported in Table 4, and b) the financial development index that is found to affect the trading volume in Table 6 do not show up in the parsimonious representation in Table 2.

Possibly, the single-stage analysis is too grainy to separate out information contents that have implications for setting up offshore RMB trading but not for the trading volume. Nevertheless, the coefficient estimates of the parsimonious representation in Table 6, with the exception of the financial development index variable, are quite similar to the corresponding ones in Table 2. In that sense, the single-stage approach based on the Tobit analysis offers a quick and handy way to identify some basic features of offshore RMB trading behaviour.

3. Concluding Remarks

In a little more than a few years after the 2008-09 Global Financial Crisis, the process of RMB internationalization has proceeded further with policy support from the Mainland monetary authorities, including the RMB cross-border trade settlement scheme, the liberalisation of the domestic bond market and the establishment of offshore RMB trading centres. This paper uses the information from the 2013 BIS Survey to study factors that affect offshore RMB trading activity.

The empirical results derived from the Tobit qualitative framework show RMB trading activity is affected by both the host market's characteristics and its relationship with China. Specifically, the size of the foreign exchange market, the equity market capitalisation, the real GDP growth rate, and the bilateral FDI flows with China are found to be statistically significant factors.

Further analyses show that the chance of an economy to host an offshore RMB market is affected by the size of the economy given by GDP, the stage of financial development, and the presence of a free trade agreement with China. In the presence of an offshore RMB trading centre, the trading volume is found to be affected by the size of the foreign exchange market, equity market capitalisation, as well as the bilateral link with China through the FDI flow channel.

In general, our findings are in accordance with the belief that offshore RMB activity is affected by both pull and push factors, and these factors can play different roles in the take-off of offshore RMB trading and in trading intensity.

China's reform efforts are progressing unevenly across sectors and time. However, it is not unreasonable to anticipate that China will continue its financial liberalisation program and its policy of strengthening the RMB's global status. The role of market forces in determining the demand and supply for RMB and RMB-denominated assets overseas is likely to increase over time. However, until China is comfortable with handing over to market forces, China's policy, and the related capital control measures, will play non-negligible roles in shaping the scale and scope of offshore RMB activity. Despite the underlying policy-driven nature, a global RMB has substantial implications for the global economy and the international monetary architecture. Further analyses of the dynamic development of the offshore RMB network are warranted.

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Appendix

I: List of Local Offshore RMB Clearing Banks

Offshore RMB centre	Authorized in	Authorized Bank
Hong Kong, China	December, 2003	Bank of China, Hong Kong
Macau, China	August, 2004	Bank of China
Chinese Taipei	February, 2013	Bank of China
Singapore	May, 2013	Industrial and Commercial Bank of China
London, UK	June 18, 2014	China Construction Bank
Frankfurt, Germany	June 18, 2014	Bank of China
Seoul, South Korea	July, 2014	Bank of Communications
Paris, France	September, 2014	Bank of China
Luxembourg	September, 2014	Industrial and Commercial Bank of China
Doha, Qatar	November, 2014	Industrial and Commercial Bank of China
Toronto, Canada	November, 2014	Industrial and Commercial Bank of China
Sydney, Australia	November, 2014	Bank of China
Bangkok, Thailand	January , 2015	Industrial and Commercial Bank of China
Kuala Lumpur, Malaysia	January , 2015	Bank of China
Santiago, Chile	May, 2015	China Construction Bank
Budapest, Hungary	June, 2015	Bank of China
Johannesburg, South Africa	July, 2015	Bank of China
Buenos Aires, Argentina	September, 2015	Industrial and Commercial Bank of China
Zurich, Switzerland	January, 2016	China Construction Bank

II: Financial Jurisdictions included in the Empirical Analysis

a. With non-censored RMB activity data:

Australia, Austria, Belgium, Brazil, Canada, Chile, Chinese Taipei, Denmark, Finland, France, Germany, Hong Kong SAR, India, Indonesia, Ireland, Italy, Japan, Korea, Luxembourg, Malaysia, Netherlands, Norway, Philippines, Portugal, Russia, Saudi Arabia, Singapore, South Africa, Spain, Sweden, Switzerland, Thailand, Turkey, United Kingdom, United States.

b. With censored RMB activity data:[11]

Argentina, Bahrain, Bulgaria, Colombia, Czech Republic, Estonia, Greece, Hungary, Israel, Latvia, Lithuania, Mexico, New Zealand, Peru, Poland, Romania, Slovakia.

[11] Censored data means data with values close to zero, reported to be nil, not reported, not shown for reasons of confidentiality, not meaningful, or not applicable.

III: Definition of Variables

RMB Trade Activity	The daily average of RMB transactions in the jurisdiction reported in the 2013 BIS Triennial Survey and normalized by GDP
Log GDP	The nominal GDP of the jurisdiction in 2013 in log scale
Real GDP growth	The real GDP growth of the jurisdiction in 2013
Forex Exchange market	The daily average trading volume of the financial centre of all foreign currencies in US$ bn as % of the jurisdiction's GDP in the 2013 BIS survey
Equity market capitalization	The total of capitalization of the largest equity market of the jurisdiction in US$ bn as % of jurisdiction's GDP in 2013
Size of international bond market	The total size of the foreign bond market in the jurisdiction in US$ bn as % of the jurisdiction's GDP in 2013
Financial Development Index	The Financial Development Index in the Financial Development Report 2012, World Economic Forum. The index is in a descending order, i.e. rank no. 1 means most developed
Size of swap line with China	The size of the bilateral RMB swap line (in RMB bn) with the People's Bank of China as % of the jurisdiction's total trade with China
Bilateral trade with China	Sum of the imports from and exports to China in 2013 as % of the jurisdiction's total trade
Bilateral FDI with China	Sum of the foreign direct investment flows to and from China in 2013 as % of the jurisdiction's total FDI flows
Free trade agreement	A binary variable for bilateral free trade agreement between the jurisdiction and China in or before 2013 as a binary variable
Political partnership	A binary variable if there is a political partnership agreement between the jurisdiction and China in or before 2013 as a binary variable

Table 1: Offshore RMB Trading - Tobit Model I

	1	2	3	4	5	6	P
Constant	-3.75	-0.10	-1.04***	-1.53***	-0.45	3.08***	-1.29***
Log GDP	0.54						
GDP Growth Rate		-0.11					-0.13*
Foreign Exchange Market			0.08***				0.02***
Equity Market Capitalization				0.02***			0.01***
International bond market cap.					0.002		
Financial Development Index						-0.13***	
Pseudo R^2	0.009	0.001	0.127	0.361	0.002	0.090	0.417

Note: Results of estimating (1a) are presented. See the text and Appendix III for variable definitions. The significance at the 1%, 5%, and 10% levels are indicated by "***", "**", and "*".

Table 2: Offshore RMB Trading - Tobit Model II

	1	2	3	4	5	P
Constant	-1.33***	-1.47***	-0.78***	-1.31***	-1.47***	-0.78***
GDP Growth Rate	-0.16*	-0.19**	-0.14**	-0.22***	-0.13	-0.14**
Foreign Exchange Market	0.02**	0.02***	0.03***	0.02***	0.02***	0.03***
Equity Market Capitalization	0.02***	0.01***	0.01**	0.01***	0.01***	0.01**
Swap Size	0.02					
Bilateral Trade		0.05				
Bilateral FDI			0.12***			0.12***
Free Trade Agreement				0.64		
Political Partnership					0.27	
Pseudo R^2	0.424	0.429	0.463	0.449	0.420	0.463

Note: Results of estimating (1b) are presented. See the text and Appendix III for variable definitions. The significance at the 1%, 5%, and 10% levels are indicated by "***", "**", and "*".

Table 3: The Presence of Offshore RMB Trading Activity - Result I

	1	2	3	4	5	6	P
Constant	-4.47***	-0.58***	0.24	-0.79*	0.01	2.96***	-1.93
Log GDP	0.84***						0.90***
GDP Growth Rate		-0.06					
Foreign Exchange Market			0.03				
Equity Market Capitalization				0.02***			
Int'l Bond Market Cap.					0.02*		
Financial Develop. Index						-0.08***	-0.09***
Pseudo R^2	0.319	0.009	0.065	0.214	0.101	0.430	0.599

Note: Results of estimating (2a) are presented. See the text and Appendix III for variable definitions. The significance at the 1%, 5%, and 10% levels are indicated by "***", "**", and "*".

Table 4: The Presence of Offshore RMB Trading Activity - Result II

	1	2	3	4	5	P
Constant	-1.83	-1.91	-1.90	-2.56	-1.88	-2.56
Log GDP	0.89***	0.86**	0.89***	1.08***	0.89**	1.08***
Financial Develop. Index	-0.09***	-0.10***	-0.09***	-0.11***	-0.09***	-0.11***
Swap Size	0.01					
Bilateral Trade		0.05				
Bilateral FDI			0.09			
Free Trade Agreement				0.88**		0.88**
Political Partnership					0.06	
Pseudo R^2	0.600	0.615	0.608	0.678	0.599	0.678

Note: Results of estimating (2b) are presented. See the text and Appendix III for variable definitions. The significance at the 1%, 5%, and 10% levels are indicated by "***", "**", and "*".

Table 5: The Volume of Offshore RMB Trading – Result I

	1	2	3	4	5	6	P
Constant	8.94**	1.05	0.09	-1.12	1.11*	2.64***	-1.99***
Log GDP	-1.13**						
GDP Growth Rate		0.04					-0.23**
Foreign Exchange Market			0.07***				0.03***
Equity Market Capitalization				0.02***			0.02***
Int'l Bond Market Cap.					0.00		
Financial Develop. Index						-0.09**	0.06**
Lambda	-3.01*	-1.26	-1.73	-0.11	-1.21*	0.989	-1.29*
R^2	0.127	0.014	0.468	0.840	0.013	0.115	0.896

Note: Results of estimating (3a) are presented. See the text and Appendix III for variable definitions. The significance at the 1%, 5%, and 10% levels are indicated by "***", "**", and "*".

Table 6: The Volume of Offshore RMB Trading – Result II

	1	2	3	4	5	P
Constant	-1.20***	-2.15***	-1.15**	-1.82***	-1.83***	-1.15**
GDP Growth Rate	-0.26**	-0.29**	-0.22**	-0.28**	-0.24*	-0.22**
Foreign Exchange Market	0.02**	0.03***	0.03***	0.03***	0.03***	0.03***
Equity Market Capitalization	0.02***	0.01***	0.01**	0.01***	0.02***	0.01**
Financial Develop. Index	0.06**	0.06**	0.04**	0.05*	0.07**	0.04**
Swap Size	0.01					
Bilateral Trade		0.03				
Bilateral FDI			0.12***			0.12***
Free Trade Agreement				0.41		
Political Partnership					-0.38	
Lambda	-1.01	-1.08	-0.74	-0.87	-1.52.	-0.74
R^2	0.897	0.899	0.919	0.902	0.899	0.919

Note: Results of estimating (3b) are presented. See the text and Appendix III for variable definitions. The significance at the 1%, 5%, and 10% levels are indicated by "***", "**", and "*".