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He, Qing; Korhonen, Iikka; Guo, Junjie; Liu, Fangge

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The geographic distribution of international currencies and RMB internationalization

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Qing He, Iikka Korhonen,
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The geographic distribution of international currencies and RMB internationalization

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Qing He, Iikka Korhonen, Junjie Guo and Fangge Liu

The geographic distribution of international currencies and RMB internationalization

Abstract

The paper investigates the determinants of geographical distribution of international currencies in global financial market transactions. We implement a gravity model, in which international currency distribution depends on the characteristics of the source and destination countries. We find that the source country's currency is more likely to be used in the financial market transactions of the destination country if the bilateral trade and capital flows are large or the destination country's economy is the larger of the two. We also find that the level of development of the destination country's financial market and whether the two countries use a common language are important determinants of the currency distribution. In addition, our model suggests that, to be a true international currency, the renminbi should be used more extensively in the financial markets of the US and UK.

Keywords: currency internationalization; distribution of currencies; gravity model.
JEL: F33; F36; G15.

Qing He, Corresponding author, School of Finance, Renmin University of China. Beijing, China.
Phone: +86 10 82500500, fax: +86 10 82509260, email: qinghe@ruc.edu.cn.

Iikka Korhonen, BOFIT – Institute for Economies in Transition, Bank of Finland

Junjie Guo, School of Finance & International Monetary Institution, Renmin University of China.

Fangge Liu, Academic Journal Press, Renmin University of China.

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1 Introduction

International use of different currencies is one of the key issues in international finance. Yet the reasons for using the currencies of different countries in financial transactions remain somewhat unclear. Since the collapse of Bretton Woods system in the early 1970s, the selection of international currencies has interested academics and policy makers. Kenen (1983) shows that to be an international currency the currency should be able to simultaneously play the roles of store of value, medium of exchange and unit of account. This means that there are several dimensions to consider when assessing the degree to which a currency has the characteristics needed to be used internationally.

The literature on international currencies has typically focused on the roles of invoicing currency for international trade and store of value. For example, Bachetta and Van Wincoop (2005) provide a theoretical analysis of the determinants of countries' currency invoicing share in international trade. Ito and Chinn (2013) empirically investigate the determinants of currency choice for trade invoicing in a cross-country context. Chinn and Frankel (2007, 2008) provide empirical evidence that GDP level, financial development and openness to the rest of the world are crucial for reserve-currency status. However, an international currency, as a vehicle currency, should be traded globally in foreign exchange markets as well. There are very few well-established results on the requirements for a currency to serve as a medium of financial market transactions.

To shed light on this issue, we implement a gravity model[1] to investigate the determinants of currency choice in international financial transactions. More specifically, we address the following two important issues: whether the international currencies differ geographically in their transactions across foreign exchange markets and what currency and country characteristics can explain the transaction pattern of the geographical distribution of international currencies.

Based on a set of data on cross-border foreign exchange transactions, we first provide evidence on the distribution of currencies in international financial transactions. The empirical results show that the gravity model performs well in explaining cross-border transactions of international currencies. We find that bilateral investment and trade between source and destination countries are important determinants of the use of an international currency. International currencies are traded disproportionately in the larger economies[2]. We also find that institutional and

[1] The gravity model has been used extensively to explain trade and asset flows between countries.
[2] We use population and real per capita GDP to proxy economic mass.

cultural factors, such as legal origins and common language, significantly affect the use of international currencies. The use of international currencies in the destination country increases significantly when the destination country implements common law or both the source and destination countries use a common language. Somewhat surprisingly, we find that international transactions with the world's major currencies are not influenced by geographical distance. This result suggests that truly international currencies are weightless, and less subject to the information asymmetry due to long distance.

We then us the predictions of the model to estimate the expected distribution of the Chinese renminbi (RMB) within the global foreign exchange market. The gap between the predicted and actual distribution of RMB offshore transactions is wide. Although Hong Kong is the leading RMB offshore market, and more than 50% of offshore RMB are traded in this market, our generated prediction is for the expected volume of RMB offshore transactions in the US to be larger than in Hong Kong. As the economic relationships between China and the UK and the EU are gaining in importance, a significant part of RMB transactions should be conducted in these areas. Hence, the establishment of offshore RMB markets in more western countries, including the US, UK and euro area, are important for increasing the international use of RMB.

The remainder of this paper is organized as follows. Section 2 reviews the primary theories of international currencies and develops our hypothesis. Research design is provided in Section 3. Our basic results are reported in Section 4. In section 5, we provide an estimation of global distribution of RMB transactions and Section 6 concludes.

2 Theory and hypotheses

The international use of a currency occurs whenever a national currency performs the function of money outside of the issuing country. International currencies should be used between agents of different countries. Thus, an international currency can be regarded to an extent as a public good (Dowd and Greenaway, 1993; Mizen and Pentacost, 1994). Changing currencies between agents of different countries is costly. When a one uses another country's currency, he must learn to calculate and deal with this new currency (Dowd and Greenaway, 1993). Tavlas (1997) suggests that transactions costs, such as switching costs and information asymmetries, are primary considerations for a nonresident to use an international currency.

Costs of switching from one currency to another are reduced when the scale of the exchange is sufficiently large (Dowd and Greenaway, 1993). The literature on international currencies suggests that the size of an economy is positively related to the volume of circulation of its currency. Krugman (1984) argued that the relative economic size of trading partners is crucial for the choice of transactions currencies. Rey (2001) confirms this hypothesis and also finds that international trade increases the circulation of a given domestic currency in destination countries. We expect that the economic size and extent of the foreign trade of source countries positively influence the use of their currencies in the destination countries.

With the collapse of the Bretton Woods system in 1973, risks arising from exchange rate movements became a major concern in determining transaction currencies. An open and well-developed financial market can efficiently funnel large amounts of capital from savers to borrowers. Furthermore, deep and liquid markets can help to reduce uncertainties due to exchange rate fluctuations and reduce the currency-exchange transaction costs. Empirical results suggest that financial market development and openness of the capital market are crucial for the international use of a country's currency (Chinn and Ito, 2006). Chen and Khan (1997) find that countries with higher capital returns attract the largest flows of capital; hence international currencies are more likely to be traded in such countries. Prasad et al. (2006) show that currencies follow capital movements and thus that the latter influence the patterns of currencies in international transactions. Papaioannou (2009) finds that deep and developed financial markets in destination countries lead to low transaction costs. Along the same lines, Ito and Chinn (2013) suggest that underdeveloped financial markets reduce the desirability of a currency in international transactions. Based on discussion above, we expect that the use of an international currency in destination country increases with bilateral capital flows and with the development of financial markets in destination countries.

The finance literature has documented that information available to market participants can differ substantially. Gehrig (1993) shows that asymmetric information between domestic and foreign investors can explain home bias in asset holdings. When domestic investors hold assets denominated in foreign currencies, they are usually less informed than the investors in the source country of the currency.

Information asymmetries may be due to some type of "familiarity" effect. Tesar and Werner (1999) suggest that the cost of obtaining information about foreign assets increases with linguistic, institutional and cultural differences. Ghosh and Wolf (2000) find evidence that capital is less likely to flow into Africa and less developed countries in the Western Hemisphere, as these

regions are at a large "economic distance" from developed countries. Flandreau and Jobst (2009) show that geographical distance is positively associated with the transaction costs of using the pound. Hattari and Rajan (2011) underline the importance of language and culture for equity flows between countries. We expect that the use of a source country's currency in the destination country increases with similarity of culture and language and decreases with bilateral distance.

Recent literature in information asymmetries has addressed the importance of informal barriers constituted by politics, institutional standards and practices. Bekaert (1995) show that poor information or information frictions, such as political risks, poor accounting standards and poor investor protections are indirect barriers to foreign investors, preventing capital flows into emerging markets. Bergsten (1997) provides further evidence that social and political stability are important for evaluating assets, as investors can access more relevant information. Flandreau and Jobst (2009) find that democracy, parliamentary control of the executive and rule of law influence the international use of domestic currencies. Based on the above discussion, we expect that the distribution of international currencies in destination countries is positively related to the political stability and legal systems of both the source and destination countries.

3 Research design

To investigate determinants of geographic use of international currency, we use an empirical specification similar to that of Rose and Spiegel (2007) and Goldberg and Tille (2008)[3]. We introduce some other variables that have been suggested to influence the geographic use of international currencies. More specifically, we estimate the following equation:

$$Share_{ij} = \beta_0 + \beta_1 X_i + \beta_2 C_i + \beta_3 D_j + \varepsilon_{ij} \quad (1)$$

Where, $Share_{ij}$ is the distribution of currency *i* in county *j*, which is measured as the ratio of financial transactions invoiced in currency *i* in country *j* to global financial transactions invoiced in currency *i*[4]. The vector X_{it} includes a series of economic and financial factors of country *i* and country *j* that may affect the geographic distribution of currency use. Variable $trade_{it}$ is the

[3] As most researches use bilateral data, the well-known "gravity model" of trade has been used as a baseline. The gravity model explains economic behaviors between two countries as a function of economic mass and distance. Variants of gravity models have been used in the international finance literature, e.g., Ports and Rey (2005) and Rose and Spiegel (2007)

[4] As we focus on the currency transactions outside the currency's home country, transactions of currency i in country i are excluded.

percentage of bilateral trade between country *i* and country *j* in total trade of country *i* (country *j*)[5]. This variable can serve as a proxy for the reliance of a country on bilateral trade with the other country. Using their currencies for transactions or settlements can reduce the transaction costs substantially. $lninvestment_{ij}$ is the natural logarithm of the sum of the cross-border portfolio investment between country *i* and country *j*, measured as the sum of cross-holdings from *i* held in *j* and cross-holdings from *j* held in I (in millions of dollars)[6]. We would expect that the information costs of assets to be negatively correlated with bilateral asset holdings. As Rose and Spiegel (2007) suggest that a well-developed financial market is able to lower transaction costs, and facilitates shifting assets offshore, we include a dummy variable $center_j$, equal to one if country *j* has a financial center and zero otherwise[7]. Traditional variables that proxy economic mass in a gravity model, e.g. GDP *per capita* and population, are also included.

Vector C_{it} includes political and institutional factors that affect the information costs of asset transactions. $civil_i$ is a dummy variable, equal to one if country *i* (country *j*) is a civil-law country and zero otherwise[8]. La portaq et al. (2001) suggests that legal origins have an important impact on financial development and innovation. A civil-law system provides better investor protection. Hence, an international currency should be more extensively used in civil-law countries. Political stability is positively related to the extent of information disclosure, which relates to lower transaction costs. To measure the political stability of county *i* (ps_i) and country *j* (ps_j), we use the metric given in Governance Matters *III* from the World Bank database.[9]

[5] $trade_{it} = (Total\,Volume\,between\,i\,and\;j\,/\;Total\;trade\;volume\;of\;i)$.

[6] According to IMF CPIS data, portfolio investment is defined as cross border transactions and positions involving debt or equity securities, other than those included in direct investment or reserve assets

[7] The criterion for financial center is based on The Global Financial Centre Index. http://www.longfinance.net

[8] For legal origins, we use the dataset from the well-known paper *The Economic Consequences of Legal Origins*, Laport et al. (2008).

[9] For more information please refer to "Governance Matters III" World Bank Policy Research Working Paper, Kaufmann et al. http://info.worldbank.org/governance/wgi/index.aspx.

Table 1 Variable definition and data source

Variable	Definition	Data source
$share_{i,j}$	Distribution proportion of currencies i in country j	The BIS Triennial Central Bank Survey https://www.bis.org/publ/rpfx13.htm
$lninvestment_{i,j}$	Cross border transactions and positions involving debt or equity securities, other than those included in direct investment or reserve assets	Coordinated Portfolio Investment Survey (CPIS) from the IMF http://cpis.imf.org/
$trade_j$	Ratio of bilateral trade between country *i* and country *j* to total trade volume in country *i*	IMF-Direction of Trade Statistics (DOTS) www.elibrary-data.imf.org
$trade_i$	Ratio of bilateral trade between country *i* and country *j* to total trade volume in country *j*	IMF-Direction of Trade Statistics (DOTS) www.elibrary-data.imf.org
$lnpop_i$	Natural logarithm of population in country i	World Development Indicators – The World Bank www. data.worldbank.org
$lnpop_j$	Natural logarithm of population in country j	World Development Indicators – The World Bank www. data.worldbank.org
$island_i$	Binary dummy variable equal to one if source country is an island, zero otherwise	Rose dataset http://faculty.haas.berkeley.edu/arose/StabData.zip
$island_j$	Binary dummy equal to one if source country is an island, zero otherwise	Rose dataset http://faculty.haas.berkeley.edu/arose/StabData.zip
$lngdp_i$	Natural logarithm of annual real GDP per capita in dollars in country *i*	World Development Indicators – The World Bank www. data.worldbank.org
$lngdp_j$	Natural logarithm of annual real GDP per capita in dollars in country *i*	World Development Indicators – The World Bank www. data.worldbank.org
$center_j$	Binary variable equal to one if country *j* is an offshore financial center, zero otherwise,	http://www.longfinance.net
$civil_i$	Binary variable equal to one for civil-law countries, zero otherwise,	The Economic Consequences of Legal Origins, Laport et al. (2008)
$civil_j$	Binary variable equal to one for civil-law countries, zero otherwise,	The Economic Consequences of Legal Origins, Laport et al. (2008)
ps_i	A measure of political stability in country *i*	"Governance Matters III" World Bank Policy Research Working Paper, Kaufmann et al. http://info.worldbank.org/governance/wgi/index.aspx
ps_j	A measure of political stability in country *j*	"Governance Matters III" World Bank Policy Research Working Paper, Kaufmann et al. http://info.worldbank.org/governance/wgi/index.aspx
$lndist_{i,j}$	Distance between capitals of source and destination countries.	http://www.worldatlas.com/travelaids/flight_distance.htm
$comlang_{i,j}$	Binary dummy variable equal to one if source country and destination country share a common language, zero otherwise,	https://www.cia.gov/library/publications/the-world-factbook/
$moneyl_i$	Binary dummy variable equal to one if source country is on the list of money laundry countries, zero otherwise	http://www1.oecd.org/fatf/pdf/AR2000_en.pdf

$moneyl_j$	Binary dummy variable equal to one if destination country is on the list of money laundry countries, zero otherwise	http://www1.oecd.org/fatf/pdf/AR2000_en.pdf
$border_{i,j}$	Binary dummy variable equal to one if source and destination countries share a common border, zero otherwise,	https://www.cia.gov/library/publications/the-world-factbook/
fc	Rank of destination country depends on its annual foreign exchange trading: a higher rank means more trading.	http://www.bis.org/publ/rpfx13.htm
euro	Binary dummy variable equal to one if destination country belongs to euro area, zero otherwise.	http://www.ecb.europa.eu/stats/html/index.en.html
$continent_{i,j}$	Binary dummy variable equal to one if source and destination countries are on the same continent, zero otherwise.	https://www.cia.gov/library/publications/the-world-factbook/
$integration_j$	A measure of financial openness constructed by Lane & Milesi-Ferretti.	New External Wealth of Nations Mark II (EWN II) http://www.philiplane.org/EWN.html
$kaopen_j$	A measure of financial openness constructed by Chinn and Ito.	http://web.pdx.edu/~io/ Chinn-Ito_websie.htm

The vector D_{it} includes cultural and distance factors. The literature of international trade and finance has suggested the important role of distance. Ghosh and Wolf (1999), studying cross-border asset holdings, provide empirical evidence that information asymmetries increase with distance. De Menil (1999) finds that distance can explain FDI flows among European countries. To capture this effect, we include the variable $lndist_{ij}$, which is the natural logarithm of distance between capitals of country *i* and country *j*. Language is directly related to the cost of obtaining information (Tesar and Werner, 1995). Hau (2001) finds that German traders perform better than foreign traders when they transact on the German stock market. Hence, we expect that a common language between source (couny *i*) and destination (country *j*) can alleviate the problem of asymmetric information. $comlang_{ij}$ is a dummy variable, equal to one if country *i* and country *j* have a common language and zero otherwise.. Detailed definitions of the variables are presented in Table 1. Following Portes and Rey (2005), we include country fixed effects in our regression analysis to control for the unobserved time-invariant country factors that might influence the distribution of international currencies. Time dummies are included to control for the year fixed effects. Subsequently, we check for robustness by splitting samples and using various specifications. We also examine the impact of capital account restrictions on the distribution of interna-

tional currencies by including several measures of financial openness commonly used in the international finance literature. All the empirical results and robustness checks are presented in section 5.

4 Data and summary statistics

We begin by taking advantage of the Triennial Central Bank Survey of Foreign Exchange and Derivatives Market Activity (hereafter, Triennial Survey). The Triennial Survey is conducted every 3 years and is available on the BIS website. There are 8 years of the panel, 1995–2013. In particular, we use Table 10 of the Triennial Survey, which provides a geographic breakdown of the transactions in world major currencies. Thus, we can determine the transaction volume of an international currency in each country's foreign exchange market. For instance, Table 10 reports that, at the end of 2013, the volume of Pound transactions in Germany was 15891 million dollars, while in US it was 134812 million dollars.

Our dataset on the geographic breakdown of transactions covers 26 countries, consistent with the sample size of Triennial Survey in 1995. Although BIS included more countries in the following Surveys, the transaction volume of 26 countries accounts for more than 89% of total transactions[10] in 2013. Following Chinn & Frankel (2008), we select 7 international currencies: US Dollar, British Pound, Euro[11], Japanese Yen, Swiss Franc, Canadian Dollar and Australian Dollar. Hence, our dataset includes 7 source (currency *i*) and 26 destination (country *j*) countries. The transaction variable we use in most specifications is the ratio of transactions in currency *i* (source) in country *j* (destination) to global transactions in currency *i*. As we focus on currency transactions outside of a given country, the transactions of currency *i* in country *i* are excluded.

[10] To maintain a balanced panel, we restrict our sample size to cover 26 countries. To check the robustness, we also allow a varying extent of coverage. Our primary results remain quantitatively unchanged.

[11] As the euro did not come into existence until 1999, we proxy euro transactions before 1999, by aggregating the transactions of currencies of euro members as well as the EMS (European Monetary System).

Table 2 Distribution proportion of international currencies in destination countries, per cent

Destination countries	U.S Dollar	Euro	Japanese Yen	British Pound	Swiss Franc	Canadian Dollar	Australian Dollar
United States	-	22.54	25.22	38.33	24.71	35.54	20.11
United Kingdom	40.24	50.61	40.22	-	40.53	37.30	37.40
Austria	0.58	-	0.42	0.45	1.39	0.16	0.10
Belgium	1.32	-	0.60	2.71	0.75	1.27	0.68
Denmark	2.17	2.07	0.52	1.70	3.07	0.39	0.27
France	4.02	-	2.56	6.44	4.44	2.43	1.78
Germany	4.96	-	2.84	7.91	6.86	1.32	1.44
Italy	1.25	-	0.67	1.58	0.76	0.22	0.23
Luxembourg	1.11	-	0.65	1.69	1.18	0.49	1.13
Netherlands	1.79	-	0.92	3.42	2.40	0.61	0.54
Norway	0.76	0.65	0.14	0.54	0.18	0.12	0.31
Sweden	1.16	1.67	0.29	1.18	0.71	0.39	0.18
Switzerland	5.93	7.76	3.51	9.45	-	3.17	2.37
Canada	2.73	1.00	1.06	2.40	1.28	-	0.91
Japan	10.66	4.90	-	7.48	1.76	3.98	9.41
Finland	0.23	-	0.03	0.22	0.57	0.09	0.02
Greece	0.18	-	0.51	0.17	0.22	0.04	0.05
Ireland	0.39	0.70	0.32	2.09	0.23	0.41	0.14
Portugal	0.13	-	0.08	0.28	0.11	0.04	0.02
Spain	0.85	-	0.23	1.50	0.26	0.14	0.09
Australia	4.55	2.47	3.49	5.08	1.52	2.50	-
New Zealand	0.43	0.08	0.19	0.26	0.05	0.08	2.06
South Africa	0.59	0.17	0.11	0.49	0.07	0.03	0.05
Bahrain	0.17	0.13	0.14	0.33	0.15	0.04	0.02
Hong Kong, China	6.36	1.66	6.96	7.68	1.94	2.61	8.98
Singapore	8.33	4.43	9.20	9.92	4.86	6.63	12.66

Note：This table summarizes the average distribution proportion of 7 international currencies in 26 countries and regions, 1995 to 2013. For original data source, see https://www.bis.org/publ/rpfx13.htm.

” - “ means that we do not include the currency’s trading proportion in the international currencies own countries

$$Distribution\ proportion\ in\ country\ i = \frac{Trading\ volumn\ in\ country\ i}{Total\ trading\ volumn\ (home\ country\ excludecd)}$$

Data Source: BIS Triennial Central Bank Survey of Foreign Exchange and Derivatives Market Activity (1995, 1998, 2001, 2004, 2007, 2010, 2013)

Summary statistics for the geographic distribution of currency transactions are presented in Table 2. For each international currency, we report the mean geographic currency share across 26 countries or regions over the entire period (1995–2013). The transactions of world major currencies show similar patterns in their global transactions. Most international currencies are traded in countries or regions with global financial centers. e.g. United States, United Kingdom and Hong

Kong. For instance, the currency shares of world major currencies traded in the United Kingdom ranges from 37.3% for the Canadian dollar to 50.61 % for the euro. However, currency shares differ substantially across countries and regions. For example, the shares of the British Pound traded in Commonwealth Nations such as Canada (2.4%), Singapore (9.92%) and Hong Kong SAR (7.99%), are much higher than other currencies. This suggests that culture and language may be important for the international use of a currency. We also find that 73% of transactions in Swiss Franc are conducted in the euro area, much higher than other currencies, which suggests that distance may influence the use of international currency.

Table 3 reports summary statistics on country characteristics of both source and destination countries. The mean of $Share_{ij}$ is 0.0433 and the standard deviation is 0.0937, which suggests an uneven distribution of international currencies among different countries and regions. The variable $trade_i$ is the ratio of bilateral trade between country *i* and country *j* to the total trade volume of country *i* (bilateral trade between country *j* and country *i* to total trade volume of country *j*). These indicators reflect the trade concentration between the two countries (Massell, 1970). The higher the trade concentration between two countries, the higher the degree of economic integration. Therefore, it is natural to infer that high trade concentration between two countries is more likely to contribute to the use of country *i*'s (country *j*'s) currency if it is an international currency.

Results show that most destination countries have civil-law systems. The political stability of source countries is higher than that of destination countries. This suggests that a country's political stability may be positively related to the international use of its currency. Only a small proportion of countries have a common language. The average of the log distance is about 8.14 (about 3484 kilometers), indicating that the bilateral geographic distance may not be an important determinant of the use of an international currency.

Table 3 Summary of major variables

Variables	Mean	Standard deviation	Minimum	Maximum	Median
$share_{ij}$	0.0433	0.0937	0.0000	0.5536	0.0080
$lninvesetment_{ij}$	9.8342	2.3857	0.0000	14.9060	10.0517
$trade_i$	0.0246	0.0510	0.0000	0.6825	0.0079
$trade_j$	0.0590	0.0940	0.0004	0.6890	0.0259
$lnpop_i$	17.9409	1.3031	15.7605	19.6174	17.9026
$lnpop_j$	16.5309	1.3507	13.1834	19.5646	16.1719
$lngdp_i$	10.8060	0.8935	9.8044	13.1835	10.5588
$lngdp_j$	10.2408	0.5922	8.0130	11.5850	10.2876
$center_j$	0.4723	0.4994	0	1	0
$civil_i$	0.4286	0.4951	0	1	0
$civil_j$	0.6571	0.4749	0	1	1
ps_i	0.9397	0.3123	0.0496	1.4915	1.0021
ps_j	0.8700	0.5459	–1.2169	1.6681	1.0132
$lndist_{ij}$	8.1562	1.0451	5.2883	9.3599	8.5265
$comlang_{ij}$	0.2866	0.4524	0	1	0

Note: $\boldsymbol{share_{ij}}$ is the dependent variable, which is the distribution proportion of currencies i in country j. $\boldsymbol{lninvesetment_{ij}}$ iscross border transactions and positions involving debt or equity securities. $\boldsymbol{trade_i}$ is the ratio of bilateral trade between country i and country j to total trade volume in country i. $\boldsymbol{lnpop_i}$ is the natural logarithm of population in country i. $\boldsymbol{lngdp_i}$ is the natural logarithm of population in country i. For more detailed data description, please refer to section 4 data and summary statistics. The data sources are given with Table 1 above.

5 Empirical results

5.1 Basic results

Table 4 reports our baseline model for the determinants of geographic distribution of the international currencies. Following Portes and Rey (2005), we estimate this model with country or regional fixed effects. Dummy variables for year-specific fixed effect are also included. White corrected (heteroskedasticity-consistent) standard errors are reported in parentheses below the coefficient estimates.

Our first specification, which includes the conventional explanation variables of a gravity model, is tabulated in Column (1) of Table 4. The variables that proxy economic mass (bilateral investment, including the countries' foreign equity and debt securities) enter with the expected signs and with very well-determined coefficients.

The bilateral variables indicate that if the source country's (country *i*) proportion of bilateral trade with destination country (country *j*) increases by 1 percent, the use of currency *i* in country *j* might increase by 0.4 percent. Meanwhile, if the cross-boarder investment between country *i* in country *j* increases 1%, the use of currency *i* in country *j* increases 0.67%. It is natural that with an increase in bilateral trade and asset holding, transactions cost by using source country's currency is substantially reduced. This result is consistent with the argument of Prasad et al that the currency indeed follows capital flow and other factors.

Other variables for economic mass matter as well. International currencies are more likely to be traded in countries with larger population and GDP per capita. This is natural, as a larger economic mass is associated with a higher demand for international currencies for international transactions and settlements. We include financial variables in the second column of Table 4. The coefficient of $Center_j$ is positive and statistically significantly different from zero, indicating that international currencies are disproportionally traded in global financial centers. As global financial centers put few constraints on the cross-board capital flows, and provide various financial products for international investors, the transactions in international currencies naturally tend to be concentrated in global financial centers.

To examine institutional effects, we include legal origin and political and institutional variables in the third column of Table 4. Political stability apparently has no significant effect on the geographic use of international currencies. International currencies are more likely to be traded in the common law countries. As common law countries usually impose few stringent regulations on financial activities, it is natural that the transactions of international currencies are concentrated in these countries.

Following the literature, we add geographical and cultural variables in the fourth column of Table 4. International trade literature has shown that the geographic distance can proxy for informational costs. Surprisingly, we do not find a significant effect of distance on the geographic distribution of international currencies. As international currencies are weightless, they are less subject to informational asymmetries due to long distance. Interestingly, we find that $comlang_{ij}$ is significantly positive. This indicates that if country *i* and country *j* have a common language, country *i*'s currency is more likely to be traded in country *j*. As having a common language in

two countries indicates their "similarity", the transaction costs of country *i*'s currency in country *j* should be lower. For example, Hong Kong was a colony of the UK, hence, the percentage of British Pound transactions in Hong Kong is much higher than that of other currencies.

Table 4 Determinants of international currencies distribution

	(1)	(2)	(3)	(4)
$lninvestment_{ij}$	0.0067***	0.0058***	0.0064***	0.0048***
	(0.0025)	(0.0022)	(0.0022)	(0.0018)
$trade_i$	0.4040***	0.3395***	0.3308***	0.2933***
	(0.0579)	(0.0587)	(0.0619)	(0.0702)
$trade_j$	0.0306	0.0263	0.0259	0.0251
	(0.0247)	(0.0223)	(0.0221)	(0.0215)
$lnpop_i$	0.0010	0.0011	0.0024	0.0040
	(0.0038)	(0.0034)	(0.0037)	(0.0043)
$lnpop_j$	0.0126**	0.0093*	0.0106**	0.0110***
	(0.0057)	(0.0048)	(0.0049)	(0.0041)
$lngdp_i$	0.0064	0.0025	0.0021	0.0057
	(0.0151)	(0.0146)	(0.0179)	(0.0164)
$lngdp_j$	0.0109**	0.0072	0.0088	0.0098*
	(0.0050)	(0.0051)	(0.0056)	(0.0055)
$center_j$		0.0378***	0.0328***	0.0323***
		(0.0156)	(0.0162)	(0.0146)
$civil_i$			0.0059	0.0183
			(0.0103)	(0.0115)
$civil_j$			–0.0181***	–0.0180***
			(0.0063)	(0.0062)
ps_i			0.0101	0.0100
			(0.0105)	(0.0124)
ps_j			0.0033	0.0031
			(0.0034)	(0.0030)
$lndist_{ij}$				–0.0034
				(0.0052)
$comlang_{ij}$				0.0305**
				(0.0129)
Constant	–0.4470**	–0.3204*	–0.3763*	–0.3082*
	(0.2044)	(0.1884)	(0.2080)	(0.1830)
Observation	923	894	827	800
R-squared	0.3524	0.4603	0.4575	0.4563

Note: Point estimates from OLS regression, heteroskedasticity robust standard errors in parentheses. ***, ** and * indicate marginal significance at 1%, 5% and 10% levels. This table shows the regression results for basic specification (regressions include fixed time and country effects; not reported here). Dependent variable is the distribution proportion of currencies i in country j.

5.2 Robustness checks

The euro was introduced to the world financial markets on Jan 1, 1999, and transactions in that currency prior to 1999 are proxied by aggregating the transactions of the currencies of euro members as well as the EMS (European Monetary System). However, this aggregation may not be a good proxy for the euro's transaction volume. Moreover, different from other currencies, such as the British Pound and US dollar, the euro is a super-sovereignty currency, which certainly affects its use in global capital markets. We might ask whether our results hold if the euro is not included in our sample.

To check the robustness of our results, we re-estimate the basic specifications of Table 4 by excluding the euro. Results are reported in Table 5. They show that our primary results are robust to this exercise. As a result, it is reasonable to keep the euro transactions in our specifications

The literature on international trade usually uses a wide range of dummy variables related with economic exchange between two countries. We therefore introduce these dummy variables into our basic specifications. First, Rose et al (2007) show that countries or regions identified as money launderers are likely to be offshore financial centers. As countries with high tolerance or less strict regulation of money laundering are more likely to attract international capital, international currencies can be readily traded in these countries. We introduce a dummy variable *moneyl*[12], which equals one if these countries or regions are identified as money launderers, zero otherwise. Second, the entry barriers for trade and capital flows vis-a-vis island nations differ substantially from continental nations, which may influence the geographic use of international currencies. We therefore introduce a dummy variable *island*[13], which equals one if the country is an island nation, zero otherwise. This variable also serves as an alternative measure of geographical effects. Third, Portes and Rey (2005) show that geographical adjacency may influence the cross-board equity transactions. As adjacent countries are likely to have similar culture and language, and especially as transportation costs between adjacent countries are much lower, country *i*'s currency is disproportionately used in its adjacent countries. To catch this effect, we include a dummy variable *border*[14], which equals one if country *i* is adjacent to country *j*, and zero otherwise.

[12] The data is available at: http://www1.oecd.org/fatf/pdf/AR2000_en.pdf.
[13] The data is available at https://www.cia.gov/library/publications/the-world-factbook/
[14] The data are available at https://www.cia.gov/library/publications/the-world-factbook/

Table 5 Robustness analysis Ⅰ

	(1)	(2)	(3)	(4)
$lninvestment_{ij}$	0.0058**	0.0048**	0.0055***	0.0046***
	(0.0023)	(0.0019)	(0.0020)	(0.0017)
tradei	0.3948***	0.3273***	0.3187***	0.3071***
	(0.0569)	(0.0612)	(0.0662)	(0.0722)
$trade_j$	0.0225	0.0180	0.0185	0.0181
	(0.0207)	(0.0179)	(0.0181)	(0.0180)
$lnpop_i$	0.0020	0.0025	0.0033	0.0041
	(0.0039)	(0.0034)	(0.0035)	(0.0044)
$lnpop_j$	0.0127**	0.0099**	0.0111**	0.0100**
	(0.0060)	(0.0049)	(0.0051)	(0.0041)
$lngdp_i$	0.0011	0.0052	–0.0023	0.0058
	(0.0120)	(0.0114)	(0.0201)	(0.0164)
$lngdp_j$	0.0127***	0.0097**	0.0109**	0.0121**
	(0.0048)	(0.0047)	(0.0051)	(0.0050)
$center_j$		0.0357***	0.0309***	0.0293***
		(0.0163)	(0.0169)	(0.0146)
$civil_i$			0.0072	0.0155
			(0.0121)	(0.0117)
$civil_j$			–0.0150**	–0.0139**
			(0.0058)	(0.0054)
ps_i			0.0081	0.0088
			(0.0082)	(0.0095)
ps_j			–0.0025	–0.0019
			(0.0035)	(0.0030)
$lndist_{ij}$				0.0010
				(0.0036)
$comlang_{ij}$				0.0258*
				(0.0134)
Constant	–0.4163**	–0.3973**	–0.3670*	–0.4706**
	(0.2065)	(0.1845)	(0.1913)	(0.2140)
Observation	876	847	784	757
R-squared	0.4951	0.5997	0.5945	0.6089

Note: This table displays the results of subsample regressions (excluding euro). The first column is derived from the basic gravity model; the second column includes the proxy for financial openness; the third column includes the proxy for financial openness and institution; the forth column includes the proxy for financial openness, institution, geography and culture.

Point estimates from OLS regression, heteroskedasticity robust standard errors in parentheses. ***, ** and * indicate marginal significance at 1%, 5% and 10% levels. This table shows the regression results of robustness analysis Ⅰ (regressions include fixed time and country effects; not reported here). Dependent variable is the distribution proportion of currencies i in country j.

Table 6 Robustness analysis Ⅱ

	(1)	(2)	(3)
$lninvestment_{ij}$	0.0055***	0.0045**	0.0053***
	(0.0020)	(0.0018)	(0.0020)
$trade_i$	0.3190***	0.3239***	0.4041***
	(0.0624)	(0.0608)	(0.0690)
$trade_j$	0.0238	0.0231	0.0242
	(0.0210)	(0.0186)	(0.0212)
$lnpop_i$	0.0028	0.0011	0.0012
	(0.0038)	(0.0038)	(0.0035)
$lnpop_j$	0.0106**	0.0140**	0.0096**
	(0.0047)	(0.0056)	(0.0047)
$lngdp_i$	–0.0050	0.0006	0.0055
	(0.0149)	(0.0147)	(0.0152)
$lngdp_j$	0.0078	0.0146**	0.0090
	(0.0056)	(0.0059)	(0.0058)
$center_j$	0.0369***	0.0268***	0.0355***
	(0.0143)	(0.0111)	(0.0142)
$moneyl_i$	–0.0141*		
	(0.0076)		
$moneyl_j$	0.0116***		
	(0.0038)		
$island_i$		0.0062	
		(0.0101)	
$island_j$		0.0392**	
		(0.0154)	
$border_{ij}$			–0.0581
			–0.0372
$comlang_{ij}$	0.0291***	0.0233**	0.0310***
	(0.0103)	(0.0097)	(0.0106)
Constant	–0.2967	–0.4544**	–0.3768*
	(0.1821)	(0.2177)	(0.1948)
Observation	878	878	884
R-squared	0.4921	0.5048	0.4968

Note: This table displays the results for alternative proxies. The first column includes alternative proxy for institutional factors; the second and the third columns include alternative proxy for geographic factors; the forth column includes all the alternative proxies mentioned above.

Point estimates from OLS regression, heteroskedasticity robust standard errors in parentheses. ***, ** and * indicate marginal significance at 1%, 5% and 10% levels. This table shows the regression results for robust analysis Ⅱ (regressions include fixed time and country effects; not reported here). Dependent variable is the distribution proportion of currencies i in country j.

Results are reported in Table 6. The coefficients for our main explanatory variables remain qualitatively unchanged in all specifications. Interestingly, we find that the coefficient of $moneyl_j$ is positive and statistically significant different from zero at the 1% confidence level. Consistent with our expectations, countries or regions identified as money launderers are more likely to be involved in international capital flows. We also find that the coefficient of $island_j$ is significantly positive, which suggests that international currencies are more likely to be traded in island nations. The coefficient of $border_{ij}$ is negative, but not significant in column (3). Consistent with our expectation, currencies are weightless, so that geographic factors are not important determinants of the use of international currencies.

Ports and Ray (2005) find that the currency block effect is important for the cross-board equity transactions. We include this regional bloc effect in our baseline specifications. More specifically, we construct a dummy variable *continent*, which takes the value of one if the source and destination countries are on the same continent and zero otherwise. Regional integration in Europe has probably affected goods trade and capital flows in this region. We include a dummy variable *euro*, which equals one if the destination country is a member of the euro area and zero otherwise. Most financial transactions are performed in the world's major financial centers. Cities like New York and London have the world's largest foreign exchange markets, and many international currencies ar e heavily traded in these regions (Mason and Warnock, 2001). We construct variable *fc* which is the rank of the destination country's global foreign exchange trading[15].

The results, reported in Table 7, show that the coefficients of our initial explanatory variables remain stable across all specifications. The coefficient of *continent* is negative, but statistically not different from zero, which suggests that the continent effect is negligible in the use of international currencies. As reported in Table 7, the coefficient of *euro* has the expected sign in the regression and is statistically significantly at conventional confidence levels. As countries in Europe tend to use the euro as the medium of exchange or the invoice money more than other international currencies, this reduces the use of other international currencies in the euro area. As expected, the coefficient of *fc* is significantly positive. The world's major financial centers have the largest foreign exchange markets. Hence, international currencies are disproportionately traded in these centers.

[15] The rank of each destination country is estimated based on the amount of its annual foreign exchange trading. The data are available at http://www.bis.org/publ/rpfx13.htm .

Table 7 Robustness analysis Ⅲ

	(1)	(2)	(3)	(4)
$lninvestment_{ij}$	0.0040***	0.0051***	0.0061***	0.0042***
	(0.0014)	(0.0019)	(0.0021)	(0.0016)
$trade_i$	0.3094***	0.2923***	0.4324***	0.3788***
	(0.0999)	(0.0672)	(0.0774)	(0.0972)
$trade_j$	0.0295	0.0254	0.0252	0.0270
	(0.0229)	(0.0209)	(0.0216)	(0.0209)
$lnpop_i$	0.0050	0.0029	0.0033	0.0048
	(0.0039)	(0.0037)	(0.0043)	(0.0033)
$lnpop_j$	0.0089**	0.0229***	0.0151**	0.0137***
	(0.0039)	(0.0067)	(0.0059)	(0.0051)
$lngdp_i$	-0.0032	–0.0033	0.0014	0.0021
	(0.0171)	(0.0192)	(0.0207)	(0.0215)
$lngdp_j$	0.0037*	0.0213***	0.0172**	0.0097*
	(0.0021)	(0.0068)	(0.0068)	(0.0063)
$civil_i$	0.0119	0.0111	0.0157	0.0080
	(0.0118)	(0.011)	(0.0134)	(0.0112)
$civil_j$	–0.0118*	–0.0321***	–0.0258***	–0.0161**
	(0.0063)	(0.0083)	(0.0079)	(0.0063)
ps_i	0.0045	0.0035	0.0079	0.0059
	(0.0123)	(0.0109)	(0.0113)	(0.0113)
ps_j	0.0077**	0.0087**	0.0077**	0.0085**
	(0.0034)	(0.0035)	(0.0036)	(0.0034)
fc	–0.0023***			–0.0018***
	(0.0008)			(0.0006)
euro		–0.0421***		–0.0324***
		(0.011)		(0.0097)
continent			–0.0677	–0.0544
			(0.0481)	(0.0376)
$comlang_{ij}$	0.0317**	0.0266**	0.0500***	0.0293**
	(0.0136)	(0.0118)	(0.0154)	(0.0132)
Constant	–0.2146	–0.5982**	–0.5322**	–0.4058*
	(0.1839)	(0.2284)	(0.2232)	(0.2332)
Observation	816	822	846	805
R-squared	0.3612	0.4389	0.4020	0.3926

Note: This table displays the results for three different effects. The first column includes alternative proxy for regional bloc effect; the second column includes alternative proxy for currencies bloc effect; the third column includes alternative proxy for major financial center effect; the forth column includes all the alternative proxies mentioned above.

Point estimates for OLS regression, heteroskedasticity robust standard errors in parentheses ***, ** and * indicate marginal significance at 1%, 5% and 10% levels. This table shows regression results for robust analysis Ⅲ (regressions include fixed time and country effects; not reported here). Dependent variable is the distribution proportion of currencies i in country j.

5.3 Financial openness

The literature has stressed the important role of capital account restrictions on international movements of capital. Chinn and Frankel (2007, 2008) show that a country's financial openness to the rest of world is the critical factor for international use of its currency. Restrictions on capital flows lead to misallocation of financial resources and limited use of those countries' currencies in international transactions (Fischer, 1998, 2003; Obstfeld, 1998; Rogoff, 1999; Summers, 2000)[16].

However, capital account liberalization may not increase the depth of the financial market, which is important for currency transactions. Klein and Oliver (2008) show that the openness of the capital account brings unequal benefits to countries. In particular, IMF (2012) suggests that adequate institutions and sound macroeconomic policies are important for full realization of the benefits of capital account liberalization.

To examine whether our results are robust to the inclusion of capital account liberalization, we use several measures of capital account openness in our model specifications. Quantity measures of capital controls (or financial openness) may be *de facto* or *de jure*. Edwards (1999) suggest that policy goals of capital control are usually unclear, and the private sector can circumvents capital account restrictions. Hence, a country's financial integration is often used as a *de facto* measure of capital transaction restrictions (Rajan, 2003). Following Lane & Milesi-Ferretti (2007), we use the ratio of the sum of total international assets and liabilities to GDP to measure financial integration. Many researchers use the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (*AREAER*)[17]. Chinn and Ito (2013) suggest that a drawback of *de facto* measures is that they depend on the normalization of the volumes of cross-border capital transactions. For instance, normalizing the sum of total assets and liabilities as a ratio to GDP would make the index appear unnecessarily low for large economies such as the US and very high for an international financial center such as Hong Kong. Chinn and Ito (2013) develop the KAOPEN index based on the AREAER tabulation using the extent and intensity of capital controls. Hence, we use this *de jure* measure of financial openness as an alternative measure of capital account openness. The results, reported in Table 8, show that the coefficients of the main variables remain stable in the presence measures of financial openness. We also find that neither measure of financial openness is statistically significantly different from zero.

[16] Many emerging market countries from Santiago to Seoul have implemented some form of capital account liberalization over the past 20 years.

[17] AREAER provides the rules and regulations governing capital account transactions for most countries.

Table 8 Robustness analysis Ⅳ

	(1)	(2)	(3)	(4)
$lninvestment_{ij}$	0.00672***	0.0066***	0.0086***	0.0012**
	(0.008)	(0.0022)	(0.007	(0.0006)
$trade_i$	0.404***	0.3348***	0.398***	0.34***
	(0.000)	(0.0728)	(0.000)	(0.0691)
$trade_j$	0.0306	0.0274	0.0300	0.0272
	(0.219)	(0.0231)	(0.221)	（0.0226）
$lnpop_i$	0.00105	0.0138	0.0001	0.0005
	(0.786)	(0.1001)	(0.981)	（0.0046）
$lnpop_j$	0.0126**	0.0138***	0.0117*	0.0134**
	(0.034)	(0.0048)	(0.054)	(0.0049)
$lngdp_i$	0.0064	0.0012	0.0058	–0.0021
	(0.673)	(0.0232)	(0.704)	(0.0024)
$lngdp_j$	0.0109*	0.0153	0.0058	0.0066
	(0.034)	(0.0064)	(0.525)	(0.0093)
$civil_i$		0.3724		0.0176
		(0.3916)		(0.0132)
$civil_j$		–0.0255***		–0.0243***
		(0.0080)		(0.0074)
ps_i		0.0026		0.0077
		(0.0085)		(0.0126)
ps_j		–0.0066		–0.0061
		(0.0031)		(0.0032)
$lndist_{ij}$		–0.0009		–0.0031
		(0.0076)		(0.0053)
$comlang_{ij}$		0.0383***		0.3881**
		(0.0164)		(0.1679)
integration	–0.0001	–0.0001		
	(0.958)	(0.0001)		
kaopen			0.00389	0.0075
			(0.535)	(0.0068)
Constant	–0.447**	–0.3204	–0.380*	–0.3763*
	(0.030)	(0.1884)	(0.052)	(0.2080)
Observation	923	799	811	799
R-squared	0.362	0.4603	0.363	0.4575

Note: This table displays the different proxies for financial openness. The first and second columns include *integration*; the third and fourth columns include *kaopen*. *Integration* is calculated based on *Wealth of Nations Mark II*. *Kaopen* is calculated by Chinn and Ito.

Point estimates from OLS regression, heteroskedasticity robust standard errors in parentheses. ***, ** and * indicate marginal significance at 1%, 5% and 10% levels. This table shows regression results for robust analysis Ⅳ (regressions include fixed time and country effects; not reported here). Dependent variable is the distribution proportion of currencies i in country j.

6 Implications for RMB

With China's rapid economic growth, the use of RMB in international markets has risen significantly in recent years. At the end of 2013, about 16% of China's trade was settled in RMB. According to the Society for Worldwide Interbank Financial Telecommunication (SWIFT), China's RMB has overtaken the euro to become the second most fused currency in international trade finance. The transactions share of RMB in global financial market has increased to 1.39%, to rank 7th in the world (BIS, 2014). Many countries have signed currency swap agreements with China.

As RMB is increasingly used in overseas markets, global financial centers are competing with each other for larger slices of RMB business. However, China still maintains restrictions on capital flows and limits the convertibility of RMB. Nevertheless, Chinese government has attempted to foster the use of RMB through the development of offshore markets in the Chinese Yuan[18]. Hong Kong has become the leading offshore RMB market since the Bank of China (Hong Kong) became a clearing bank. On July 6, 2012, China and Singapore signed an agreement to designate a Chinese bank to clear RMB deals in Singapore. Since then many international financial centers have gained the right to be RMB clearing and settlement hubs[19].

As China still has not liberalized its capital account, the early development of RMB offshore business has depended on policy support from the Chinese government. Location and timing of offshore establishments are still a major concern for the Chinese government.

BIS began to collect RMB transaction data in 2010. Based on observations from 2010 to 2013, we construct the actual global distribution of RMB transactions in foreign exchange markest. Figure 1 plots the transaction share of RMB in 6 countries or regions in 2010 and 2013. It shows that most of RMB trading takes place in Hong Kong. As Hong Kong has a similar culture, economic structure and a close relationship with mainland China, it is natural that Hong Kong would be the leading offshore RMB market. The figure shows that about 50 percent of RMB trading occurs in the Hong Kong offshore market. Singapore is the second largest RMB offshore market, and it has a close trade relationship with China as well as a large Chinese-

[18] Offshore markets can help to increase the recognition and acceptance of currencies (He and McCauley, 2010). The success of US dollar internationalization is largely accredited to the euro-dollar market where approximately 80% of the US dollar trading takes place.

[19] The British and Chinese government agreed to establish a clearing bank in London for RMB (Reuters, 2013). Frankfurt was also chosen as an RMB clearing and settlement hub in 2014 and is starting to compete with other RMB offshore markets.

speaking population. On the other hand, despite a high level of bilateral trade between China and Germany, few RMB transactions take place in the Germany.

Figure 1 RMB transactions in global major financial centers.

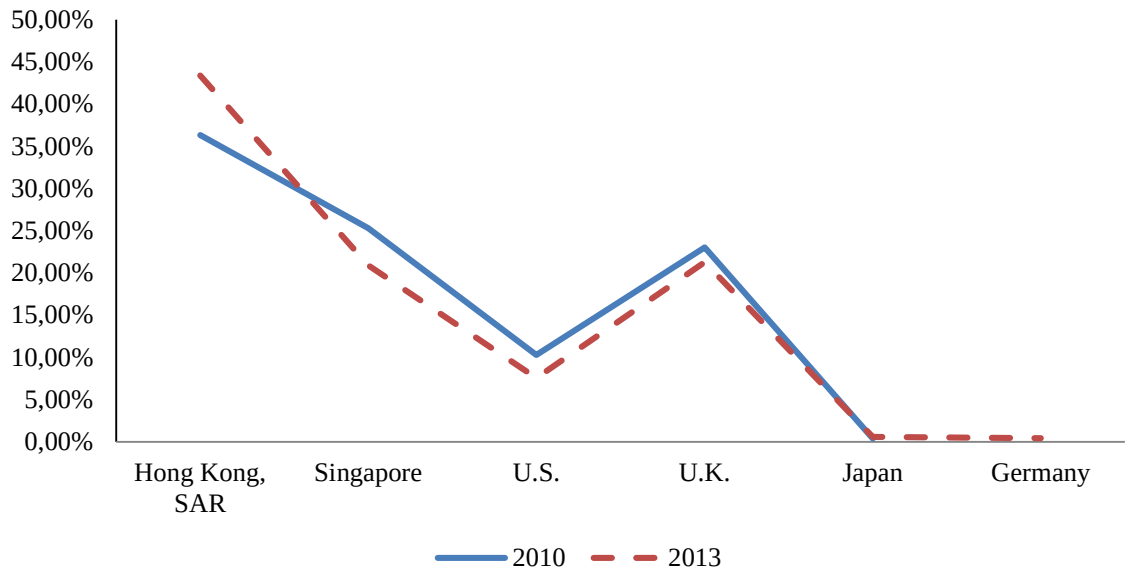
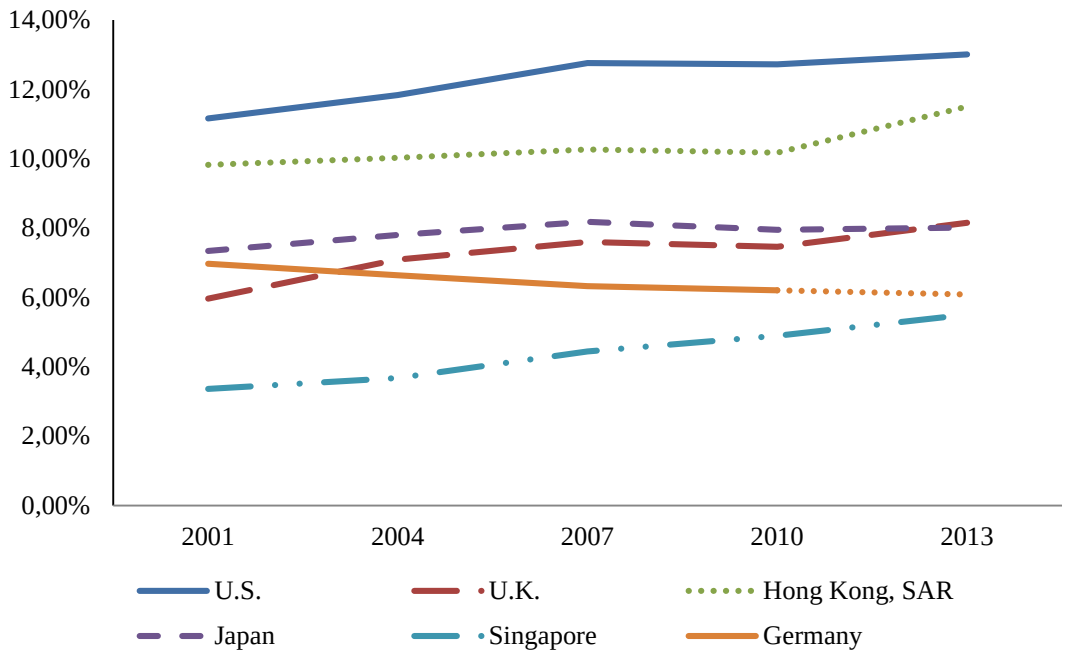


Figure 2 shows the predicted shares of RMB in global foreign exchange market transactions. For simplicity, we only plot transaction shares for RMB in US, UK, Japan, Singapore, Germany and Hong Kong, from 1995 to 2013. The estimates are based on the results of our benchmark specification[20].

Overall, the actual distribution of RMB transactions is much more concentrated than the model estimates. For example, our model predicts that only 10 % of global RMB transactions are settled in Hong Kong whereas the actual share of RMB transactions in Hong Kong is more than 50%. The prediction also suggests that the largest offshore RMB market should be established in US instead of Hong Kong. As of 2013, the end of our sample period, the share of the RMB offshore transactions in Germany would be 6 % whereas the actual share was essentially non-existent.

[20] More specifically, our prediction is based on the estimation results in column (1) of Table 4. To check the robustness, we implemented various specifications. It turns out that our prediction remains unchanged.

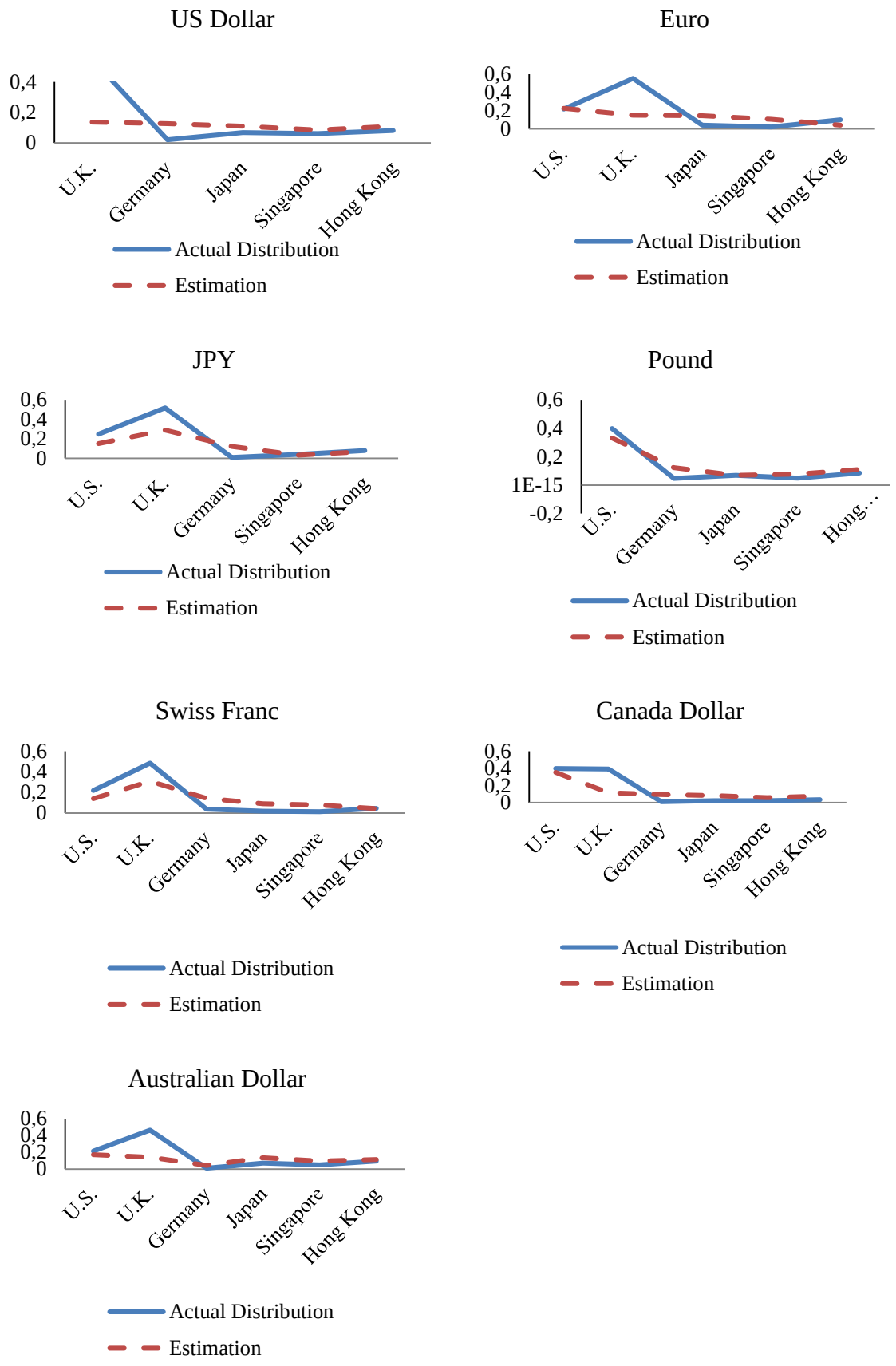
Figure 2 Predicted RMB transactions in global major financial centers



To examine the model's ability to predict other features of international currency markets we illustrate the predicted and actual distributions of international currencies in the world's major financial centers. It appears that our predicted results are fairly well in line with reality for the other international currencies.

These models suggest that our predictions are reliable, and the gap between the predicted and actual distributions of RMB offshore transactions is large. The US has a much larger economic mass than Hong Kong. Bilateral economic activities between US and China have played an important role in international trade and finance. Therefore, RMB offshore transactions in US are expected be larger than in Hong Kong. Meanwhile, economic relationships between China and UK as well as China and EU are increasingly important. Bilateral trade between China and the UK surpassed $70bn (£43bn) in 2013. Bilateral trade between China and EU area was 729.97 billion USD in 2013. The EU remains China's biggest export market (17 per cent of its exports) and China is now the EU's second biggest export market (9 per cent). Bilateral investment flows have increased in the last ten years. However, various administrative measures continue to restrict RMB trading internationally. At the same time Hong Kong enjoys a preferred position here and therefore it is not surprising that the majority of RMB trading takes place there. To facilitate global use of RMB restrictions for other financial centers should be loosened.

Figure 3 Transactions in international currencies in global major financial centers



7 Conclusion

Using a data set from seven international currencies' transactions across 26 countries and regions from 1995 through 2013, we implement a gravity model and investigate the determinants of the geographical distribution of international currencies. The empirical results show that bilateral trade and capital flows between source and destination countries are important determinants of geographic use of international currencies. International currencies are traded disproportionally in destination countries with large economic mass, non-civil law systems and where the source and destination countries share a common language. However, the distance between source and destination countries plays no role on explaining the geographic use of international currencies. In this sense currencies are truly weightless.

We then predict the distribution of RMB trading in the global foreign exchange markets. Most RMB transactions are concentrated in the Hong Kong financial market. In fact, trading in Hong Kong is much higher than predicted by our empirical model. This can be explained by China's restrictions on capital movements and the preferred status of Hong Kong. To be widely internationally used, the RMB should be heavily traded in the US and UK This will not happen until restrictions on capital movements are relaxed to a significant degree. Even then, it is not certain that China's currency will be used in international transactions as much as China's economic size would suggest. The case of Japan shows that even a large country's currency may be relatively little used in global financial markets.

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