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CURRENCY INTERNATIONALIZATION: THE CASE OF THE RMB

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ABSTRACT

Currency internationalization could be considered as one of the primary facets of globalization in the modern world. Today, the US dollar accounts for nearly eighty-five percent of all global transactions, both in trade and finance. However, as China's power has risen in the past few decades, many have pondered whether the Chinese currency, the RenMinBi (RMB), can internationalize. This study examines the literature on what components create an international currency. Then, we examine the characteristics of China's financial markets and international relations to become familiar with the scholarly discourse surrounding China's financial markets, international influence, and monetary stability. We then collect panel data from various sources including the World Bank, Heritage Foundation, and IMF from 2008 to 2018 to determine whether the RMB can internationalize. Using this data, we compose a few separate models based on whether a country has a Bilateral Swap Agreement (BSA) with China or if it has an RMB Clearing Center – which we consider to be symbols of increasing RMB internationalization. We hypothesize that China may be more likely to target higher-risk countries (i.e. more volatility, less stability) as stepping stones towards global usage of the RMB. The results of our study display One Belt One Road Membership to be the most impactful variable within our equation, followed by China's business freedom index and trade with China divided by a certain country's GDP. Using these findings, we offer the use of

political analysis along with economic factors in the study of the currency internationalization as well as describe the limitations our study struggled with. It is hoped that this study can offer insight for currency analysts and the common investor as to how to investigate currency internationalization and the importance of including political insights in models of currency internationalization.

SECTION I: A BRAVE NEW WORLD OF CURRENCY?

The US dollar has dominated global financial markets since the end of the first world war. Data from the IMF shows the US dollar leaps and bounds ahead of the runner-up, the Euro, in the currency composition of official foreign exchange reserves. As of the second quarter of 2019, the US dollar composed $6.6 trillion out of a total of $11.5 trillion in allocated foreign exchange reserves (IMF, 2019). The dollar's dominance is reflected in international business transactions as well, with around $580 billion used outside of the US in 2010, equivalent to more than 65% of all issued dollars (Goldberg, 2010). Additionally, US dollars are part of about 90% of foreign exchange trading (XE, 2019). This should come as no surprise – the US dollar's widespread acceptance comes from a variety of factors, including the hegemonic status of the United States, the Bretton-Woods System that placed the dollar at the center of international currency markets after World War II, and the confidence international investors and economists place in the continuation of the US dollar as a stable international currency. However, as in any hierarchical system, there are always challenges to the front-runner.

The Chinese RMB or RenMinBi (RMB) has emerged in the past decade as a potential contender to the US dollar. Along with many other countries, China has pushed policy agendas to shrink the role of the US dollar in international

trade. China's leaders' rhetoric against the US dollar describes the practice of dollar diplomacy as "hegemonic and imperialistic" (Hendry and Doff, 2019). Beginning in 2008, the Chinese government launched a campaign to internationalize the RMB and to shrink its reliance on the dollar. Some of this has been successful - as China's economic growth continues, the use of RMB in international business, foreign currency reserves, and debt grows with it. As of the second quarter of 2019, Chinese RMB accounts for $217 billion of the world's total foreign exchange currency reserves, making it a contender reserve currency (IMF, 2019).

The Chinese government has taken an active role in ensuring the increased use of RMB in international transactions by encouraging debtor nations to adopt the currency. RMB internationalization comes with a variety of benefits for China, including protection against exchange rate risk and expansion of Chinese economic influence around the world. But observers of international affairs have been divided on the ability of the RMB to survive or thrive in global commerce. Characteristics unique to the Chinese economy and monetary system, such as capital controls, have created a unique economic system for the RMB to operate in. These same characteristics have caused the United States to label the Chinese government and its economic policies as "currency manipulators," citing China's recent efforts to weaken the RMB's value and to lift exports (Swanson, 2019).

However, many are skeptical of China's ability to internationalize the RMB. Critics are oftentimes quick to claim that China's lack of efficient financial markets and liberalization efforts will hinder the RMB from going global. Even some articles in mainstream news outlets state that China's inability to remove capital controls will prevent the country from internationalizing. One article from *Business Insider* states that "Currencies that foreigners can save and invest efficiently are always preferred for international transactions" (Della Rocca and Steil 2018). Others state that China needs to open up its onshore capital markets. Many doubt the RMB can make significant progress as an international currency due to China's hesitant liberalization and lack of deep and complex financial markets.

The main objective of this article is to caution those who believe that China's RMB will never become an international currency due to its economic inefficiencies. Based on the academic literature on international currencies, China's domestic markets and financial statecraft, and China's presence in the international market, we theorize that political power offers China a route to RMB internationalization that circumvents financial liberalization. An analysis of 2008-2018 panel data from the World Bank, OECD, Heritage Institute, and other sources supports this theory. We estimate binomial logit regression models of the impacts of various measures of currency stability, financial market depth, and

Chinese political power on the likelihood that countries will form a clearing center or bilateral swap agreement (BSA) with China.

Our findings suggest that while traditional economic factors do contribute to the process of currency internationalization, variables that reflected the influence of political power seemed to have an equal or greater impact. We find that variables measuring political power had a significant impact on the formation of both bilateral swap agreements and clearing centers. Particularly, variables measuring participation in the OBOR initiative led to an increased likelihood of a BSA forming by 75% and a clearing center forming by 16%. From these observations, we conclude by offering an altered approach to international finance that includes a broader and more political perspective. To discover the impact of the variables within these categories, this study first reviews literature around elements of the Chinese economy and international currencies to see if the two are compatible.

Our paper proceeds as follows: In Section II, we review the literature, where we uncover the primary characteristics of currency internationalization and study China's domestic financial markets and international economic doctrines. This is followed by a brief discussion of the theory gathered from our literature review. Section III presents the data from various sources including the World Bank, OECD, Heritage Foundation, and others, and discusses some of the

observations made from our summary statistics. Section IV presents our theoretical regression and explains why a binomial logit equation was selected and descriptions of the variables used in this study. Section V discusses the results of our regression, as well as some of the implications of our findings. Finally, section VI presents our conclusions and the implications of our study's findings.

SECTION II: LITERATURE REVIEW

The studies surrounding of RMB internationalization and currency determination address three fundamental questions. First, what are the characteristics of a popular international currency? Second, what factors within the Chinese economy could enhance or stagnate the progress of RMB internationalization? Third, how does China develop its foreign policy doctrine to influence the spread of the RMB? This study reviews the literature on these three essential questions to uncover the key determinants of RMB reserves. This review reveals that key concepts are the stability of currencies, the structure of domestic financial markets, and the political power of the issuing country.

What Creates International Currency?

To start with stability, countries generally want non-volatile currencies to hold in foreign exchange reserves. Wilson (2015) writes on the many aspects of stability that allowed the US dollar to rise to its immense use in international trade settlements, such as large reserves, liquidity availability, and stable interest rates.

Wilson states that despite incidents like the 2008 global financial crisis, the use of the dollar by foreign entities has increased to its current level of around $5 trillion per day in foreign exchange transactions. Wilson argues that large reserves of the US dollar around the world provide incentives for countries to prevent the dollar from collapsing, creating a virtuous cycle that contributes to the currency's dominance. Li and Taube (2019) also emphasize the importance of stable interest rates, especially in regards to trade settlements and expansion, for creating an international currency. Finally, the liquidity of currency – a key component to its stability - is vital in the process of becoming an international currency. The reason, according to Wilson (2015), is that liquidity is needed to meet international demand for trade settlement since it provides a secure way for the currency to flow to and from a particular economy. Today, U.S. Treasury bonds provide much of this financial stability and liquidity, though the dollar is being challenged by several other currencies that hold many of the same traits.

The second necessary factor for the development of international currency is the breadth and the depth of the financial industry of the issuing nation. The U.S. dollar comes from a nation that has long had an enormous and elaborate financial system. Wilson (2015) states that the U.S.'s expansive credit to its allies during the first and second world wars was a catalyst for creating an elaborate financial system. The U.S. expanded on this by allowing private financial institutions to spread overseas and creating a central bank to be a market maker

and provide liquidity. Deep and intricate financial systems also create network hubs, such as New York, where not only actual capital but human capital is exchanged as well. Meyers (2015) describes financial centers, including the semi-autonomous Chinese territory of Hong Kong, as catalysts for exchanges of information and financial knowledge. These environments allow foreign investors to become comfortable in the domestic financial markets of the respective nation, facilitating the internationalization of a currency as investors gain confidence.

However, some authors, such as McDowell (2019) and Cohen (2017), argue that through financial statecraft, a country can subvert this "requirement" and internationalize its currency without altering the dimensions of its internal markets. McDowell describes China's offensive and defensive strategies for such financial statecraft, stating that RMB Bilateral Currency Swaps (BSAs), is both a "sword and shield." BSAs are contracts that exchange of interest and principal in one currency for the same in another. They serve as a shield since they are designed to promote the use of RMB as a trade settlement currency and reduce China's dependence on the dollar. As a sword, BSAs function as short-term liquidity backstops outside of the IMF and World Bank for countries in difficult financial situations. BSAs enable the Chinese government to develop allies while undermining the US' ability to punish foreign governments. McDowell concedes, however, that BSAs have not been extremely successful in this regard and have instead led to China becoming a lender of last resort for high-risk countries. The

problems with BSAs notwithstanding, the spread of RMB clearing centers could enable the internationalization of the RMB without China becoming a lender of last resort (McDowell, 2019). A clearing center, or clearing bank, is an offshore financial institution through which RMB transactions can be cleared. Clearing centers are primarily operated by China's five state-owned commercial banks--the Industrial and Commercial Bank of China, the China Construction Bank, the Bank of China, the Agricultural Bank of China, and the Bank of Communications – each of which is granted RMB clearing permissions abroad. Additionally, Cohen (2017) offers further insight into China's financial statecraft strategies, stating China utilizes "cautious financial liberalization and diplomacy" to internationalize its currency through impressive efforts on the supply side, making the currency available to high-risk nations. From this, we see evidence for both BSAs and clearing centers as tools for RMB internationalization that do not require China to alter its internal economic system.

Finally, an international currency requires a nation to have political power. Wilson (2015) argues that the size of the US military and its leading status in many international organizations is a key explanation as to why the US dollar took hold as an international currency. Hofstedt (2009) also provides evidence of a first-mover advantage in setting up international agreements or organizations, which can increase a nation's power and political prestige. Countries can also gain political power through trade expansion. Li and Taube (2019) describe a

process in which countries can gain power in a trading nation by switching from a trade surplus to trade deficit, with the caveat that inflation and exchange rates do not change enough to hurt confidence in the currency.

Domestic Factors Influencing RMB Internationalization

Next, what domestic factors within China influence the spread of RMB in the international currency system? The published literature offers a few insights, including the importance of the operational capacity of Chinese banks, China's domestic financial restrictiveness and regulations; and corruption within China. To begin with the importance of operational capacity, Wu and Chen (2010) discuss the operational performance of banks within China – with shareholding commercial banks being a determinant to the spread of RMB into the international monetary system, which will be discussed in more detail in the section below. Wu and Chen describe China's banking system as a monopoly dominated by state-owned banks (SOBs), with shareholding commercial banks (SHCBs) holding a smaller market share, though they have enjoyed more opportunities in recent years due to reforms. Wu and Chen's data shows SHCBs to have lower operating costs than SOBs, due to property rights (which reduce the need for government coordination), the bloated size of SOBs, and the phasing out of RMB restrictions such as capital controls and interest rates imposed on foreign banks and SHCBs.

This has allowed SHCBs to expand its foreign exchange business and the use of RMB into the global investment environment.

Another key domestic factors in RMB internationalization is the freedom and complexity of Chinese financial markets. For example, Huang et al. (2013) describe China's rapid financial deepening since the 1970s and its growth strategy that utilizes policy distortions to repress costs. Some of these policy distortions include the People's Bank of China setting key interest rates, utilizing quantitative measures in monetary policy, and window guidance - where regulators influence the amount and composition of bank loans by communicating directly to bank executives. This repression, however, has not done serious damage to growth, according to Huang et al. In fact, it is cited by the authors as a source of stability that strays away from the market volatility of complete liberalization and allows for the government to direct resources where they are deemed appropriate. It could be argued that financial repression within China may signal stability to some investors McDowell's (2018); in other words, China's policy distortions may lead to a vote of confidence in the RMB as an international currency. Yet as China continues to liberalize, these domestic capital controls could be put into jeopardy. Zhang et al. (2019), argue that despite an improving score on OECD's financial restrictiveness index, China's opening to foreign competition will invite in more capital flows, enhancing competition but endangering the effectiveness of the domestic capital control regime. The literature suggests that while China

shows is well behind the U.S. in terms of financial liberalization, it is not unreasonable to predict that the stability offered by China's domestic capital controls may allow the country to circumvent the need for more significant financial liberalization.

Political Power: Foreign Policy's Influence on RMB Internationalization

The third, and probably broadest, division of the literature reviewed relates to the international determinants of RMB use. Stanley et al. (2018) describe China's gradual process of capital account liberalization along with a "closed at home, relaxed operations abroad" capital account system that has allowed the country to meet the qualifications for an international currency while maintaining domestic stability. This aligns with the theories of financial statecraft formulated by Cohen (2017) and McDowell (2019) that were described earlier in this review. Stanley et al. also touch on the rising status of China abroad and in international organizations, further contributing to the RMBs ability to become an international currency.

One of the most important aspects of the adoption of RMB as an international reserve currency is China's outward investments. Huang and Wang (2011) describe China as an important player in the global Outward Direct Investment (ODI) scene, with nearly $56.5 billion of ODI in 2009, a figure that grew at an average annual rate of 55 percent since 2003. Chinese State-Owned

Enterprises (SOEs) dominate its ODI, with much of the investment flowing towards the services sector (76.57%) and the primary sector (18.72%). Chinese firms care little about the institutional risks within a host's economy. Instead, they seek developing economies rich in raw resources and developed countries where China is at a comparative disadvantage. Dreger and Schüller (2017) show the developed side of the spectrum by investigating Chinese investment in Europe, which accounts for roughly 42 percent of China's ODI in developed countries. China's strategy in Europe, according to the authors, is to access the EU's internal market and move up the global value chain – usually accomplished by purchasing well-known or large European companies. The authors display similar findings to Huang and Wang's examination – that the debt-to-GDP ratio of a country is irrelevant to Chinese investors, with the most important factors being the market size of the country and its bilateral trade with China. Li and Taube (2019) also provide evidence for the effectiveness of Chinese ODI in European countries in RMB internationalization, with €500 million worth of RMB purchased for foreign exchange reserves in 2018.

China has inserted itself more intensively in developing countries than with OECD countries. Hofstedt (2009) describes China's interactions in Africa as extremely active and assertive. For example, China is actively engaged with many African supranational organizations, attending international summits, pledging $150 million for the development of a headquarters for the African Union,

providing development aid ($1.3 billion for debt relief for twenty-seven African countries between 2000 and 2003), and establishing “Special Economic Zones” to facilitate trade between China and Africa with added advantages for Chinese investors such as relaxed taxes and regulations. Perhaps most importantly, in 2008 China switched from a trade surplus with Africa to a trade deficit. As stated before, a trade surplus transitioning into a trade deficit is one of the key factors influencing the international spread of currency since countries are incentivized to adopt the currency into their reserves to protect against exchange rate risk. Finally, Li and Taube (2019) write about the One Belt; One Road (OBOR) mission - a massive infrastructure project aiming to connect China to Europe along the route of the old Silk Road. So far, sixty nations have joined the OBOR project and have agreed to terms of infrastructure, industrial investment, and financial cooperation during its development process. In regards to RMB internationalization, the OBOR has increased the trade volumes between China and the member countries dramatically. These increasing trade volumes, combined with added Chinese investment, incentivize countries to adopt RMB reserves to reduce exchange rate risk and facilitate international transactions, according to the authors. Furthermore, the shift in China’s trade orientation towards developing economies in Asia, Eastern Europe, and Africa will continue to be facilitated by OBOR, which, as discussed earlier in Hofstedt’s work, puts

China in a position of political power as more countries come to depend on the success of the Chinese economy and currency.

Finally, the role of offshore financial centers, Hong Kong, in particular, is paramount to the spread of RMB. Cheung et al. (2015) describe the first of China's offshore financial markets as Hong Kong, which opened RMB trading to the world in 2004. Meyer et al. (2010) describe the significance of Hong Kong for China and why the Special Administrative Region is so important for China's international capital flows. To elaborate, Hong Kong's status as an international networking hub with a stable rule of law and one of the highest scores of economic freedom allow for international investors to invest in the RMB without having to enter into the Chinese mainland's complex and restrictive financial structure. These RMB markets have spread across other financial centers as well, reaching out to Singapore, Sydney, New York, London, and other nations by 2014. According to Cheung et al. (2015), these international markets help investors become more comfortable with financial transactions done in RMB, providing a valuable component to the process of RMB internationalization. These offshore markets also provide liquidity, allow for companies to separate currency risk and country risks, and allow for diversification and management advantages – further contributing to the importance of RMB clearing centers.

Theoretical Framework

From the literature, we can begin to unravel part of the mystery surrounding the characteristics of currency internationalization and China's ability to progress in this realm. The literature as a whole exhibits three main characteristics to an international currency. First, international currency must have a sense of stability. Stability can come in many different forms, yet it is a key component for investors adopting a reserve currency such as the RMB. Investors are more likely to adopt the currency of a stable currency from a stable economy, as a form of reserves since they see it as a reliable retainer of value. Next, the literature suggests that an international currency's host country must have deep, free, and complex financial markets. These markets will allow international currency to respond appropriately to market forces and efficiently allocate financial resources. However, some scholars debate this – mainly with theories that financial statecraft and policy distortions can have a large influence on currency internationalization as well. Finally, scholars suggest that the political power of the issuing nation is key to the spread of an international currency. Political power can take many forms - by starting international organizations, increasing military size and influence, and growing the trade surplus or deficit to a point where many countries rely on the success of the issuer's economy. While China maintains political power as well as stability (at least in the short term), this study aims to uncover whether China's lack of deep and complex financial networks in the mainland impede the RMB's progress towards becoming an

international currency. Since data on RMB bilateral foreign exchange reserves and trading is not available, we will examine other features of RMB internationalization mentioned in the literature: RMB clearing centers and Bilateral Swap Agreements (BSAs). We theorize that with an economic stability increase in both China and a given country, there will be an increase in the likelihood of an RMB clearing center or BSA forming between the two countries., Likewise, China's political power will increase the likelihood of such institutions forming. However, we question to what degree the breadth and depth of financial markets will affect currency internationalization, especially in regards to China's internal markets.

SECTION III: CREATING AN INTERNATIONAL CURRENCY ISSUER: THE DATA

Sources of the Data

This study utilizes a few sources of data from 2008 to 2018 in the regression. Data was collected by country and year, with data on China separated from the data for China-specific variables. First, we utilize data from the World Bank for the inflation rate, GDP of each nation, and the percentage of stocks traded to GDP. Next, the OECD (Organization for Economic Co-operation and Development) gives us data for countries in the OECD and the OBOR (One Belt; One Road) initiative (OECD 2019). Third, the UN's Comtrade department

provides data on China's bilateral trade. Fourth, the American Enterprise Institute provides data on China's outflows of FDI. Fifth, we utilize data from Global Capital China and McDowell's study for RMB Bilateral Currency Swaps (BSAs) and Clearing Centers. Sixth, the Heritage Foundations Investment, Business, and Financial Freedom Indexes are used for both China and each country in the study. Each of these sources gathers data on a country-to-country basis. This section of the study will describe each of the data sources in detail and the significance of the contents in regards to the summary statistics.

World Bank Data – Inflation, Stocks, and GDP

First, this study analyzes data from the World Bank from 2008 to 2018 tracking the inflation rates, the GDP of each nation, and the value of stocks traded as a percent of total GDP in each country that reported to the World Bank. Beginning with the inflation rate variables, the inflation rate of each country (*INFLATE*), as well as China's (*CHNINFLATE*), is a key indicator of macroeconomic stability within the country. As stated in the theoretical framework section and the literature review, stability is a key determinant of whether or not a country will adopt a currency or invest in another country. Furthermore, the internal stability of a country could influence its willingness to adopt other international currencies into its markets. Finally, the last variable with data from the World Bank is China's value of stocks traded to GDP ratio. This

variable (*CHNSTOCK*) aims to test the second core element of an international currency's success – deep, free, and complex financial markets. This variable will help us analyze the impact of China's financial activity on a country's likelihood of adopting the RMB (World Bank, 2019). World Bank GDP in constant 2010 US dollars data was also collected to scale other variables used in this study to weigh the impact of China's investments and trade on a countries economy.

OECD Data

The OECD provided a list of countries participating in the One Belt; One Road (OBOR) initiative and in the OECD itself (OECD, 2019). The OECD data is used to create two independent dummy variables, *OBOR* and *OECD*. *OBOR* takes on a value of 1 if the country was listed as a participating member in the One Belt; One Road project in a report by the OECD (OECD, 2018). *OECD* reflects whether each country is a member of the OECD (1) or not (0). With these two variables, we can analyze both the impact of China's dual strategies for investment in developed versus developing countries and if the One Belt; One Road initiative has a significant impact on RMB internationalization.

UN Comtrade

Data from the UN's Comtrade department measures bilateral trade between China and its trading partners in nominal U.S. dollars (2019). This variable, *CHINATRADEGDP*, displays the trade flow between the two nations

from 2008 to 2018. With these variables, this study can gauge the impact trade volumes have on a country's decision to adopt the RMB into its financial systems. Trade volumes also reflect the elements of China's political power in a country's willingness to adopt its currency. Hence, countries with higher trade volumes with China could be more likely to adopt the RMB to protect against exchange rate risk and ease increased transactions with Chinese counterparties.

American Enterprise Institute

Third, data on China's outbound investments from 2008 to 2018 is collected from the American Enterprise Institute (2019). This data includes the investment each country receives from China in millions of dollars. The variable (*CHNINVESTGDP*) is included in our model to test whether countries receiving more Chinese ODI are more likely to conduct transactions in RMB or hold RMB as a reserve currency. If Chinese ODI does correlate with the country to adopting RMB into its financial transactions, this variable will signal the political power element of RMB, derived in this case from financial dependence. If Chinese ODI displays a negative relationship, it supports the theory that countries China invests in may not be developed enough to engage in a BSA or RMB clearing center.

Global Capital and McDowell

The next sources of variables provide us with information on RMB clearing centers (*CLRCNTR*) and Bilateral Swap Agreements (*BSA*). First,

information on RMB clearing centers was gathered from Global Capital China, a financial news website. This site provides a list of countries with RMB clearing banks along with the date of their foundation and links to local news articles detailing the formation of the banks (Global Capital, 2019). We transcribed this data into two key points, the country with the clearing center and the year of the clearing center's formation. which will be used as our dependent variable to represent a symptom of RMB internationalization, *CLRCNTR*. All countries start as 0s in the data set until an RMB clearing center is opened within their borders, at which point the year and following years for that country become a 1. Next, data from McDowell's article provides us with the participant country names and years that RMB BSAs were formed from 2008 to 2018 (McDowell 2019). These data serve as our second dependent variable (*BSA*), which will test a potential second characteristic of RMB internationalization, Bilateral Swap Agreements. As with the *CLRCNTR* variable, all countries start as 0s in the data set until a bilateral swap agreement is created between China and the respective country, at which point the year and following years for that country become a 1.

The Heritage Foundation

The final data source is the Heritage Foundation, which provides Business, Investment, and Financial Freedom Indexes. These indexes incorporate measures of the number of restrictions on components of a given country's economy to

produce a score from 0 (least free) to 100 (freest) (Miller et. al 2019). This study uses three of these metrics, the Financial Freedom index (*FINANCIAL_FREEDOM* and *CHNFINANCIAL_FREEDOM*), Investment Freedom Index (*INVESTMENT_FREEDOM* and *CHNINVESTMENT_FREEDOM*), and Business Freedom Index (*BUSINESS_FREEDOM* and *CHNBUSINESS_FREEDOM*). Investment Freedom and Financial Freedom serve to test the relationship between depth and breadth of financial markets and the adoption of RMB. (McDowell 2019) and (Stanley et al., 2018). Finally, Business Freedom gauges the stability of a country's economy, as well as China's, based on economic theories of efficient markets. To elaborate, Miller et al. (2019) describe how low business restrictions allow markets to quickly adapt to new market conditions, leading to long-term stability. Our analysis of the summary statistics below provides greater insight into how each of the variables is used and the data observed within each variable.

Analysis of Summary Statistics

Table 3.1 Summary Statistics

Variable	N	Mean	Standard Deviation	Minimum	Maximum
Stability					
INFLATE	1342	5.75	6.93	-8.97	121.74
CHNINFLATE	1342	2.80	1.89	-0.73	5.92
BUSINESS_FREEDOM	1342	66.06	16.44	20	99.9
Depth and Breadth of Financial Markets					
CHNFINANCIAL_FREEDOM	1342	28.10	3.92	20	30
CLRCNTR	1342	.06	0.25	0	1
FINANCIAL_FREEDOM	1342	51.13	18.24	0	90
INVESTMENT_FREEDOM	1342	54.35	21.98	0	95
CHNINVESTMENT_FREEDOM	1342	25.90	3.55	20	30
CHNSTOCK	1342	118.77	86.05	17.16	357
CHNBUSINESS_FREEDOM	1342	51	2.57	46.4	54.9
Political Power					
CHNINVESTGDP	1342	0.03	0.07	0.0001	0.96
CHINATRADEGDP	1342	0.10	0.16	0.006	2.219
OECD	1342	0.26	0.44	0	1
OBOR	1342	0.41	0.49	0	1
BSA	1342	0.13	0.34	0	1

Once the summary statistics are collected from the data used in the regression, a few observations can be made from the above table (see Table 3.1). For context, this study uses panel data from 205 countries and regions with available information from 2008 to 2018, resulting in 1342 observations. There are more than the 195 sovereign countries that the UN recognizes due to the importance of specific regions or non-recognized countries in the data. For instance, Hong Kong, Taiwan, and Macau play a huge rule in trade with China – yet they are not recognized as sovereign countries by the UN. There is much

controversy surrounding the legitimacy and sovereignty of these nations, yet this paper is focused on tracking the economic impact of China's currency in the international sphere. Hence, countries and regions that contribute heavily to RMB internationalization but have questionable sovereignty will remain in the study.

Next, we will examine the variables that measure economic characteristics, such as inflation and stock trading activity. Beginning from the top, the first variable, *INFLATE*, displays the ith countries' level of inflation on an annualized basis. The variable has a mean of 5.72 with a standard deviation of 6.93. This demonstrates that while there are some countries with higher levels of inflation (i.e. countries such as Argentina or Zimbabwe) a vast majority of countries do not go above 17% inflation. *CHNINFLATE*, the variable that displays China's level of inflation from 2008 to 2018, has remained relatively stable during this time. With a minimum of -0.728% and a maximum of 5.92%, China seems to have kept its inflationary volatility low the past few years. However, with an economy as large as China's, a few percentage points in either direction could have a profound global impact. The next variable, *CHNSTOCK*, investigates China's financial activity from 2008 to 2018. From the data, it is clear that China has a very large stock market in proportion to its GDP – averaging 118% of its GDP in the value of stocks traded. However, there is a large standard deviation to this statistic (86.047), indicating that China's stock activity has not been consistent during the past decade and a half. This could be

due to China's low scores on the financial and investment freedom indexes, indicating that China's stock market activity could have been severely limited at times due to regulations or financial restrictions.

The next category of variables uses data from the Heritage Foundation's Economic Freedom Index which scores countries from 0 to 100 (0 being completely restricted; 100 being fully free) based on various metrics in different categories ranging from investment to business freedom. This study examines both the scores of the ith country and China to examine their significance on whether or not a country will be more likely to adopt the RMB in the form of a bilateral swap agreement or a clearing center. Beginning with our variable for financial freedom, *FINANCIAL_FREEDOM*, the average score of 51 signifies that many countries fall on both sides of the spectrum, as well as in the middle, of the financial freedom index. However, China's financial freedom score(*CHNFINANCIAL_FREEDOM)*, is consistently between 20 and 30, which the Heritage Foundation refers to as the "repressed" zone. This seems to align with our literature review, particularly the Stanley reading where China's financial restrictions and their impacts were described in detail. Next, the variables measuring investment freedom seem to describe a similar situation. The variable *INVESTMENT_FREEDOM* shows an average score of 54.31 with a large standard deviation of 21.97, indicating there is a wide range of scores across countries from 2008 to 2018. *CHNINVESTMENT_FREEDOM*, on the other hand,

seems to describe a more consistent narrative, with scores remaining between 20 and 30 for the period examined. The final variables examined in this category measure business freedom. Interestingly, the average scores, despite having a standard deviation of 16.436, are significantly higher than the averages for investment and financial freedom. This could be due to the effects of globalization in the twenty-first century – as countries uncover the benefits of foreign investment and freer economic systems in a globalized world, they may be more likely to lessen restrictions on businesses. However, some countries still may wish to indulge in financial protectionism to protect against foreign influence, which may cause lower averages for financial freedom and investment freedom around the world. China, perhaps unsurprisingly, falls below the average with a score of 50.99 and a small standard deviation – indicating that the country still suffers from the rigidity of regulations on investment, business, and financial activity.

The next category of variables reflects China's investment and trade with certain nations. We will test whether or not these variables have a significant association with the likelihood a country will enter into a bilateral swap agreement or open an RMB clearing center. The first variable, *CHNINVESTGDP*, takes the total foreign direct investment China sent to the ith country in a specific year and divides it by that countries' GDP to capture the scale of Chinese investment in that country's economy. From the table, countries receive an

average of about 3.3% of their GDP in Chinese investment. There are some larger percentages as well, including the maximum of 96.4% for Niger, which received Chinese investment nearly equivalent to its entire GDP in 2009. The next variable, *CHINATRADEGDP*, examines the amount of trade between the ith country and China and divides this number by the ith country's GDP. Being one of the world's largest exporters and one of the largest trading powers, China trades in great quantities with many different countries. Thus, perhaps unsurprisingly, the average country in this study trades the equivalent of 10% of its GDP with China, displaying China's economic might in regards to trade. Overall, these variables display the sheer economic power China possesses, indicating that countries more dependent on Chinese trade and investment may be more likely to adopt processes conducive to RMB internationalization.

The final category of variables are dummy variables that reflect participation in international organizations, or this case the One Belt One Road Initiative (*OBOR*) and the Organization for Economic Co-operation and Development (*OECD*). *OBOR* measures whether a nation is involved with the OBOR project. The mean of 0.406 indicates that many nations were involved in the OBOR project during the study - 70 in all. OECD's value reflects whether the country is a member of the OECD. The average of 0.26 indicates that only a minority of countries are in the OECD. The final two dummy variables serve as our dependent variables, *BSA* and *CLRCNTR*. First, BSA examines whether or not

the ith country has a bilateral currency swap with China in the year observed. As the average indicates, most countries do not have a bilateral swap agreement, which aligns with theories that China has a long way to go towards internationalizing their currency. Finally, *CLRCNTR* examines whether or not the ith country has an RMB clearing center, a crucial tool in the process of RMB internationalization. However, the average shows that even fewer countries possess one of these critical components for RMB internationalization. Again, this reinforces the narrative that China has a long way to go in regards to convincing countries to switch to the RMB as an international medium of exchange. With the summary statistics summarized, we will now proceed to our theoretical model to describe how each of these elements will be utilized to uncover some of the determinants of RMB internationalization.

SECTION IV: THEORETICAL REGRESSION

Binary Logistic Models

We estimated two binary logistic models (see Models 1 and 2), with and without country and time fixed effects, to measure the spread of the RMB internationally through a variety of different elements, ranging from financial freedoms to inflation rates. The two models have the same independent variables. Model 1's dependent variable is *BSA*, which has a value of zero for a country without a bilateral currency swap agreement with China and a value 1 if a country does possess such an agreement for every year after the year of inception. Model

2's dependent variable is *CLRCNTR*, which takes on a value of 1 for every year a country possesses an RMB clearing center or 0 if it does not.

The binary logistic model was chosen since it addresses unboundedness issues that are inherent to linear probability equations. The model is estimated using the method of maximum likelihood method since the relationships among the variables in the logistic models are not linear.

Model 1: BSA Model

$$\begin{aligned} BSA_{it} = \ & \beta_0 + \beta_1 INFLATE_{it} + \beta_2 CHNINFLATE_{it} \\ & + \beta_3 CHNFINANCIAL_FREEDOM_{it} \\ & + \beta_4 FINANCIAL_FREEDOM_{it} \\ & + \beta_5 INVESTMENT_FREEDOM_{it} \\ & + \beta_6 CHNINVESTMENT_FREEDOM_{it} \\ & + \beta_7 BUSINESSFREEDOM + \beta_8 CHNSTOCK_{it} \\ & + \beta_9 CHNBUSINESSFREEDOM_{it} + \beta_{10} CHNINVESTGDP_{it} \\ & + \beta_{11} CHINATRADEGDP_{it} + \beta_{12} OECD_i + \beta_{13} OBOR_i + \varepsilon_i \end{aligned}$$

Model 2: Clearing Center Model

$$\begin{aligned} CLRCNTR_{it} = \ & \beta_0 + \beta_1 INFLATE_{it} + \beta_2 CHNINFLATE_{it} \\ & + \beta_3 CHNFINANCIAL_FREEDOM_{it} \\ & + \beta_4 FINANCIAL_FREEDOM_{it} \\ & + \beta_5 INVESTMENT_FREEDOM_{it} \\ & + \beta_6 CHNINVESTMENT_FREEDOM_{it} \\ & + \beta_7 BUSINESSFREEDOM + \beta_8 CHNSTOCK_{it} \\ & + \beta_9 CHNBUSINESSFREEDOM_{it} + \beta_{10} CHNINVESTGDP_{it} \\ & + \beta_{11} CHINATRADEGDP_{it} + \beta_{12} OECD_i + \beta_{13} OBOR_i + \varepsilon_i \end{aligned}$$

Additionally, we have estimated both of these models with and without fixed effects by country and time. This is done to control for time-invariant

characteristics that vary between countries and characteristics that impact all countries equally in each period. However, future research would need to explore further approaches to dealing with the binary outcome variable in a time-series cross-sectional data structure. It is widely known that this data structure presents challenges in recovering estimates especially when using fixed effects to account for unobserved heterogeneity (see Beck et al., 1998; Beck N., 2018; Greene et al., 2002; Kropko and Kubinec, 2020).

Dependent Variables

We chose *BSA* and *CLRCNTR* as dependent variables. We believe them to be characteristics of RMB internationalization and other data measuring it is difficult to obtain. To elaborate RMB currency reserves data is unavailable due to its confidential and sensitive nature. But we consider RMB clearing centers and bilateral currency swap agreements to be two signals of RMB internationalization. McDowell (2018) states that "the RMB's future as a trade settlement currency will depend…on the spread of RMB clearing centers." McDowell also argues in his paper that bilateral currency swap agreements carry evidence of being "financial statecraft" on the part of the Chinese government. While he concludes that oftentimes these swaps are utilized by high-risk countries in a roundabout way to get US dollars, they also display evidence of becoming an effective tool for the internationalization of the RMB, given that China is willing to take a lender of last resort role. There is evidence of China heading down this route,

especially with some of its investments in high-risk areas (see Hofstedt, Huang & Wang, and Dreger & Schüller). As for clearing centers, as stated above, McDowell's (2018) conclusion offers RMB clearing centers as a preferable measure of RMB internationalization, stating that they provide an essential source of RMB liquidity in foreign markets. With these factors considered, we believe that tracking both the presence of clearing centers and bilateral swap agreements accurately portrays the internationalization of RMB.

Independent Variables

In regards to our independent variables, we expect to see several categories of relationships. Table 2.1 summarizes our hypotheses. First, if China is heading down a lender of last resort route to RMB internationalization, we should see some evidence of countries with weaker or riskier economies possessing bilateral currency swap agreements (*BSA*) or RMB clearing centers (*CLRCNTR)* with China. If this is the case, we expect to *INFLATE* to carry a positive coefficient, so that countries with higher inflation rates will be more likely to possess an RMB clearing center or BSA. However, we are unsure whether China's inflation rate (*CHNINFLATE*) will be significant to the spread of RMB internationally, at least in regards to BSAs and RMB clearing centers. We also believe that countries with lower scores on *FINANCIAL_FREEDOM*, *INVESTMENT_FREEDOM*, and *BUSINESS_FREEDOM* will be more likely to possess a BSA or clearing center.

Another element of our study concerns the complexity and size of financial markets. We believe that *CHNSTOCK* will carry a positive coefficient, as it reflects the depth of China's financial markets through the volume of stocks traded to GDP. We also track China's scores for business freedom, investment freedom, and financial freedom (*CHNBUSINESS_FREEDOM*, *CHNINVESTMENT_FREEDOM*, and *CHNFINANCIAL_FREEDOM*, respectively). These serve to help us examine whether free financial markets have a relationship with bilateral swap agreements and clearing centers. If our hypothesis is correct, the coefficients on these variables will not be statistically significant.

The final category of independent variables addresses the third element of international currencies, the political power of the issuing nation. We expect *OBOR*, a dummy variable representing a country's participation in the One Belt; One Road initiative, to be positive. Conversely, we believe that *OECD*, representing whether a country is a member of the OECD, to either be insignificant or negative since China is not a member of the OECD and may wish to gain power relative to that prominent international organization. Additionally, we include *CHNINVESTGDP*, which tracks China's investment in the ith country divided by the ith country's GDP during a specific year, and *CHINATRADEGDP*, which utilizes the same measurements in regards to net trade. We expect *CHINATRADEGDP* to carry a positive coefficient and *CHNINVESTGDP* to be

either 0 or negative. In regards to *CHNINVESTGDP*, Dreger and Schüller (2017) show that China invests in places where it is at a comparative disadvantage or investing in a low-value primary industry. From this observation, we predict that countries with high levels of Chinese investment will either not be interested in a BSA with China or will not have the financial capacity to enter into a BSA or accept an RMB clearing center. On the other hand, we expect trade to have a positive relationship with both clearing centers and BSA agreements. This is reinforced by the findings of Li and Traube (2019), who argue that China's increased trade with a nation will help facilitate the spread of RMB into that countries economy – both through exchange rate pressure and diplomatic reasoning. With these independent variables selected, we can test our hypotheses regarding the three major elements of international currency: stability, deep and free financial markets, and political power.

Violations of the Classical Linear Regression Assumptions

The data employed in our model estimate could exhibit characteristics that violate a classical linear regression model, specifically through multicollinearity, serial correlation, and, heteroskedasticity. We considered these issues, though it is worth noting that a binomial logit model is non-linear. First, to assess multicollinearity, we estimated both of our models using ordinary least squares (OLS) and calculated the Variance Inflation Factors (VIFs) for each variable. All

variables, except for *CHNFINANCIAL_FREEDOM*, fell under a VIF of 3.5. *CHNFINANCIAL_FREEDOM*'s VIF of 4.12 suggests collinearity with another variable, biasing the standard errors higher and reducing t-statistics lower. We kept CHNFINANCIAL_FREEDOM in the model since our theory on the importance of China's internal financial market policies supports its inclusion, and we wanted to avoid omitted variable bias that would likely result from excluding it.

Turing to serial correlation, the nature of the data is that there is serial correlation in the dependent variables because their values become 1 and remain 1 when a nation enters a BSA or clearing center agreement with China. The current SAS software, however, does not have a correction for serial correlation for binomial logistic models. The Generalized Method of Moments (GMM) estimator was considered, but time constraints prevented this advanced method from being implemented. Lastly, in regards to heteroskedasticity - since the independent variable only takes two values, the concept of variance is not the optimal way to describe the dispersion of the independent variable. Because of this, we do not test or correct for heteroskedasticity in our models.

Table 4.1: Hypotheses and Tests

Number	Hypothesis	Expected Sign	Null hypothesis
H1	*INFLATE*: Countries with higher inflation rates will attract BSAs and clearing centers.	$\beta_1 > 0$	$B_1 \leq 0$
H2	*CHNINFLATE*: As China's inflation rate increases, BSAs and clearing centers will become less likely to form	$\beta_2 < 0$	$\beta_2 \geq 0$
H3	*CHNFINANCIAL_FREEDOM*: As China's financial freedom increases, a country is more likely to have a BSA or clearing center	$\beta_3 > 0$	$\beta_3 \leq 0$
H4	*FINANCIAL_FREEDOM*: Countries with increased financial freedom are less likely to enter a BSA or clearing center.	$\beta_4 < 0$	$\beta_4 \geq 0$
H5	*INVESTMENT_FREEDOM*: countries with higher scores of investment freedom are less likely to have BSAs or RMB clearing centers	$\beta_5 < 0$	$\beta_5 \geq 0$
H6	*CHNINVESTMENT_FREEDOM*: As China's investment freedom increases, the likelihood of BSAs and clearing centers occurring in countries will increase	$\beta_6 > 0$	$\beta_6 \leq 0$
H7	*BUSINESS_FREEDOM*: Countries with higher scores in business freedom may be less likely to receive RMB clearing centers or BSAs	$\beta_7 < 0$	$\beta_7 \geq 0$
H8	*CHNSTOCK*: As China's levels of stock activity increase, it is more likely that countries will adopt RMB through BSAs or clearing centers	$\beta_8 > 0$	$\beta_8 \leq 0$
H9	*CHNBUSINESS_FREEDOM*: As China's business freedom increases, then it is more likely that countries will adopt the RMB through clearing centers and BSAs	$\beta_9 > 0$	$\beta_9 \leq 0$
H10	*CHNINVESTGDP*: As countries receive more investment from China, they may be less likely to RMB through clearing centers or BSAs	$\beta_{10} < 0$	$\beta_{10} \geq 0$
H11	*CHINATRADEGDP*: countries that trade more with China in proportion to their GDP may be more likely to adopt the RMB through clearing centers and BSAs	$\beta_{11} > 0$	$\beta_{11} \leq 0$
H12	*OECD*: Countries within the OECD will be less likely to have clearing centers or BSAs with China	$\beta_{12} < 0$	$\beta_{12} \geq 0$

H13	*OBOR*: countries within the OBOR project will be more likely to have clearing centers or BSAs with China	$\beta_{13} > 0$	$\beta_{13} \leq 0$

SECTION V: REGRESSION ANALYSIS

Our estimates for all four estimated models are displayed below (Figure 3.1). In the text below, we interpret coefficients as the increase in the probability a country will have a BSA or clearing center with China. Consistent with standard practice (Studenmud, 2015) we divide coefficients by 4 to account for curvature in the relationship captured by binomial logistic models. We have divided our results into three categories based on the three major themes of international currencies examined in this study: stability, deep and complex financial markets, and political power.

Figure 3.1: Regression Model Estimates

	BSA FE (1)	**BSA no FE (2)**	**ClrCntr FE (3)**	**ClrCntr no FE (4)**
Variable	Coefficient	Coefficient	Coefficient	Coefficient
INFLATE	0.2869	0.037 *	0.3779	-0.00074
	0.5451	0.0037	0.6929	0.9863
CHNINFLATE	28.1723	-0.0284	7.0387	0.079
	0.7123	0.6467	0.9347	0.5514
CHNFINANCIAL_FREEDOM	2.7376	-0.00974	1.4997	0.0513
	0.929	0.8341	0.9147	0.4232
FINANCIAL_FREEDOM **	0.1325	0.0549 *	0.3105	0.0716 *

	0.7793	<.0001	0.3535	<.0001
INVESTMENT_FREEDOM **	-0.1886	-0.0535*	0.0189	-0.0313*
	0.6541	<.0001	0.9686	0.0206
CHNINVESTMENT_FREE DOM	-3.1808	-0.00487	-1.8809	-0.0743
	0.7876	0.8902	0.8349	0.1731
BUSINESS_FREEDOM**	-0.0271	0.0683*	-0.1319	0.0685*
	0.962	<.0001	0.7846	<.0001
CHNSTOCK	0.0669	0.00127	0.00913	-0.0008
	0.6681	0.3332	0.9691	0.6276
CHNBUSINESS_FREEDOM **	3.5438	0.2322*	3.2413	0.6791*
	0.944	0.0001	0.8862	<.0001
CHNINVESTGDP	33.9374	-7.4696*	-17.6069	-15.59
	0.6994	0.0198	0.8971	0.1096
CHINATRADEGDP**	-38.8854	1.0708*	2.3222	2.8916*
	0.705	0.0198	0.9833	0.0006
OBOR **	-	2.8514*	-	0.6448*
	-	<.0001	-	0.0377
OECD	-	0.169	-	0.4314
	-	0.6411	-	0.3092

*Denotes statistical significance of the estimate (95% confidence level)
**Denotes statistical significance of the variable for both clearing centers and bilateral swap agreements

All variables are derived from data on 205 countries and regions with available information between 2008 and 2018, resulting in a total of 1342 observations. Each column contains both a coefficient estimate (top) and p-value (bottom) for the variable in question. Inflation statistics for CHNINFLATE and INFLATE are from the World Bank Databank and are by consumer prices on an annual percentage basis. Chinatradegdp and Chninvestgdp both use UN Comtrade data to calculate a countries trade and investment from China as a proportion of the nation's GDP. Freedom Index variables are calculated by the Heritage foundation across a series of metrics. More information on how these metrics are calculated can be found here (www.heritage.org/index/explore). OBOR and OECD are dummy variables that display a 1 for all years if a nation is a member of the One Belt One Road initiative (OBOR) or Organization for Economic Co-operation and Development (OECD).

As displayed by our results, our regressions that account for time-invariant country-specific effects are insignificant. Unmeasured political and cultural factors may influence the insignificance seen in this equation. Yet, it is also possible that omitted economic factors are also swaying the variables within the fixed effects equations to be insignificant. Additionally, as discussed earlier, there is a wide array of literature that argues against using fixed effects in a binary logistic regression stating that it is ineffective towards uncovering unobserved heterogeneity. Even so, while the inclusion of economic factors could influence our fixed effects equations - our non-fixed effects equations show evidence that political factors also play a strong role. For the remaining analysis below, we will discuss the results of our regressions that do not use fixed effects – keeping in mind the potential effects of omitted variables and the potential ineffectiveness of the binary fixed effects equations to account for heterogeneity.

Stability

The first component of an international currency examined in our study is the stability of the issuing country's economy, as well as the economies of its partners. For this factor, we mainly used inflation indexes (*INFLATE* and *CHNINFLATE*) to measure economic stability. Beginning from the top, we notice that inflation (*INFLATE*) was positive and significant in the BSA equation yet insignificant in the clearing center regression. This provides evidence that while RMB bilateral currency swaps may be popular in countries with higher inflation rates. Yet, there is a lack of evidence for a correlation between that and RMB clearing centers. Next, China's inflation rate (*CHNINFLATE*) is insignificant in both regressions. The coefficient estimate for *INFLATE*, however, was of particular interest since it is only significant in the BSA models, in which it carries an estimated coefficient of 0.037. Here we find evidence that for every 1% increase in inflation, there is a 0.92% increase in the likelihood that a bilateral swap agreement with a specific country will form, all else held constant. This aligns with McDowell's (2019) theories of bilateral swap agreements as a mechanism for China to become a lender of last resort for higher-risk economies. However, the same does not apply for the formation of clearing centers which could indicate that there are different models of financial statecraft that China utilizes when internationalizing RMB, as discussed in McDowell's (2018) article. Following this reasoning, clearing centers could be indicative of China's efforts to internationalize the RMB in low-risk economies, whereas bilateral currency

swaps could be used in countries that have less desirable credentials. In regards to economic stability, the significance of the inflation rate of the ith country provides evidence that China may be able to be selective when choosing a partner for a clearing center or BSA.

Inflation does not capture the full scope of the economic stability of a nation. To account for this, our regression also incorporates the Business Freedom Index to offer insight into the stability of the business market within China and its trading partners. Miller et al. (2019) argue that countries with higher indexes of business freedom are more likely to operate efficiently and effectively, or are, in other words, stable. Our regression results back up these claims. The variables accounting for business freedom both within and outside of China (*CHNBUSINESS_FREEDOM* and *BUSINESS_FREEDOM*, respectively) were both found to be significant in both equations. For bilateral currency swaps, for every 1-point increase on China's Business Freedom index, the likelihood of a bilateral currency swap agreement forming increased by 5.81%, which is rather strong. On the other side, a 1-point increase in China's Business Freedom index increased the likelihood of a country developing an RMB clearing center by 16.98%, which is much stronger than the bilateral currency swap agreement. One possible explanation is that partner countries are sensitive to the business environment within China, as was discussed in Li et al. (2015) and Wu and Chen (2010). The ith country's business freedom index (*BUSINESS_FREEDOM*) also

seemed to have a slightly positive association with the creation of BSAs and clearing centers, with a 1-point increase on the business freedom index increasing the likelihood of a BSA or clearing center forming by 1.71% and 1.71% respectively. Business freedom seems to have nearly the same effect on both clearing centers and BSAs, indicating that the component may be equally important for the formation of both.

Overall, our regression provides support to some of the theories raised in the literature, particularly that of Stanley et al. (2018), who argued that China's financial strategies onshore and offshore differed greatly. These dual strategies, as was discussed in McDowell's (2019) article as well, allow for China to be selective in international finance while domestic policies lower foreign investors' sensitivity to particular economic concerns within China. However, it is important to keep in mind that the RMB is pegged to a basket of currencies, which started in 2004 after it was pegged to the US dollar for nearly a decade. Since China does not have a floating currency, inflationary measures may not be the best indication of economic stability. Even so, we are offered valuable insights by the regression in regards to China's financial statecraft and which countries the rising power potentially sees as targets for the international spread of RMB. Also demonstrated is the importance of the Chinese business market in the development of RMB clearing centers and BSAs.

Deep and Complex Financial Markets

The next component concerns the "deepness" and the complexity of a financial market. To briefly recap, we hypothesize that China's financial market characteristics will not be relevant to the international spread of RMB due to the influence China's financial statecraft may play in the process. To test our hypothesis, our regression incorporates 5 separate variables (*CHNFINANCIAL_FREEDOM*, *FINANCIAL_FREEDOM*, *CHNINVESTMENT_FREEDOM*, *INVESTMENT_FREEDOM*, and *CHNSTOCK*) to measure the effects of external and internal financial market characteristics on the spread of RMB. In regards to China-specific variables, China's financial freedom score (*CHNFINANCIAL_FREEDOM*), investment freedom score (*CHNINVESTMENT_FREEDOM*), and stock activity to GDP (*CHNSTOCK*) were all found to be insignificant in both equations, according to our regressions. This indicates that our analysis failed to provide evidence that Chinese freedom index scores affect the adoption of RMB. While we cannot reject the possibility that *CHNFINANCIAL_FREEDOM* and *CHNINVESTMENT_FREEDOM* have no effect, Zhang et al. (2019) and Stanley et al. (2018), point out the stagnant progress of financial liberalization in China for the last few years, despite China's and the RMB's growing international presence. Findings within the literature support our hypothesis and suggest that China's strict internal financial controls

are not impeding its external processes of RMB internationalization despite the insignificant results in our regressions.

However, as was the case with stability, our regression provides evidence that China is selective towards the countries it spreads to RMB too. Financial Freedom (*FINANCIAL_FREEDOM*), for both clearing centers and bilateral swap agreements, was found to be significant in all equations. The same was true for Investment freedom (*INVESTMENT_FREEDOM*). As Huang & Wang (2011) pointed out, China does identify specific characteristics when investing in certain sectors or economies. These characteristics, which included whether China has a comparative advantage in a certain industry and the presence of crucial resources for China's economic progress, could also include the economic doctrines of a specific country as well. Additionally, both the BSA and clearing center regressions showed evidence of *INVESTMENT_FREEDOM* carrying a negative coefficient (-0.0535 and -0.0313, respectively) while *FINANCIAL_FREEDOM* carried a positive coefficient (0.0549 and 0.0716, respectively). Interpreting these coefficients, we find that holding all else constant, for every 1-point increase in *FINANCIAL_FREEDOM* and *INVESTMENT_FREEDOM*, the likelihood that a bilateral currency swap will form between a particular nation and China changes by 1.37% and -1.34% respectfully. On the side of clearing centers, for every 1-point increase in a *FINANCIAL_FREEDOM* and *INVESTMENT_FREEDOM*, the likelihood that an RMB clearing center will form in a country changes by 1.79%

and -0.78% respectively, holding all else constant. With these observations in mind, we reexamined the source of the data to uncover how investment freedom differed from financial freedom. Higher Investment Freedom, as described by the source, creates "maximum entrepreneurial opportunities and incentives for expanded economic activity, greater productivity, and job creation" and is hindered by "restrictions on the movement of capital." Conversely, financial freedom deals with "the availability of diversified savings, credit, payment, and investment services to individuals and businesses," and is hindered by "Banking and financial regulation by the state that goes beyond the assurance of transparency and honesty" (Miller et al. 2020). From these findings, we discover evidence that China may shy away from countries that have fewer restrictions on the movement of capital but be slightly attracted to countries that have less financial and business regulation, perhaps for the benefit of Chinese FDI.

Political power

The final element of international currencies within the regression is the political power of the issuing nation. Beginning with our variables *CHNINVESTGDP* and *CHINATRADEGDP*, these were designed to capture the effects of China's economic prowess on the internationalization of the RMB. China's investment as a percentage of a nation's GDP (*CHNINVESTGDP*) was significant for developing a bilateral swap agreement, yet insignificant for the

creation of an RMB clearing center. Conversely, China's trade as a percentage of a nation's GDP (*CHINATRADEGDP*) showed the inverse of these results, where trade was significant to the creation of a clearing center, but insignificant to a bilateral currency swap. The answer to why this likely is lies within the characteristics of clearing centers and bilateral currency swaps themselves. Bilateral swaps may be more characteristic to countries where China is hoping to grow its influence, where clearing centers may be more likely to form in countries whose economies have a high volume of Chinese trade. Even so, a closer examination of the variables' coefficients is needed to determine how certain characteristics influence the development of RMB clearing centers and bilateral swap agreements.

Upon closer examination, China's investment in proportion to GDP (*CHNINVESTGDP*) and China's trade in proportion to GDP (*CHINATRADEGDP*) seem to play different roles in the development of BSA and clearing centers. In regards to BSAs, Chinese investment seems to play a more influential role than trade. However, holding all else constant, for each percent increase of Chinese investment in proportion to ith country's GDP, the likelihood of a BSA forming between the two nations falls by 1.87%. A possible explanation for why this is lies within the Dreger and Schüller (2017) article, which explained that China tends to invest in areas where it does not have a comparative advantage. Since it has already been demonstrated through our data that BSAs are

more likely to form in countries with higher inflation rates, it is plausible that BSAs do not form in highly developed countries where China does not have a comparative advantage since those countries may not require a bilateral currency swap agreement with China since China is at a comparative disadvantage in that market. In developing countries – where China is investing in primary industries, there may be a negative relationship due to these countries being unable to participate in a bilateral currency swap due to weak financial capacity. However, further examination beyond the scope of this study would be required to confirm this theory. Conversely, trade plays a more significant role in the formation of a clearing center than investment. To elaborate, holding all else constant, a one percent increase in Chinese trade in proportion to the ith country's GDP increases the likelihood of a clearing center within the ith country by .27%. While a small percentage, the positive influence of trade on the formation of a clearing center could point towards how China is utilizing its massive export-based economy to catalyze the process of RMB internationalization, as was discussed in detail in Stanley et al. (2018) and Chueng (2015). Overall, the potential negative influence of investment on the formation of BSAs and the positive influence of trade on clearing center formation offers valuable insight into how China may utilize its economic-political power to facilitate the process of RMB internationalization.

Additionally, China's role in international organizations does play a role in the spread of RMB. The final variables of interest in the realm of political

power concern the spread of RMB through China's international organizations, particularly, the One Belt One Road Initiative (*OBOR*). To begin with the OBOR's effects on BSA formation, a country within the One Belt One Road initiative is 72.28% more likely to enter into a BSA with China, holding all else constant. Such a high percentage is supported by Li and Taube's (2019) theories on the implications of the OBOR initiative in regards to RMB internationalization. The authors discuss how OBOR trade expansion and RMB internationalization are mutually reinforcing, since allowing for internationalization offers protection from exchange rate risk as a country's trade value with China grows. For clearing centers, however, the estimated effect of the One Belt One Road initiative was also positive but not as strong. Holding all else constant, a country participating in the OBOR initiative increased the likelihood of a clearing center forming by 16.12%. Again, the positive effect of the OBOR may be due to countries looking to mitigate their exchange rate risk and facilitate trade settlements with China as trade between the two countries grows. However, there is evidence that suggests that China may be a bit more selective with clearing centers than bilateral swap agreements, as was demonstrated by the positive estimated coefficients concerning financial freedom. This line of thought may indicate that a nation may require a developed financial sector to receive a clearing center. In other words, developing countries in the OBOR may not have the financial capacity to maintain an RMB clearing center. Even so, further

research that accounts for a nuanced examination of the capabilities of a country's financial system is required to provide greater evidence to these suspicions.

Limitations on Regressions

Our study, while utilizing a wide array of data, was limited in a few regards. To begin, some variables measuring critical components of a country fell as insignificant or may not have been included in the study. For instance, OECD, which accounted for whether a country's economy is a member of the OECD (Organization for Economic Cooperation and Development), was incorporated into this study to examine whether a country's status as "developed" would help or hurt the spread of RMB within its borders. However, the variable was found to be insignificant in both equations. Yet, this does not mean that the economic development of a country or its wealth is unimportant to the process of RMB internationalization. Given more time and greater resources, a future study could incorporate more factors of development and wealth, such as median income, GDP per capita, or potentially the GINI index of inequality which would likely offer more valuable insights about the influence of wealth and inequality in the spread of RMB. There are endless potential contributors to the process of RMB on a variety of metrics, some of which could be extremely powerful and significant to the process of internationalization. While we encourage the investigation of RMB internationalization on all metrics, the limitations of this

study prevent us from examining such a wide array of possible indexes and metrics. It is also important to recall, as discussed in the previous section, that our data suffers from serial correlation due to the nature of data used for our dependent variables. Next, we acknowledge the shorter time frame of our study. Unfortunately, due to how recent RMB internationalization is as a concept, annual data was limited to the ten years between 2008 to 2018. Finally, the use of our two regressions with and without fixed effects only captures a small glimpse into the bigger picture of RMB internationalization. While our study's resources did not allow for a diverse array of regressions, future studies should consider utilizing multiple regressions on a wide variety of metrics to better understand the processes behind the spread of the RMB. Overall, while our study was not without certain shortcomings, we do believe it offers indications into some of the nuances of currency internationalization.

SECTION VI: CONCLUDING REMARKS

In this analysis, we discovered through our empirical examination of the internationalization of the RMB that political factors weigh heavily on the RMB's progress towards becoming a reserve currency. While traditional economic factors such as liberalized markets and financial stability did play a role in the process of internationalization, our study offers evidence to stress the importance of politics in developing an international currency. This is first supported by some of the

theories reviewed as well, specifically the works of Cohen (2018) and McDowell (2019) who argue that financial statecraft and diplomacy may allow a currency to internationalize without the issuing country meeting conventional requirements for its internal economic climate. In our regression analysis, we found that OBOR membership and trade with China as a proportion of GDP were two of the stronger determinants for both Bilateral Swap Agreements and Clearing Centers. However, it is possible that causation could go in either direction for these variables, warranting further investigation in future research. Furthermore, countries with high levels of financial and investment freedom were more likely to host a BSA or clearing center while China's scores in these areas were found to be insignificant in all equations. As our data section showed, the lack of variability within China-specific variables likely leads to the explanation as to why these scores are insignificant. While the insignificance of the China-specific variables does not allow us to make any conclusions, the estimated results from the scores of other countries hint towards evidence of the "sword and shield" approach to financial statecraft demonstrated within our data. Lastly, we discovered evidence of China investing in riskier economies through our inflation variable. This variable demonstrated an increased likelihood of a BSA or Clearing Center in nations with higher inflation rates. This could offer support to theories that China may be leaning towards a lender of last resort policy as both a political move and to spread the RMB to potential debtors.

However, some of the economic characteristics did play a vital role in determining the spread of RMB. For instance, China's Business Freedom Index score played a significant role in estimating the presence of a BSA or a clearing center in the ith country. This could indicate that China has not been able to entirely circumvent traditional economics to internationalize the RMB and that the characteristics of the Chinese market are still important to the equation. Additionally, the study of RMB internationalization is still relatively new. As a result, data on the spread of the RMB is somewhat limited. Because of this, our study needed to utilize the characteristics of RMB internationalization rather than empirical measurements of currency reserves or the use of RMB in trade settlements. Moreover, a potential weakness of this study is the relatively small number of variables used to represent each of the three factors suspected of driving RMB adoption. As discussed earlier, many more indexes and economic measurements should be included in future studies to more accurately gauge the importance of each of the three characteristics in international currency. This could offer a more insightful outlook on the impact politics has had on the internationalization of the RMB relative to the domestic and international economic characteristics of China and the world. Also, the use of fixed effects in a binary logistic model that uses panel data presents challenges in gathering estimates. Finally, future studies are recommended to apply more advanced

statistical techniques to address violations of classical econometric assumptions in similar models.

While there is still much research to be done on the internationalization of the RMB and how it spreads, this article aims to stress the importance of political power in the creation of international currencies. We argue that while China's economy may possess economic inefficiencies that hinder the international growth of the RMB, political power appears to allow China to overcome some of the economic inadequacies of its domestic capital markets and continue the process of internationalizing the RMB. In brief, the results of this study suggest that future analyses in the realm of international finance and the study of RMB internationalization should incorporate measures of political power and financial statecraft in models of currency internationalization.

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