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CENTRAL BANK BILATERAL CURRENCY SWAP AND TRADE FLOWS: AN  
IMPLICATION FOR RENMINBI INTERNATIONALIZATION

MOHAMMED ABDULLAHI AHMED

PHD

LINGNAN UNIVERSITY

2019

CENTRAL BANK BILATERAL CURRENCY SWAP AND TRADE FLOWS: AN  
IMPLICATION FOR RENMINBI INTERNATIONALIZATION

by  
MOHAMMED Abdullahi Ahmed

A thesis  
submitted in partial fulfillment  
of the requirements for the Degree of  
Doctor of Philosophy in Economics

Lingnan University

2019

## ABSTRACT

### Central Bank Bilateral Currency Swap and Trade Flows: An Implication for Renminbi Internationalization

by

MOHAMMED Abdullahi Ahmed

Doctor of Philosophy

The emerging economic prosperity of China and its increasing economic integration with the rest of the world as the second largest economy seems to give China an edge to amplify its global competitiveness. For example, the accession of China to World Trade Organization in the early 2001 has intensified its rapid GDP growth, growing trade and current account surpluses, financial inflows and growing stockpiles of reserves holdings. The global financial crisis of 2008 nearly put a halt to China's export-led and current account surpluses trajectory, in 2007 China's current account surplus fell from 10% of GDP to about 2% in 2013. This necessitates the internationalization of the Chinese Renminbi to boost trade, investment and hedge against foreign currency risk through bilateral currency swap. In bilateral currency swap, on the trade date, counter parties exchange notional amounts in two different currencies. For instance, one party receives 30 million British pounds while the other receives 3.3 million Chinese Renminbi. This implies a GBP/RMB exchange rate of 1.1, and at the end of the deal they swap again using the same exchange rate. Evidently, the currency bilateral swap agreements signed by the People's Bank of China and some Central Banks in advanced, emerging markets and developing economies is reinforcing the trend of Renminbi internationalization in global trade. The thesis applies trade gravity equation to investigate China's Renminbi bilateral swap agreements and trade flows. Empirically, we investigate impact of the bilateral currency swap agreements on international trade flows. Using large panel data of over 200 countries from 1990 - 2017 for the first time to the best of our knowledge. The empirical results show that currency swap as an emerging international trade agreement is trade creating. We find that the magnitude is relatively close to what is documented in the literature for other kinds of trade agreements like the currency unions and free trade agreements. This may potentially provide impetus for countries that embrace China's currency swap line. Similarly, most of the bilateral swap lines offered by People's Bank of China have been to countries that trade more with China. Furthermore, since bilateral currency swap enable countries to boost their liquidity access in the financial system for trade and financial transaction. Significantly, we examine the financial development of both China and its currency swap partners. The empirical results show that bilateral currency swap line matters for trade in countries with relatively low-level financial development.

**Keywords:** Central Banks, RMB Bilateral Currency Swap Line, China, Trade Flows and Financial Development.

## **DECLARATION**

I declare that this is an original work based primarily on my own research, and I warrant that all citations of previous research, published or unpublished, have been duly acknowledged.

  
 SIGNED

(MOHAMMED Abdullahi Ahmed)  
Date: 14/OCTOBER/2019



CERTIFICATE OF APPROVAL OF THESIS

CENTRAL BANK BILATERAL CURRENCY SWAP AND TRADE FLOWS: AN  
IMPLICATION FOR RENMINBI INTERNATIONALIZATION

by  
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Doctor of Philosophy

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## **ACKNOWLEDGEMENTS**

My supreme gratitude is to God almighty, the omniscient, and the omnipresent who had sphered my life in good health to undergo the research process that produce this dissertation to a successful fruition. I must also express words of gratitude to my parents for their general support to my life and upbringing, may God grant them ever lasting peace both on earth and hereafter. My appreciation also goes to all family members and well-wishers for their moral support, especially beloved sister Ummi Mohammed for her constant moral support throughout my academic journey.

I would like to thank my supervisors Professor Crozet Mathieu Daniel and Assistant Professor Whitten Gregory William for their valuable comments, support and guidance. Also, I appreciate the support of academic and administrative staff members of the Department of Economics, Lingnan University.

## **CHAPTER 1**

### **GENERAL INTRODUCTION**

#### **1.1 Introduction**

The first half of the 21<sup>st</sup> century witnessed one of the powerful international financial instrument in the space of international economics, known as “Central Bank liquidity swap” by Federal Reserve, which provides backstop liquidity to emerging markets and OECD countries during the global financial crisis in 2008.<sup>1</sup> This phenomenal adoption of central bank currency swap agreements is at best described using the aphorism “necessity is the mother of invention” the currency swaps emerged to ease the severity of the 2008 global financial crisis (see Goldberg and Kennedy, 2010; Destais, 2016; Kwon, 2015; and Liao and McDowell, 2015). Consequently, the central banks of some developed economies utilized and embraced a new international financial instrument (central bank currency swaps) as a swap line to one another to lessen the severe effect of the credit crunch (McGuire and Von Peter, 2012; Obstfeld, Shambaugh, and Taylor 2009).<sup>2</sup> In contrast, Campanella (2014) and Cheung et al. (2017) argued that the People's Bank of China's (PBOC's) objective was seemingly geared towards exploiting this tool to support trade, investment and promote the internationalization of its currency on a global scale with the aim to discard the domination of the US dollar in global trade (see Bank of Korea, 2012). Similarly, Cheung et al. (2011) opined that RMB-based trade policy relates to a combination of

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<sup>1</sup>Currency swaps enable central banks to exchange a set of amounts of local currency with another central bank at a fixed rate; this sort of arrangement is an important factor in the stabilization of financial market and facilitation of trade clearance. Foreign central banks could draw on those lines to provide liquidity to institutions within their jurisdiction, thereby, ensuring that domestic banks and firms have access to short-term capital for their trade activities.

<sup>2</sup>Currency swap provide short-term liquidity to help enhance financial stability for the both counterparts, especially in lubricating international trade.

factors like China's openness together with its current account surpluses and the bid to internationalize RMB.

Wilson (2015) reports that the Chinese (RMB) barely not visible in international trade or financial flows in the last eight years; its emergence now appears in blossom level. Since 2008, the People's Bank of China (PBOC) had signed the bilateral swap agreements (BSAs) with more than twenty-five counter-parties (central banks) in the bid to facilitate international trade and financial investment across the world. It is worthy to note that while several factors were at large behind the propagation of RMB usage in recent years, for example the emergence of China as the most significant trading nation provides an impetus for RMB internationalization. The share of China's world exports has grown from 3.9 percent in 2000 to 12.4 percent in 2014 surpassing the United States, a position it held over five decades (see Song and Zilibotti, 2009; Aizenman et al., 2017; Wilson, 2015 and Yang and Han 2013).

Therefore, with the growing importance of China in the arena of global affairs especially international trade, it makes sense for one to understand its proximate motive to internationalize the use of Renminbi (Cheung et al., 2011; Cohen, 2012; Roubini, 2009; and Eichengreen, 2011). This also coincides with the collapse of trade financing during the 2007 global financial crisis.<sup>3</sup> Within this period China's exports dropped by 20 percent. The PBOC'S response to the risk and problems was to encourage the Chinese exporters and importers to settle their trade transactions in RMB. In addition, the possession of RMB denominated deposits and bonds held by corporations in the offshore markets is highly prevalent around the world. For

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<sup>3</sup>Obstfeld, Shambaugh and Taylor (2009) provides a detail empirical results related to the financial stability and foreign currency reserves. Showing that country's reserve holdings and predicted reserve holding after crunch of credit in 2008 can significantly predict exchange rate movements of both emerging and advanced countries. Further indicating that the amount of swap to the total foreign reserve for a country is an indicator to predict GDP movement.

example, some trade transactions denominated in RMB had leaped from zero in the year 2009 to more than \$300 billion in the first three-quarters of 2012 (BIS, 2013). Primarily, the strategic element of the internationalization of China's Renminbi involves the negotiation of the bilateral swap agreements (BSAs) between the People's Bank of China (PBOC) with a growing number of partner central banks across the globe with the plan to propagate the cross-border trade and settlement of direct investments. So far, since 2008 more than 25 duly signed bilateral swap agreements came into effect. The preceded developments are arguments that provide ample motivation for this study.

Recently, only a few papers analyze the effect of the currency swap line on international trade flows. For example, Lin and Cheung (2016) employed Heckman's 2-step procedure to analyze the swap line partner's decisions to sign or not sign the China's local currency line. They employ some institutional, political, and economic variables like the economics sizes (GDP), political stability, the rule of law, corruption and strategic partnership between China and its counterparties, to explain what likely binds the currency swap agreement. The point of their argument based on the empirical results shows that China's swap line is undetermined by pure economic considerations: political and institutional factors also plays a key role. Edwin and Yu (2015) evaluate the potentials of China's Renminbi becoming a trade settlement currency, their quantitative experiments suggested that there is a broad scope for the use of renminbi in trade invoicing in the Asia-Pacific and beyond. Theoretically, the argument suggest that China needs to open its capital account and liberalize its financial market sector to gain the required thick market externalities for the Renminbi to emerge as dominant invoicing currency. After investigating the determinants of currency invoicing share in trade using euro as the case study, subsequently,

inferences drawn from the case study were used to benchmark the potentials of Renminbi as an invoicing currency at least in the Asia-Pacific region. Liao and McDowell (2015) empirically show that de facto trade interdependence and de jure economic integration are vital factors that determine the swap lines of China, with FDI inter-dependence having a partial effect. They argued that the existence of prior preferential trade agreement (PTA) and bilateral investment treaties (BIT) could increase the probability of the bilateral swap agreement (BSA) corporation. Aizenman et al. (2011) in general examine the possibility of swap lines to substitute or compliment international reserves, empirically they show that swap lines can reduce the need for reserve accumulation especially the Asia's stockpiling appetite.<sup>4</sup> Evidently suggesting that the scope for swaps to substitute reserves is limited, although the swap lines have weakened the precautionary motive for reserve accumulation in the Asian region. Similar studies that seek to analyze China's swap line in the light of RMB internationalization include Yang and Han (2013) applied inventory optimization to analyze the factors related to the optimal currency swap size between China and its trading counterparts. The findings show that the mean value of the foreign exchange demand, its volatility and the distribution form are essential for optimal swap size. Garcia-Herrero and Le (2015) argued that given the China's massive leverage position, it does not appear relevant for China to keep pushing for RMB internationalization since the leveraging process will continue to keep interest rates artificially low and makes the allocation of savings inefficient. More so, RMB

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<sup>4</sup> In the words of the Governor of the Central bank of Pakistan Anwar Yaseen, he says 'the currency swap agreement with China represented a watershed event. Without it, Pakistan would have faced a balance of payments crisis in 2013. Similarly, the swap deal helped Argentina's economy to boost its reserves. When the first swap took place in October 2014, the amount worth 814 million US dollars. Under the agreement, Argentina can also pay RMB when importing goods from China. In effect, the agreement saved Argentina from its financial woes, because if came shortly after it fell into its second default in 12 years ([www.chinaview.cn](http://www.chinaview.cn)2015-08-24).

internationalization is not sufficient to help Chinese government and corporate firms to fund themselves in the international markets without having a reliance on the US dollar.

The literature is well established both regarding theory and empirics that ‘currency swap’ is an essential tool to manage the effect of exchange rate volatility on trade. Particularly, for firms and countries that engage in international trade and investment (see Wei, 1999; Adam-Muller, 2000; Wong, 2003 and Broll and Wong, 2003). An excellent specimen of currency swap in recent decade is the People’s Bank of China’s bilateral swap agreements with the intent to cope with the volatility of its currency and that of its trade partners. Simultaneously, other objectives include RMB internationalization, promotion of bilateral trade and investment between the two signatories that signed currency swap in their local currencies for a specific time frame. Indeed, such agreements indicate a positive signal on the prevalence of liquidity of the other country’s currency in the onshore markets. Once currency swap line is into force, for example, China and say Korea, the exporter will borrow in the currency of importer, and sell the currency against the Renminbi and make use of Renminbi for its local exchange operations. On the expiration of the contract, the exporter will receive the currency of the importer to pay off the importing currency locally, with the respective differences having considered. Similar arrangement applies to Chinese importer. Therefore, in this respect the adoption of currency swap will substantially reduce the demand for an invoicing currency say US dollar.

In addition, once currency swap arrangements are into force, the exchange rate is determined, and naturally this give impetus to high imports, more especially when the other currencies are depreciating. Another major merit of swapping is the reduction of transaction costs and hedging against unforeseen volatility, which

facilitate the removal of invoicing currency like the US dollar. In other words, currency swaps provide a suitable platform for importers and exporters to counter currency risk. Similarly, another distinctive advantage of currency swap is the greater recognition of the currencies that entered into such international transactions. Invariably, today's dominance of China in the global currency swap agreements with many countries may likely pave way for RMB internationalization process.<sup>5</sup> However, whether this type of cross-currency swap agreements exert a substantial and significant impact on overall trade flows is an essential empirical question yet unanswered in the literature.

The thesis seeks to explain the ex-post behavior of China's Renminbi trade policy and the pattern of world trade, an essential novelty in this piece of work is to investigate the effect of currency swap on trade empirically. The literature of international trade provides a scanty evidence in this area. Therefore, our empirical investigation provides more elaborate discussion on currency swap and trade which will be of interest and relevance to the world. There are two novelties to this study. First, we take a line variant of the previous studies, and the foremost objective is to investigate empirically trade creation and trade diversion effect of the RMB-based trade policy-the bilateral currency swap agreements (BSAs) on bilateral trade. The study examines the positive impact on the counterparties to the agreement (trade creation) and the adverse effect on non-partner countries (trade diversion). Using the gravity model, we intend to show the empirical evidence of trade creation via ex-post analysis of the trade flows. Methodologically, the theory consistent structural gravity

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<sup>5</sup>Etymologically: the suffix international embodied international characteristics of a currency to RMB in the global economy (trade, investment and reserve currency). The measure of RMB internationalization in this premise is the recent bilateral currency swaps of the People's Bank of China (PBOC).

model is an essential tool in our research kits to unbundle our goal. Regarding the sample, we drew sample 27 countries that were into China's currency swap line for empirical analysis. Similarly, our analysis relies on a panel approach which accounts for country-pair fixed effects solely to circumvent the embedded endogeneity in trade policy analysis, and phase-in effects of the bilateral currency swap agreement, which has important implication for future significance of swaps on trade.

The outcome of our empirical findings reveals an apparently large impact of bilateral currency swaps on trade flows. Succinctly, on average, the estimates suggest that bilateral currency swap increases counterparts trade more than three times. An important caveat we hold is that currency swap might be different from other forms of international trade agreements, such as the currency unions, currency peg, and dollarization, and indeed they have a different impact on trade. In a similar vein, we also acknowledge that different econometric techniques deliver different results. The magnitude of the measured effects of the findings might skeptically rise concerns merelyweighing the effects to have been too large to believe. However, we square the results with other forms of international trade agreements in the literature to gauge a possibility that lies in between. For example, Glick and Rose (2016) found a fairlylarge impact currency union on trade in the magnitude of 114%. Earliest literature began with Rose (2000) that found triple effects CUs on tradethough this sound suspiciously large, and subsequent empirical finding even set out a more dampeningeffect (see Esposito 2017; Frankel 1997; Ghosh and Yamarik 2004; Baier and Bergstrand 2007; Magge 2008; and Eicher, Henn and Papageorgiou 2008).

## **1.2 Research Objectives and Questions**

1. The thesis set to examine the effect of the bilateral currency swap agreements (BSAs) on international trade flows.
2. To investigate the determinants of international trade flows between China and its counterparties to the bilateral swap agreements.
3. To examine relationship between trade and financial development in the light of Chinas' bilateral swap network

## **1.3 The Research Questions are as Follows:**

1. Does bilateral currency swap agreements (BSAs) increase members' international trade?
2. What are the determinants of international trade between China and the counterparties to the bilateral swap agreements?
3. Does currency swap matter for all countries with different level of financial development?

## **1.4 Contribution**

The study sets to augment to the general body of literature and knowledge of international economics, related to currency swaps agreement on international trade, and international bilateral agreements, documenting quantitative implication for the Renminbi internationalization, currency swapping and world trade. A vital avenue and a novelty for this research are to investigate empirically RMB bilateral swap agreement and trade effects as semi currency anchor and measure the extent of trade diversion/ trade creation. Given the increasing importance of China to the rest of the world in global trade, quantitative evaluation of RMB-trade policy and the pattern of trade would provide policymakers and academics a new insight on the effect of large

area currency swaps, economic integration, and global trade. Therefore, the thesis will extend the literature in this dimension, as a novel and promising research exercise to document what lies behind the phenomenal currency swapping as a unique type of international agreement on trade. The adoption of central bank bilateral currency swap agreements (BSAs) is one of the most significant international monetary developments of the post-2007 global financial crisis (see Details, 2016). Its implication has an unprecedented impact on the United States and China, let alone it is a far-reaching consequence for the rest of the world. The innovation of this sort will have profound effects on both financial development, reserve distribution, and the world's investment and trading system, although this is still far from clear.

### **1.5 Limitation of the Study:**

While concomitantly, a possibility of default and moral hazard may linger in this type of arrangement since central banks extend loans drawn from the swap line to commercial banks to raise liquidity level, especially in financing international trade and investment. This may lead to financial frictions, a problem that is likely to transform into financial crisis havoc (Rose, and Spiegel, 2012 and Details, 2016). Firms with liquidity need can borrow fund for financing trade through the commercial banks to cushion the effect of foreign exchange shortage and therefore, avoid the near collapse international trade flows. However, there were growing concerns advanced about challenges of the future swap agreement might lead to moral hazards problem. Since the central bank currency swap line prevented indiscriminate fire sales of assets and other undertaken that could have exacerbated the crisis during the currency mismatch (Goldberg and Kennedy, 2010; and Ruan, 2013). Therefore, firms risk-taking behavior will be out of control without due caution, given that many swap lines now almost appear to be permanent. In effect, this might encourage high

risk-seeking attitude by firms, leading to default, financial friction and subsequently colossal currency swap mismatch (Rose, and Spiegel, 2012). Because banks and firms felt assured with the expectation that central banks could provide them with foreign currency on the rainy days when markets shrink, firms can cover up with funds borrowed from central bank swap lines and making the banks to have a foreseeable safety valve for short-term funding and mopping other liquidity requirements. Therefore, due to data limitation the scope of the thesis and our empirical investigation will not cover issues of financial friction and swap default. Indeed, this is a pointer to a promising future direction of research in this area of international economics related to central bank bilateral currency swap agreements and trade flows.

## **CHAPTER 2**

### **RENMINBI INTERNATIONALIZATION**

#### **2.1 Renminbi Internationalization: Rationale and Strategy**

Over the last two decades, the Chinese authorities commenced an extensive process to liberalize and internationalize Renminbi particularly under premier Zhu Rongji since 1993. The Chinese authorities are committed to achieving full convertibility of Yuan (Renminbi) by the end of the century. Before this period, the Chinese economy had been operating under a tight capital control since the formation of the People's Republic of China (PRC) in 1949 (Cheung et al., 2017; Ito, 2011; Vallee, 2012; Yu, 2012; Chen and Cheung, 2012; and Park, 2010). However, the liberalization and financial market reform initiated in the 1980s set the center stage for the rapid expansion of the Chinese economy. In the year 1994, deliberate and conscious efforts were implemented to lessen capital account restrictions in a piecemeal fashion and eventually established current account convertibility in 1996 (see Gao and Yu, 2009). The Asian financial crisis 1997-8 put a temporary halt to this objective. The Asian economic upheavals of 1997-8 has made the Chinese authorities to relax its initial target of ensuring full convertibility by the close of the century. The global financial crisis of 2008 causes a decline in the overall trade financing due to US dollar shortage. In effect, this culminated to a massive decline in Chinese exports, and further exposed the unreliability of the existing international monetary system. The situation necessitates a move to safeguard against future reoccurrence, largely due to high reliance of the Chinese economy on international trade.

Consequently, as reported in Campenella, (2014) RMB internationalization is now at the apex of the economic policy of China enshrined in the codified 12<sup>th</sup> five-

year plan (for the period 2011-2015). The plan implementation of the plan is through the meticulous and strategic engagements of powerful economic and financial institutions of the Chinese economy: The People's Bank of China (PBOC), the Ministry of Commerce, and the Ministry of Finance. Similarly, the plan is designed to enhance the cross-border use of RMB and subsequent liberalization of its capital account. In recent years, we have witnessed a passionate commitment by the Chinese government to liberalize its capital account through gradual expansion of the Renminbi (RMB) for settlement of global trade, development of a robust offshore Renminbi environment. In the bid to facilitate this goal, firms domicile outside China can open Renminbi (RMB) accounts in mainland China (Shanghai and four cities in Guangdong province) or Hong Kong (He, 2012; Cui, 2013a; Cui, 2013b; and Germain, and Schwartz, 2017). Since 2009 this pilot scheme was in operation for RMB trade settlement – the scheme is the first legal framework undertaken by the authorities to use RMB for current account transactions.

To strengthen the internationalization process, the People's Bank of China (PBOC) declared its plan to develop and convert Shanghai into a global financial hub. In addition, new offshore clearing centers were extended in Singapore, Malaysia, and Europe. Furthermore, negotiations to strike more offshore deals in several other countries, like Canada, Australia, and the United States, are ongoing (Cheung et al., 2017). The extension of offshore Renminbi (RMB) is a strategic move towards promoting RMB as global investment currency for capital investment. The people's currency is now an asset class with a broad network of market participants that utilize it as an investment currency. The International Monetary Fund (IMF) on November 30, 2015 approved the inclusion of Renminbi in its Special Drawing Rights (SDR) baskets of currencies; this is another turning point for RMB to turn around with the

elite global currencies, including the US dollar, British Pound, Euro and the Japanese Yen. Although, the quest for the internationalization agenda still has a long way to go, however, the recognition of RMB as part of the SDR basket is indeed a watershed and a milestone for the internationalization objective (see David, 2016).

Gao and Yu (2009), and Subramanian and Kessler, (2012) maintained that before the active internationalization of RMB move, the Chinese government mildly started the liberalization of its currency and capital markets, due to concerns from its major trading partners. The people's currency has a history of the pegged exchange rate, for example from 1994 to 2005, Renminbi was pegged RMB 8.28 to US dollar one. In the second quarter of 2005, the Chinese authorities-initiated policies that gradually aided the basing of RMB value subject to a daily trading band and basket of currencies, though rigidly controlled around the range of  $\pm 0.3\%$ . Moreover, the Chinese authorities imposed tight capital controls. The relatively flexible exchange rate policy has made the RMB to appreciate by 21% from July 2005 to July 2008. During the 2008 global financial crisis, the People's Bank of China retained a peg policy to the USD from July 2008 through 2010, and in 2012, the trading band was increased to 1% and later 2% in 2014. However, RMB suddenly started witnessing two-way volatility in 2014.<sup>6</sup> The People's Bank of China (PBOC) declared a surprising devaluation in August 2015, which depreciate the value of RMB by 3% against the US dollar overnight. Since then RMB has depreciated continuously against the USD, which may also have to do with Federal Reserve raising its rate, to strengthen the US dollar relative to other currencies (Love and Chen, 2015; and Campenella, 2014).

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<sup>6</sup>The trading band was increased to 0.5% in 2007.

Chen et al. (2009) evaluate RMB internationalization process as part of the broader desire to reform and regenerate the international monetary system to represent a more diverse and interconnected global economy. In addition, the study reports that the use of RMB in trade financing has rapidly increase in recent years. In the same vein, another concern that leads to China's combined efforts to promote the cross-border use of RMB relates to the overall move to improve its financial liberalization program. In effect, to reduce China's reliance on the US-centric global financial system. Therefore, the RMB internationalization is to support the international monetary system reform. For example, the pace at which dollar accumulation expose many countries running surpluses in the current account, and by implication stand the risk of sudden dollar shortage. Internationalization of RMB in the subsequent years ahead is an alternative solution to this form of currency risk. In a way, this could help the move towards rebalancing the international monetary system that relies on few de facto currencies (Detais, 2016; and Eichengreen, 2011; and Chen and Cheung, 2009; Gao and Yu, 2009) argued that challenges still lie ahead for RMB; crucially the question is whether Chinese authorities will sequentially alter the status quo by ensuring more flexibility of the RMB exchange rates and full liberalization of the financial markets among factors others is key for RMB internationalization and becoming entirely part of the international monetary system reform. Nevertheless, along with the desire to fulfill the objective of international monetary reform several reasons account for the RMB internationalization. For example, Cheung et al. (2011) stressed that RMB's status does not match China's positioning in the world economy, as the second-largest economy. Among other reasons mainly advanced in the literature, including the following:

1. RMB internationalization will help in the reduction of currency risk for both the exporter and importer so that the acceptance of RMB as trade settlement currency would promote international trade and investment, which is beneficial for both China and its global trading partners.
2. RMB internationalization will reduce high exposure to dollar exchange rate volatility, given China's position as the holder of foreign exchange rate reserves and the lion share of the stockpile reserve is in US dollar (the dominant international reserve currency). Therefore, China's US dollar accumulation will likely reduce downward or reverse as RMB gains acceptance for global trade and investment.

Furthermore, Cheung et al. (2011), Ruan (2013), Yu (2012) and Ito (2011) emphasized arguments far from globalizing RMB as a store of value nor efforts build up a network of a financial hub in East Asia and beyond. They extend that the move is part of China's strategy to rebalance the lingering skewed international balance sheet - namely large and rapidly increasing exposure to foreign exchange rate risk. Stressing that the exposure derives from the combination of China's openness to direct investment from the rest of the world, current account surpluses, and lack of RMB internationalization. Furthermore, China like many advanced economies, at present it has a short position in its currency and a long position in other reserve currencies especially the US dollar (this accounts for inward direct investment and inward portfolio equity as RMB liabilities). Comparing China with Japan, the former now has a sizeable second source of its net foreign currency, with the persistently sizeable current account surpluses for a decade. The flows had cumulated into a stock known as the net international investment position, which is the difference between the nation's external assets and its liabilities. The continuous surpluses in China's current

account had built up and positioned the Chinese economy as a net creditor nation.

Cheung et al. (2011) added that the Chinese economy is converging with that of Japan at 40-50 percent GDP. In comparison, Japan's massive reserves position racked up over a generation, while China's standing witnessed a swift swing in a decade, moving from a net debtor of some 10% of GDP to a net creditor of 37% in 2009. Besides, in the case of China, the rest of the world's equity position and net investment in foreign currency, which is the sum of China's long position in foreign currency. In 2009, the amount approximated to 60 percent of China's GDP. The government absorbs the risk in the form of foreign exchange reserves financed by RMB liabilities (including reserves and Central Bank bills. The same authors argued that with RMB internationalization if some of China's claims to the rest of the world become RMB denominated, in turn, this would reduce the long foreign currency position of China when it claims on the rest of the world are denominated in RMB. Again, using Japan as an example, Cheung et al. (2011) further maintained that the international use of creditor country's currency could allow the rest of the world to share the creditor country's currency risk. Significantly, modest internationalization of Japanese Yen permitted the rest of the world to share the foreign exchange exposure as the world uses yen denominate both assets and liabilities. Moreover, the claim of Japan to the rest of the world equivalent to the modest amount of 2% of its GDP. Considerably, the Chinese economy in its short lifespan as a strong creditor nation has piled up substantial foreign exchange exposure like that of Japan (see Cheung et al. 2011, p. 47). However, in Japan case, most Japanese companies, like pension funds, and mutual funds received and held a stock of securities denominated in Yen, doubling its official reserve. Which is equivalent to one-third of the GDP, which is around 11.6 percent, denominated in Japanese Yen. In comparison, the net international assets as

a share of its GDP are still small relative to that of Japan. However, its overall long position in foreign exchange is as large as that of Japanese economy or even more significant. The long position is attributable to a more significant share of GDP in foreign holdings of equities in China due to the massive amount of foreign direct investment (FDI) inflows for almost two decades and lack of RMB internationalization. Therefore, the potential strategy seen to curb this challenge is RMB internationalization, mainly to ensure denomination of most of China's external claims in RMB. The combination of these entire factors made the Chinese authorities to put a proactive strategy in place to ensure RMB internationalization.<sup>7</sup> Cheung et al. (2011) refer this policy as “renminbization of China's claim to the rest of the world.” The People's Bank of China (PBOC) sets to achieve the full convertibility of its currency through triple steps. First, RMB as a global trade currency, where business outside China are acquainted with using RMB for its payments and receipts of goods and services traded. Second, RMB as a global investment currency has the main objective is to ensure that RMB is freely investible, i.e., investors can be able to move their RMB-based holdings across the border, and global firms may require the conversion of their earning in RMB into other currencies. Thirdly, RMB as a global reserve currency, with the increasing importance of China as economic leader in the arena of international trade, the government is determined to match its currency with its position (Li, 2013; Lai and Zhou, 2012; Kamps, 2006; and Eichengreen, 2011);

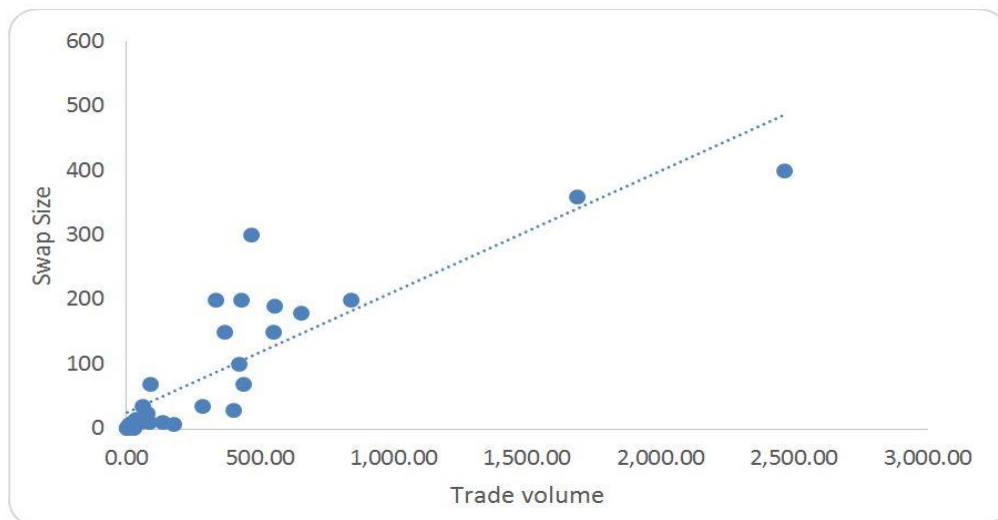
## **2.2 Renminbi Swap Line and Currency Network of China**

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<sup>7</sup>Additionally, another key factor resides in the objective of international system rebalancing; available evidence reveals that at least 30 world's central banks hold a portion of their reserves in RMB. Relatively, this is an indication of some level of acceptance of the RMB by number of Central Banks in the world, suggesting that RMB is effectively on the path of becoming a de facto reserve currency, although challenges such as inconvertibility and capital controls among other still lingers a head.

Renminbi (RMB) internationalization is receiving attention on commencement comparable to some of the China's initiatives such as the Asian infrastructure investment bank (AIIB) and the one Belt, and one Road initiative scheme. The government actively engage in the efforts to internationalize its currency (RMB). Although the Chinese capital account is, still relatively closed, non-resident investors cannot have access to RMB in international markets (Lin and Cheung, 2016; Gao and Yu, 2009; Park, 2010; Yu, 2012; and Chen and Cheung, 2011). Therefore, the alternative way to increase and encourage the international trade flow is through the swap line agreements even without opening of the capital account. The main aim of the currency swap agreement is to solve the problem of illiquidity in the time of downturn. For instance, taking the remote example of Asian financial crisis, after the crisis many Asian countries, including China, embraced a currency swap agreement under the canopy of the Chiang Mai Initiative (CMI). It follows that the United States entered a currency swap with several countries (such as Switzerland, Korea, Brazil, Mexico, and Singapore) to mainly provide liquidity in the form of US dollar to these countries. Most of the swaps are denominated in US dollars while others are in the local currencies (Liao and McDowell, 2015; Aizenman et al. 2011; Bowles and Wong, 2013; Cohen, 2012; McGuire and Peter, 2012). Going beyond the Asian regional cooperation, the currency swap line of China continuously raises to approximately 30 countries since 2008 (see Table 1). Besides, In addition, the broader purpose is to facilitate bilateral trade and investment.

Figure 1: Correlation Between Trade Volume and Swap Size (in billion RMB)



Source: People's Bank of China's News Release.

Bilateral swap agreements (BSAs) is not an entirely a new phenomenon. For example, in the aftermath of the global financial crisis, the Association of the South East Asian Nations plus the three largest East Asian economies – Japan, South Korea, and China signed the Chiang Mai Initiative (CMI) to guide against the future occurrence of liquidity shortage (see Aizenman et al. 2011).<sup>8</sup> The Chiang Mai Initiative is a regional network of bilateral swap agreements (BSAs) among its members affected by the Asian crisis by varying degree. In comparison, US Federal Reserve move to enter into the bilateral swap agreements displayed a preference for considering developed countries as BSA partners following the 2008-09 financial fallout. Mainly central banks of developed countries accounted for 10 out of the 14 temporary BSA counterparts. After that, in October 2013, some of the temporary BSAs were converted into standing arrangements with five developed countries, namely the Bank of England, the Bank of Japan, the European Central Bank, Swiss

<sup>8</sup> The CMI initiative was link to IMF program, after its multilateralization and then converted into a single agreement in 2008. Furthermore, the CMI size now worth \$240 billion in 2014 compared to the initial \$120 billion. In comparison, bilateral currency swap agreements of China signed after the 2008 global financial crisis is denominated in RMB, while the CMI initiative are denominated in USD.

National Bank, and Bank of Canada (Detais, 2016 and Goldberg and Kenney, 2010). These countries possess a high degree of financial openness with less history of sovereign default; this is important for the US Federal Reserve to minimize credit risks. Unlike the Federal Reserve, the PBOC's include many developing countries as BSA partners. Among the more than 30 useful BSAs, only six are with central banks of developed economies. No clear-cut evidence suggests that the decision of PBOC is not under the influence of geopolitical or institutional factors; somewhat in the quest for internationalization, the selection of China's swap line agreement is as open as possible. For instance, several countries with default history are a signatory to China's swap line, like Argentina. Even though, these countries may be keen to establish such kind of financial arrangements solely to improve their standing and guard against external shocks. Similarly, for such countries, Renminbi swap line is in their economic interest if China has fewer concerns over their sovereign default history (see Aizenman, 2011). Figure 3 shows the relative importance of its swap partners as a significant exports destination since 1970s.

Furthermore, the usage of RMB as trade and investment currency will help in the elimination of exchange rate risk both for Chinese firms and for their trading partners that requires funding for international investment. Liao and McDowell (2015) argued that economic motivations rather than geographical considerations drive the RMB internationalization. For example, trade and investment dependence concerns due to break off in credit market liquidity have motivated the People's Bank of China (PBOC) to provide swap line to obtain liquidity for trade and investment. Ruan (2013), Aizenman (2011), and Ito (2011)) maintained that bilateral currency swap cooperation is mutually symbiotic mechanism that is benefit to both countries. First, it provides trade-financing insulation against international liquidity shocks. Secondly, it benefits

both partners reduced transaction costs that may arise in cross-border trade and investments. Bilateral currency swap is also an alternative means for lubricating and financing international trade.<sup>9</sup> The initiative of bilateral currency swap agreements (BSAs) enable China and its trading partners to revert the over-dependence on US dollar for invoicing and settlement of trade. Therefore, PBOC's initiative makes economic sense as they help to reduce the risk of abrupt shocks and shield the exporters against currency risk, by eliminating the costs of hedging against foreign exchange rate risks. As whole, this help to lower the transaction costs of trade and investments (Wilson, 2015; Yang and Han, 2013; and Bowles and Wang, 2013).

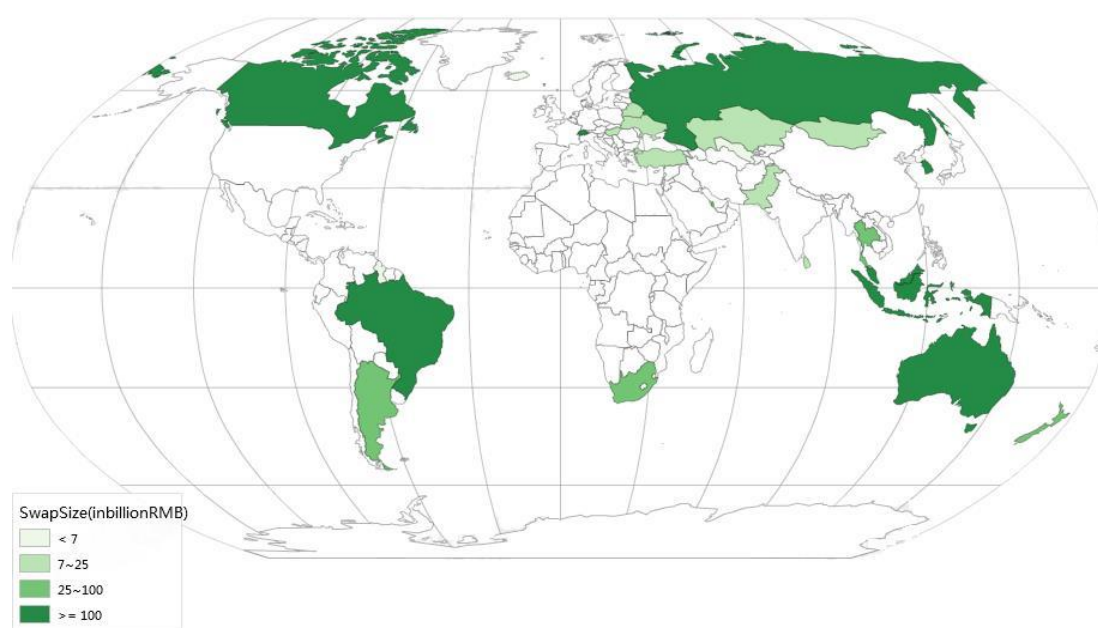
As discussed in Details (2016) currency swaps is another new channel through which central bank inject the equivalent amount of swapped foreign currency into the domestic financial system, in effect, the funds will be borrowed by commercial banks and other business entities to settle for imports the collaborating country. Conversely, exporters in the partner countries receive the proceeds mainly denominated their domestic currency, which will also reduce the cost of fund transfer. Furthermore, the central bank bilateral currency swaps are useful for managing the unintended consequences of capital markets break down, since some of the swap funds are channel into financial markets, at large this will elevate RMB's potential to emerge as the viable reserve currency for global central banks. It is relevant to note that with the rapid growth rate of China and most of the economies in the Asian region, Renminbi's prospect is likely to continue to manifest with greater acceptability than ever before (Eichengreen, 2011). The wide acceptability is an essential way to enhance the development of the Chinese capital markets. With the large and aging population of

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<sup>9</sup>The BSAs approach supplies RMB to central banks of China's trade partners for clearing trade.

China, this will also provide a higher yield as the populace finds a proximate capital investment at home and a new source of investment from global investors. Kwon (2015), Wilson (2015) and Cui, 2013 argued that Asia's emerging economic dominance could be projected in the coming decades will see the more significant interaction between central banks both in the region and across the globe, especially if the Renminbi sustains a pivotal position as a unit of account in the special drawing rights (SDRs). Importantly, for the fully fledged internationalization to accrue to RMB in the international monetary system, Chinese authorities must consolidate its position in the international community by establishing both economic and political role globally (Liao and McDowell, 2015). Figure 3 below depicts the average exports shares of China from 1970 to 2013 to its bilateral swap partners, and mirror exports shares of partners to China. Overall, we show that exports share from both directions exhibit an upward trend. In fact, this cursory signal reveals the increasing relevance of the role of Chinese swap agreements in the expansion of trade and investment in the global economy.

Figure 2: Geographical Location of China's RMB Swap lines



Source: People's Bank of China's News Release.

Significantly, another important factor that provides stimulus for China's volume of trade growth was the accession of China into World Trade Organization (WTO) in 2001. Fundamentally, synthesis of these factors has beset and driven the emergence of China as a global player on a world economics scale (see Kwon, 2015; Bowles and Wang, 2013; Roubini, 2009; Lao and McDowell, 2015; McCauley, 2011; Cohen 2012). Therefore, China is becoming a global economic player by many measures. Besides, all these advances, the country's strength is not parallel to its currency strength and internationalization, if the RMB does not play significant role in international trade and investment. In recent years, China has been making headway to strengthen its role and participation in the international monetary system, by exerting efforts to propagate the use of its currency, Renminbi (RMB). The green spot in Figure 2 depicts the geographical location where RMB usage is used as trade clearing currency through the bilateral swap agreement with the Peoples' Bank of

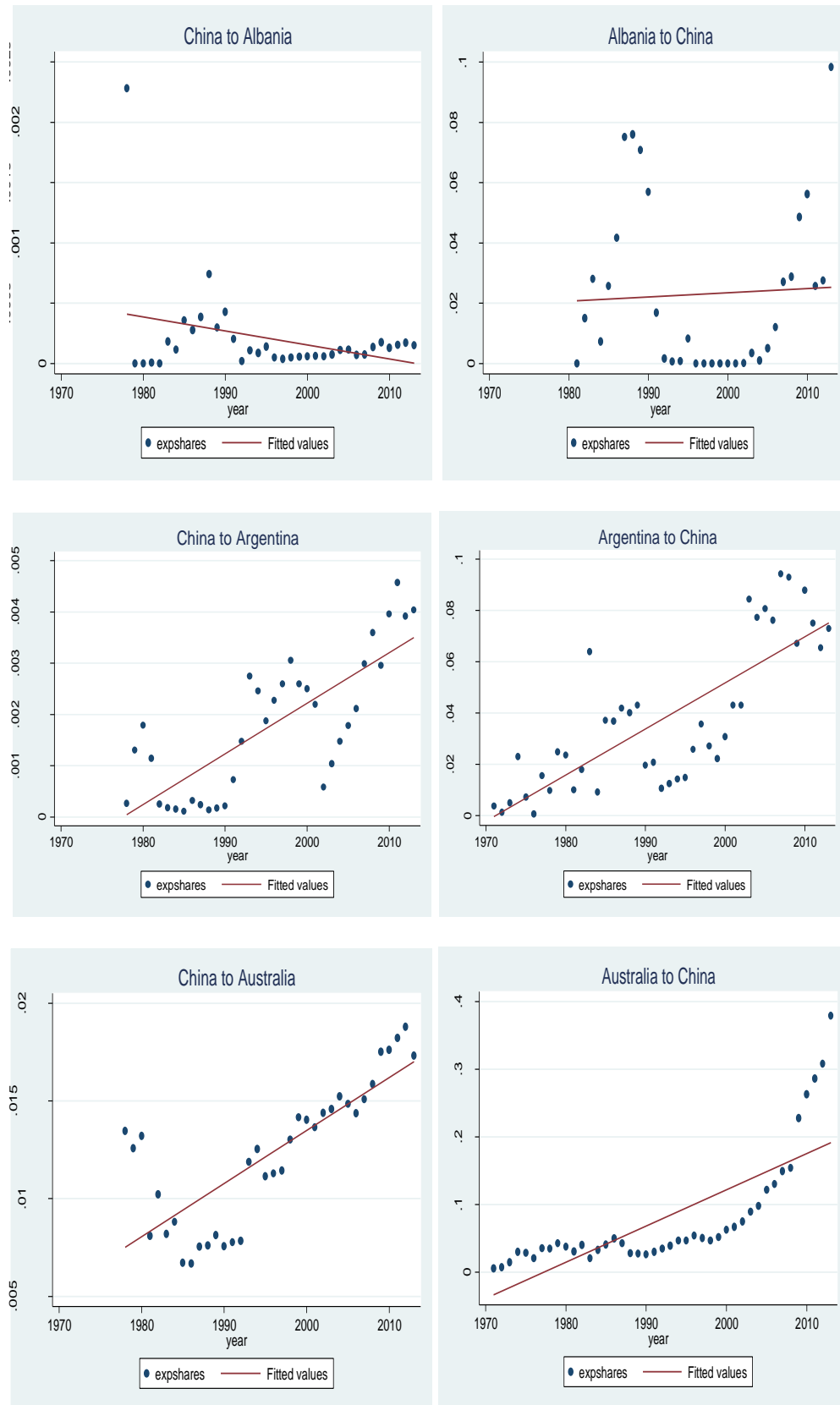
China (PBOC) and some central banks in the world across continents. Moreover, Renminbi enters the special drawing rights (SDR) in November 2015 with a share of 10.9%, which makes it among the most important currency in the unit, just behind the dollar and euro. Within the existing SDR arrangements with the IMF and quite some countries that are a signatory to the swap line. Central banks can draw Renminbi under swap agreements and can potentially convert fund drawn from swap funds into SDR and then into US dollars via a set of transactions (Love and Chen, 2015; Lucia, 2016; and David, 2016). Therefore, countries that are a signatory to the swap line with People's Bank of China have access to US dollars. In a way, bypassing the restrictive Federal Reserve swap network, mainly to OECD countries and some emerging markets.<sup>10</sup> The size PBOC's swap line over eight years across continents amounts to more than 3 trillion renminbi (\$500 billion). Among those countries that join PBOC's swap line deals include some European countries such as Albania, Belarus, Iceland, Hungary, Kazakhstan, Ukraine, United Kingdom, Russia, and Turkey. The Asian countries include Hong Kong, South Korea, Mongolia, Singapore, Malaysia, Indonesia, Pakistan, Uzbekistan, Thailand, Sri Lanka, Qatar, and United Arab Emirate. Some countries in the South America include Argentina and Brazil. Again, countries from Australia and Oceania continent include New Zealand and Australia (Lin and Cheung, 2016).

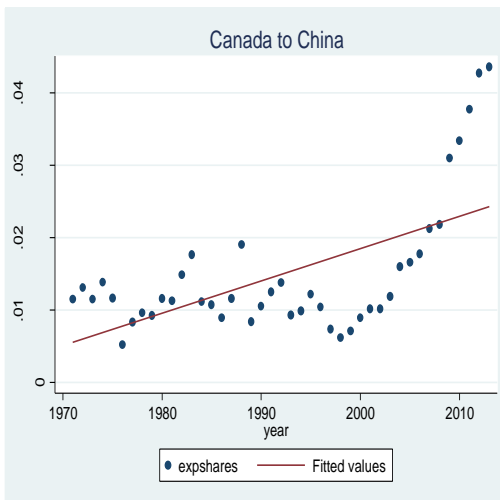
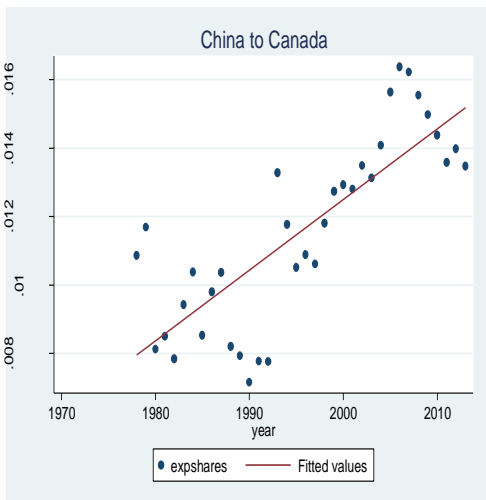
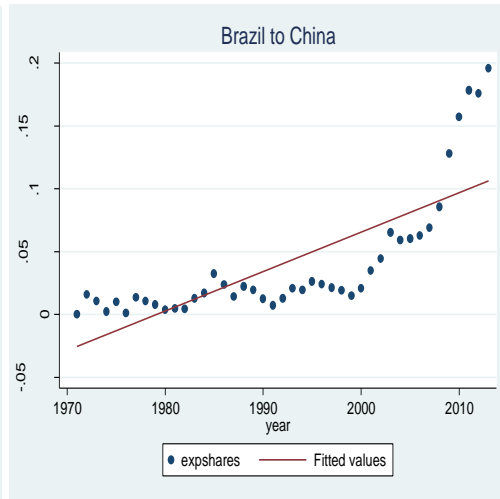
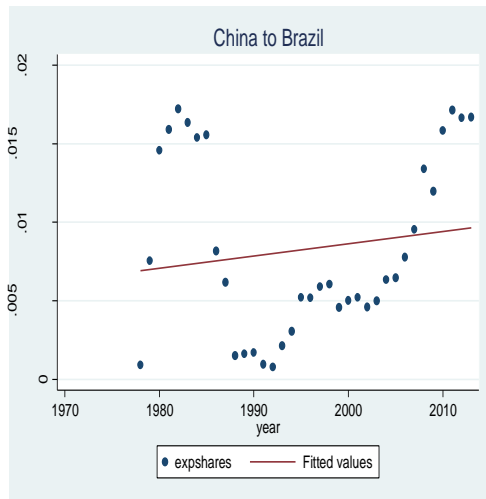
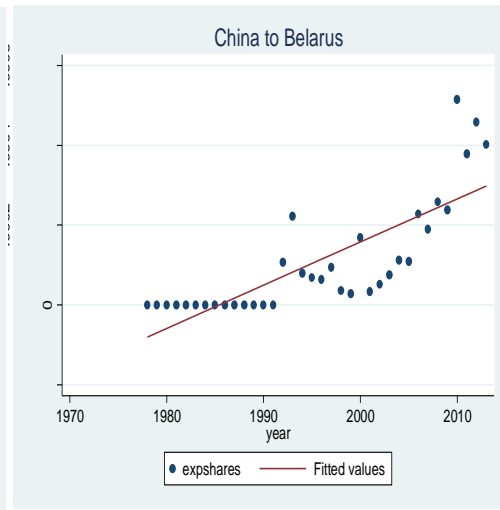
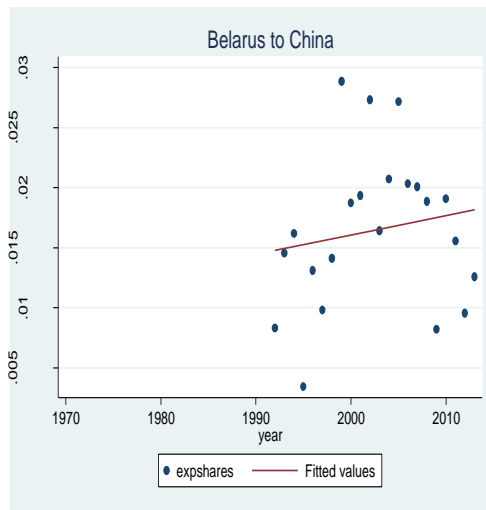
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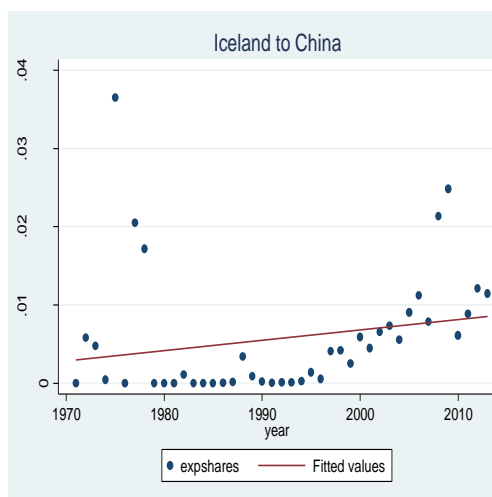
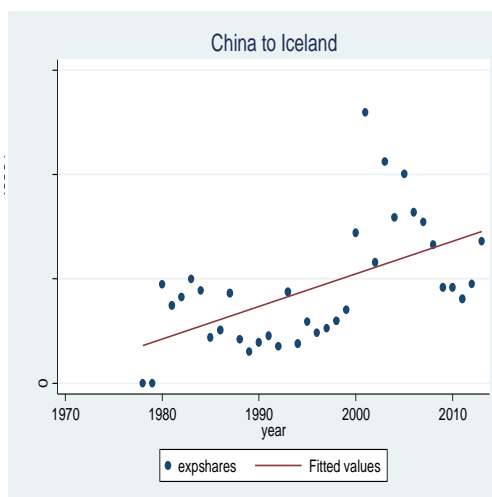
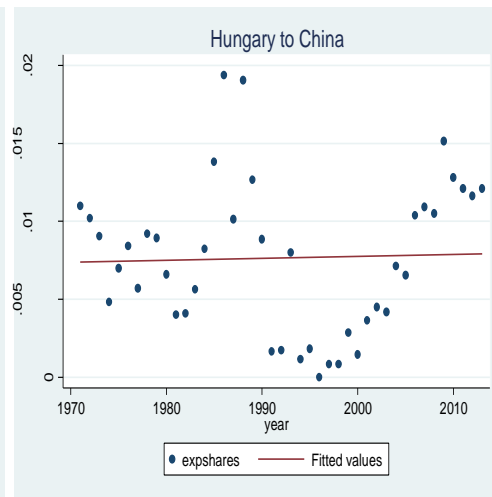
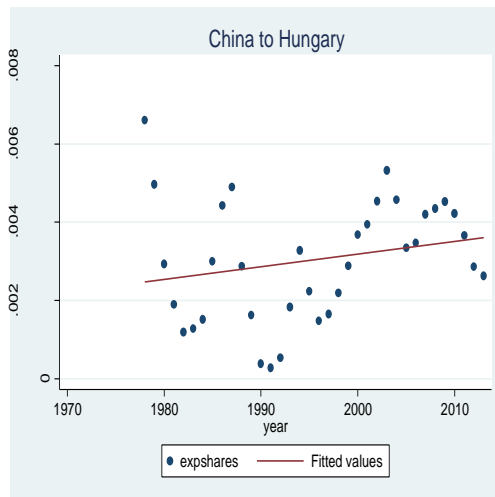
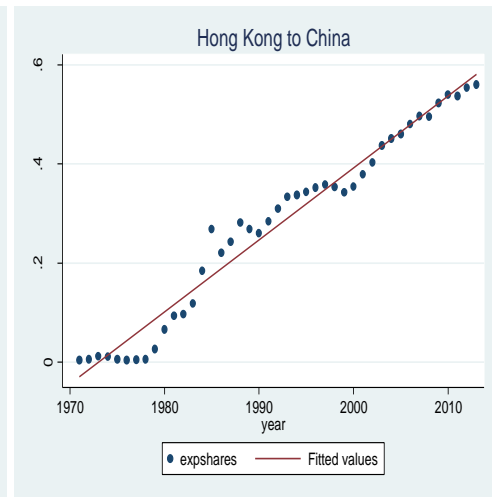
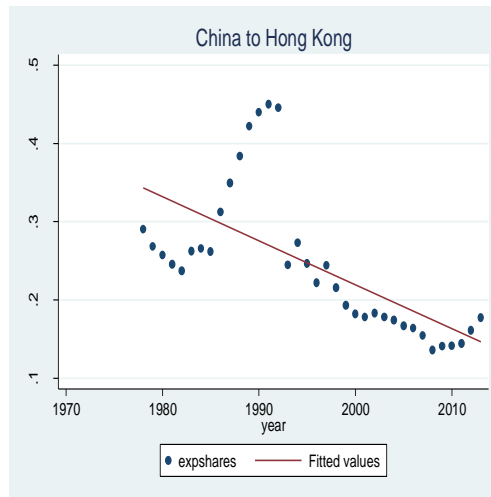
<sup>10</sup>It is also an alternative to highly institutionalized and multinational source of finance, and one of these consequences could to generate boost to global liquidity and augmenting to world arsenal of international financial instruments outside the established western – controlled policies. Arguably, the significance could manifest in nearly 10 to 15 years.

Figure 3: Average Total Exports Shares of China and Bilateral Swap Partners

Average Export Shares (percentage) of Total Exports







Source: Author's Computation.

Contemporarily, the Chinese economy is an excellent specimen of export-powered growth, through learning by doing, reversing its status quo from autarkic fashion to opening up to foreign know how, and buffered by a complex and well tracked industrial policy.<sup>11</sup> China marked two decades of growth from (1980-2000), a quantum leap of transformation from autarkic and drudgery agricultural economy to a more sophisticated industrial sector and rising service sector in one generation (see Song and Zilibotti, 2009). In the period under scrutiny, China has recorded rapid growth in international trade, current account/GDP surpluses since the 2000s, and this is consistent with massive reserve hoarding and sterilization of expanding its trade surpluses and inflow of financial investment (Aizenman and Lee, 2008). Arguably, (Aizenman, Jinjazzak, and Zheng, 2015) stressed that these policies deliberately pursued by the Chinese authorities intend to delay and slow the real appreciation associated its rapid growth success. The Asian region had seen the proliferation and build-up of FX reserves unprecedentedly since after the Asian financial crisis of 1997-1998. The Asia's reserve swelled from US\$202 billion in 1990 to US\$3371 billion in 2008, and the growth continues to gallop at 20% per year. It is important to note that China's contribution to this buildup accounted for than 50% of the realized growth of 1990-2008. In seeking to understand the extraordinary growth of Asia's FX reserves in the post-Asian financial crisis. Aizenman et al. 2011 opined that the Asian's crisis had a devastating impact socially and economically in the region. Even though five countries – Indonesia, Korea, Malaysia, Philippines, and Thailand bore the weight of the shock, but the psychological impact of the crisis spread to the whole region. On the precise cause of the crisis, a considerable deal of controversy clouds discussion of academics and policy circle. However, the consensus was that of a shortage of

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<sup>11</sup>Learning via experimental approach greatly help China to poster its rapid productivity growth.

international liquidity. Broadly speaking, the move to accumulate massive reserves and bilateral currency swapping highlights the precautionary self-insurance against the occurrence of another crisis. Aizenman et al. (2011), assess the prospective rise and impact of the aftermath of the 2008 global financial crisis that had seen the proliferation of the currency swap agreements between major central banks like the US Federal Reserve, PBOC, ECB, some Asian economies, and later rest of world. They show that currency swaps constitute one dimension of complimenting international reserves for effective insurance against unexpected shocks. Additionally, US Federal Reserve and ECB swap line served somewhat as a substitute to the foreign reserve accumulation for some emerging markets.

Alternatively, this piece of work seeks to explain the motive of PBOC's currency swaps from mercantilist export promotion as a way of intensifying the continuous Chinese economy's export-led drive towards growth. In Figure 3, depicts the computed the average trade shares of China's exports and that of the 26 counterparties to the bilateral swap agreements with People's Bank of China from 1948-2013.<sup>12</sup> Evidently, our analysis suggests that export markets are highly significant between China and most of the 26 counter-parties to the bilateral swap agreements (BSAs) over time. The relative trade shares depict a positive trend especially for the provider, further suggesting that swap lines primal motive perhaps resolves around the provider country's self-interest, even though the benefits are substantially symbiotic for the recipient and provider country.<sup>13</sup> Comparatively, Aizenman et al. (2011) show that the recipients of swaps utilized it to reassure market

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<sup>12</sup> The remaining of the entire mirror trade shares of the rest of the counterparties of the bilateral swap agreement is shown in the appendix.

<sup>13</sup> Buying foreign currencies to hold back domestic currencies is an effective measure to improve the external balance (competitiveness of a country) and hence exports promotion. This is referred to as mercantilist demand for reserves or seeking to accumulate foreign currency via swap lines, which contrast the demand for reserves associated with precautionary self-insurance.

and convert financial instability during economic downturn even when vast stockpiles of FX reserves prove abortive in the reassuring market. Our analysis also shows that formalizing and institutionalizing swap arrangements beyond the temporary anti-crisis tool to long-term measure to dampen the liquidity support for both precautionary self-insurance and promotion of international trade on a world mercantile scale. The paper argued that even though swaps at large may contribute on a world scale to the public good, in reassuring global financial stability, most of the central banks providing the support of liquidity do so in their respective self-interests. Figure three, empirically depict strong evidence of trade especially after the deal, showing that counterparts are substantial export markets – this explains the continuous rise of the People's Bank of China's extension of swap facility several countries. Similarly, it is discernable along this line of thought to weigh the inclusion of some countries like Argentina and Belarus among others. For example, some of these economies are relatively not highly considered for having strong macroeconomic fundamentals and sound fiscal management, their inclusion as recipients of swaps by the PBOC reveals the significance of quest for export markets (see Figure 3). Moreover, China's significant role in international trade paved the way for RMB to possess an intrinsic value, although China's level of financial development still lagged compared to the major financial centers, which explains the massive investment of China in the US financial markets. Consequently, it is difficult to conclude that China's wide area of swap network results from the credibility of PBOC. Apparently, it may not be more credible than other central banks in the emerging markets, despite its vast sum of hoarded reserves. – The dominance of China's swap lines provides the impetus for RMB to emerge as a new reserve currency.

Furthermore, another motive related to the precautionary self-insurance and mercantilist export promotion of holding reserves, however, different is the exchange rate stability. The relative stability of the exchange rate is a crucial macroeconomic fundamental that often most countries strive to monitor and buffer their economies in the event of unprecedented volatility. Therefore, building reserves and complimenting it in the form swap lines and currency network perhaps is a dimension of country's strategic and systematic pattern to intervene in the foreign market with the sole aim of stabilizing the exchange rate. This motive is somewhat closely related to the mercantilist export promotion drive, for instance having a competitive exchange rate gives a country leverage to enhance its current account position through international trade and as such a country build ample amount of reserve it needs for precautionary purposes. It is difficult to create a dichotomy among the three motives for the accumulation of reserves and swap lines with mutual exclusivity theoretically and in terms of empirical parlance.

## **2.3 Theoretical and Empirical Literature**

### **2.3.1 Currency Swap, Trade and Exchange Rate Volatility**

The existence of swap lines as a hedging facility is one way of reducing the exchange rate uncertainty on international trade. Theoretical studies long established the expected impact of exchange rate volatility on international trade (see Allayannis, 2001). The effect might negatively assert influence on trade depending on some factors such as the structure of production such as the small number of firms, risk preferences, presence or absence of forward contract markets or currency swap options, and degree of economic integration (see Auboin and Ruta, 2013; Kawai, 1986; Broll and Wessel, 2011; Wong, 2003). Goswami et al. (2004) theoretically show that high economic exposure determines firm's preference to currency swaps. The

economic exposure is positive if the foreign currency denominated cash inflows negatively correlate with foreign exchange rates. Their theory suggests that currency swaps help global firms to achieve long-term financing and financial risk management goals. Theoretically, most studies underpinned the idea that an increase in exchange rate volatility leads to a decrease in international trade. For example, if economic agents are risk averse, a higher volatility of exchange rate increases uncertainty, and hence raises the cost of conducting international trade (see Doganlar, 2002; Ethier, 1973; and Clark, 1973; Barkoulas, et al., 2002). McKenzie (1999) show that uncertainty will be greater in the absence of an adequate hedging instrument, indicating that the existence of a well-functioning forward market might lower exchange rate volatility downwards. The pioneering work of Ethier (1973) further supported the assertion that with perfect forward markets, and no other sources of uncertainty rather than exchange rate, the volume of trade is uninfluenced by exchange rate volatility. Moreover, Viane and Vries (1992) also reexamined the impact of rising volatility of the exchange rate on trade volume; their findings slightly contrast Ethier (1973). Showing that even when a forward market exists, the spot exchange rate volatility indirectly affects the volume of trade via its effect on the forward rate. In addition, they show that with an increase in the volatility of the exchange rate, the imports and exports might be different. It follows that in equilibrium forward rate is determined by the total supply and demand for the forward currency. As a result, exports lose (benefit), and imports benefit (lose) when trade balance sign become positive (negative). Broll and Eckwert (1999) explored the theoretical likelihood of a positive association between exchange rate volatility and exports. The intuition behind this possibility is because an increase in exchange rate volatility open options to export to the world markets, implying that firms that are

more flexible can react to these changes and reallocate their exports destinations. Wei (1999) investigate the hedging hypothesis, i.e., an empirical puzzle in international finance, based on the notion that identifying the large and negative effect of exchange rate on trade is difficult due to the availability of forward and swap options. In testing the validity using data of over 1000 country pairs, the results show that there is no evidence in the data to support the validity of the hedging hypothesis. Moreover, country pairs with large trade potential, still, exchange rate volatility deters goods trade largely than that typically claim and documented in the literature. Wong (2003) show that hedging theorem holds if firms always find it optimal to export entire their output in the foreign markets. However, if firms are flexible by ex-post allocating their exports between the domestic and the international markets, and guide against foreign exchange risk exposure, implicitly using real hedging instrument introduces a convex component into the firm's foreign exchange exposure. Adam-Muller (2000) examines the optimal production, hedging and export allocation of a risk averse international firms that exports to different foreign markets with different currencies and multiple exchange rate risks. In the first scenario, that only one forward market for a single currency exist. In this case, the export allocation to different markets is separable from the firm's preference and the joint distribution of the exchange rates. In the second scenario, where hedging instruments and forward markets for each currency exist. In this case, production and exports allocation are separable. As result hedging with forward contracts, depend on risk premium and the joint distribution of the exchange rates. Brollet al. (2015) examine the behavior of competitive exporting firms that exports to two foreign countries in a state of multiple sources of exchange rate uncertainty. Showing that since firms cross hedge their exchange rate exposure if there is an only one forward market between the domestic currency and foreign country's

currency. Therefore, firms optimally export to both foreign countries and the decision of firm's production is independent of the firm risk attitude and the underlying exchange rate uncertainty. Further, the showing that the firms' optimal forward position depends on whether the two random exchange rates correlate in the sense of expectation dependence.

Furthermore, the empirical literature revealed clear-cut evidence between exchange rate volatility and trade. Baum and Caglayan (2010) investigate the effect of exchange rate uncertainty, and international trade flows from the period of 1980-1998 for a broad set of industrial economies. Their results show the absence of a significant relationship between exchange rate uncertainty and trade volume. They argued that the openness of capital market in the emerging countries tend to reduce the effect of exchange rate volatility on international trade as compared to the impact in the developing counterparts. Grier and Smallwood (2007) show relatively a modest evidence of negative impact of the exchange rate volatility on multilateral exports within the subsample of some developing countries and find little significant effects for some developed countries. Tenrenyo (2007) applies the gravity equation to analyze 87 developed and less developed countries in a panel data framework; the study does not find evidence pointing a significant link between exchange rate volatility on trade. Arizeet al. (2008) find a negative and statistically significant long-run relationship in eight Latin American countries. Grier and Smallwood (2013) find evidence that real exchange rate uncertainty negatively affects trade for many less developed countries. The revealed evidence depicts unexpected impulse response of the real exchange rate on the growth of exports. Nevertheless, the empirical results also indicate asymmetric positive shocks that generate substantial negative response while unexpected depreciations produce a relatively smaller positive response.

Caglayan and Demir (2013) also find a significantly negative of exchange rate uncertainty on trade flows in emerging markets. Furthermore, the results show that the direction of trade matters under the condition of exchange rate uncertainty, especially the direction of south-south or south-north trade. Asteriou et al. (2016) tested four empirical models for the impact of exchange rate volatility on export and import demand for the MINT countries. The empirical findings show that in the short run for Mexico and Indonesia, volatility affects exports and imports demand, except for Turkey, where the magnitude of the volatility has a small effect on export or import demand. In the case of Nigeria, the results indicate a unidirectional causality from export demand to volatility. Yang and Yu (2016) explore the effects of exchange rate variation on bilateral trade in exchange rate regime and with a vehicle currency. The findings suggested that appreciation of the import country's currency against the vehicle currency expectedly promotes imports and that the volatility of the import country's currency against the vehicle currency depresses the expected level of imports. Nevertheless, the effect on export country's currency is ambiguous.

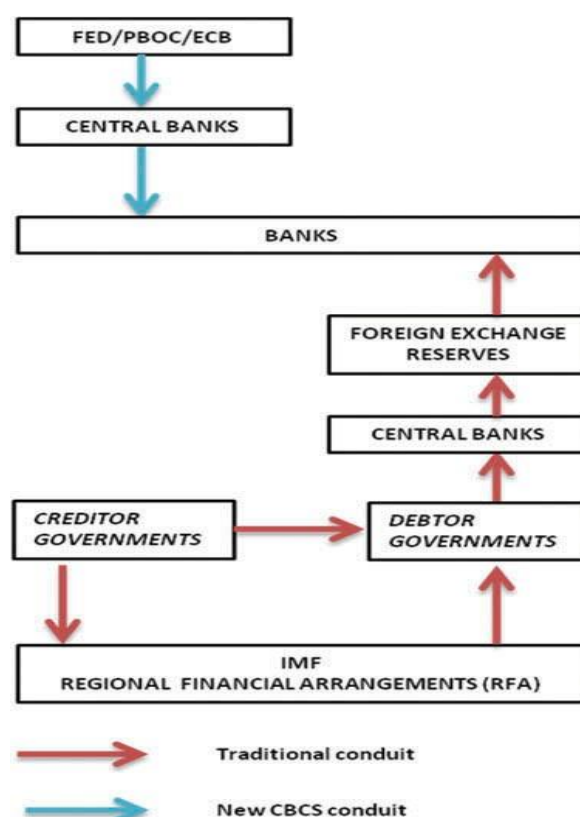
### **2.3.2 Currency Swap Mechanism**

Currency swaps evolved from back to back loans. In a back to back loan, two parties in different countries make loans to one another, of equal value, each denominated in the currency of the lender and each maturing on the same date. The two loans are covered by separate agreements. The initial loan will be transacted at the spot rate, the interest payments and principal repayment would be carried out at formal rates (Detais, 2016; Sivaprakasa and Mathew, 1996; and Close, (2001).Khurshed (2012) illustrated that Currency swap can be viewed as foreign exchange agreement between two parties to exchange principal and interest payments of a loan in one currency for equivalent aspect of an equal in net present value loan in

another currency. This sort of arrangements is motivated by comparative advantage. Generally, currency swap that involves the exchange of principal and in one currency for the same in another currency is a foreign exchange transaction that is not required by law to be shown on the balance sheet. Similarly, since the exchange payments take place in two different currencies, the prevailing spot rate is benchmark to calculate interest payment and the principal. Significantly, the swap agreement is a customized instrument of international finance used to hedge against exchange rate and interest rate risk which is particularly important for firms and countries whose major source revenue heavily relies on international trade.

Historically, currency swap was originally utilized in the 1970s to evade foreign exchange control in the UK. During that period, the United Kingdom firms had to pay a premium to borrow in US dollars. In the exertion to skirt this, UK Companies firms set up back to back loan agreements with US firms who desire to borrow pound sterling. Nevertheless, currency swap arrangements date back to 1981 when IBM and World Bank entered into swap arrangement. Thereafter, currency swap has become a vital international financial instrument for management of debt and interest rate risk management. The market for swap agreement was developed and largely dominated by major investment and commercial banks that actively market their product and services to corporate, institutional, and government clients. Contemporarily, swaps are among the most heavily traded international financial instruments (contracts) in the world. For instance, the total amount of outstanding and interest rate swap exceeds \$426.7 trillion as of 2009, according to international swap and derivative association.

Figure 4: International Liquidity Swap Scheme



Source: Adopted from Details (2016).

Significantly, currency swap has two major uses, firstly, it enables the parties to secure a cheaper debt (i.e. to borrow at best available rates irrespective of currency and swapping debt in the desired currency via back to back loans). Secondly, swaps are effective mechanisms for hedging against exchange rate exposure and fluctuation. Moreover, currency swaps are cost effective ways to transform risk exposures and alter future cash flows of firms. Similarly, comparative advantage is the fundamental motivation for wide area swap – covered foreign currency borrowing like the central bank bilateral currency of route of China and United States that covered many countries with large volumes swap – covered borrowing. Suppose the borrowing cost differ across markets, issuers as firms or central banks are likely to ameliorate their overall financing cost initiating swaps agreement in a manner in each party signatories

to the swap financial contract has an incentive or comparative advantage using the funds and proceeds.<sup>14</sup>

Table 1: China's RMB Currency Swap line and Partner Countries

<b>Partner Economies</b>	<b>Currency Swap line size</b>	<b>Effective Date</b>	<b>Expiration Date</b>	<b>Duration (year)</b>
<b>South Korea</b>	RMB 180 bn/KRW 38,000 bn	12 Dec. 2008	Dec. 2011	3
<b>Hong Kong</b>	RMB 200 bn/HKD 227 bn	20 Jan. 2009	Jan. 2013	3
<b>Malaysia</b>	RMB 80 bn/MYR 40 bn	8 Feb. 2009	Feb. 2012	3
<b>Belarus</b>	RMB 20 bn/BYR 8,000 bn	11 Mar. 2009	Mar. 2012	3
<b>Indonesia</b>	RMB 100 bn/IDR 175,000 bn	23 Mar. 2009	Mar. 2012	3
<b>Argentina</b>	RMB 70 bn/ARS 38 bn	2 Apr. 2009	Apr. 2012	3
<b>Iceland</b>	RMB 3.5 bn	10 Jun. 2010	Jun. 2013	3
<b>Singapore</b>	RMB 150 bn/SGD 30 bn	23 Jul. 2010	Jul. 2013	3
<b>N Zealand</b>	RMB 25 bn/NZD 5bn	18 Apr. 2011	Apr. 2014	3
<b>Uzbekistan</b>	RMB 0.7 bn	19 Apr. 2011	Apr. 2014	3
<b>Mongolia</b>	RMB 5 bn	6 May 2011	May 2014	3
<b>Kazakhstan</b>	RMB 7 bn	13 Jun. 2011	Jun. 2014	3
<b>Thailand</b>	RMB 70 bn/THB 320 bn	22 Dec. 2011	Dec. 2014	3
<b>Pakistan</b>	RMB 10 bn/PKR 140 bn	23 Dec. 2011	Dec. 2014	3
<b>UAE</b>	RMB 35 bn/AED 20 bn	17 Jan. 2012	Jan. 2015	3
<b>Turkey</b>	RMB 10 bn/TRY 3 bn	21 Feb. 2012	Feb. 2015	3
<b>Australia</b>	RMB 200 bn/AUD 30 bn	22 Mar. 2012	Mar. 2015	3
<b>Ukraine</b>	RMB 15 bn/UAH 19 bn	26 Jun. 2012	Jun. 2015	3
<b>Brazil</b>	RMB 190 bn/BRL 60 bn	26 Mar. 2013	Mar. 2016	3
<b>England</b>	RMB 200 bn/GBP 20 bn	22 Jun. 2013	Jun. 2016	3
<b>Hungary</b>	RMB 10 bn/HUF 375 bn	9 Sep. 2013	Sep. 2016	3
<b>Albania</b>	RMB 2 bn/ALL 35.8 bn	12 Sep. 2013	Sep. 2016	3
<b>EU</b>	RMB 350 bn/EUR 45 bn	9 Oct. 2013	Oct. 2016	3
<b>Switzerland</b>	RMB 150 bn/CHF 21 bn	21 Jul. 2014	Jul. 2017	3
<b>Sri Lanka</b>	RMB 10 bn/LKR 225 bn	16 Sep. 2014	Sep. 2017	3
<b>Russia</b>	RMB 150 bn/RUB 815 bn	13 Oct. 2014	Oct. 2017	3
<b>Qatar</b>	RMB 35 bn/QAR 20.8 bn	3 Nov. 2014	Nov. 2017	3
<b>Canada</b>	RMB 200 bn/CAD 30 bn	8 Nov. 2014	Nov. 2017	3

Source: People's Bank of China news releases and Lin et al. (2016).

<sup>14</sup>For example, comparative advantage exists in financial market if similar risk is priced differently in different market, in this situation central banks and firms stand to gain from currency swapping. The benefit of swap more generally helps countries regulate their exposure to exchange rate uncertainty and interest rate risk.

The swap agreement had seen a remarkable comeback, especially, in the 2000s when trading currency swaps increased for many world de facto currencies. In the heart of the global financial crisis of 2008, currency swap transactions were utilized by the United States' Federal Reserve and central bank of developed and emerging countries. Where both parties exchange domestic currencies at the prevailing market exchange rate and reverse the swap at the same exchange rate, predetermined at a future date. Essentially, the liquidity swap was aimed at providing liquidity in U.S. dollars to foreign markets. It is important to note that the central banks' liquidity swap and the plain vanilla currency swap are structurally the same. While plain vanilla currency swap is driven mainly by comparative advantage, the central bank liquidity swaps are emergency loans of U.S dollars to overseas markets. In contrast, the Peoples' Banks of China (PBOCs') motive is a multi-dimensional one, to serve both the aim of trade and investment promotion in addition to Renminbi internationalization framework which was a policy move to integrate the Chinese economy into the global monetary system. Table 1 depicts Renminbi currency swap network since 2008.

## CHAPTER 3

### THE DATA AND ECONOMETRIC METHODOLOGY

#### 3.1 Data Description

Our dataset on bilateral trade data for 213 countries and standard gravity variables comes from Glick and Rose (2016), and the data span from 1990 – 2017. In the data set, trade data relies on the direction of trade statistics (DOTs), real GDP and population come from the World Bank's *World Development Indicators*, augmented with the Penn World Table 7.1 as well as the IMF's International Financial Statistics. Glick and Rose exploit CIA's *World Fact-book* for some country-specific variables such as latitude, longitude, landlocked, island status, contiguous border, shared language, colonizers. Information on regional trade agreements originates from the World Trade Organization. Our definition of China's RMB-swap is that Renminbi serves as a clearing trade currency between China and counterparties to the swap agreement or among whole signatories. The analysis covers 213 countries, out of which 26 countries are the counterparty to the China's bilateral currency swap agreement (RMB-trade based policy). We show the lists of the signatories in Table1; we also indicate the size of the swap exchanged with the effective date in which the agreement came into force, inclusive the expiration date and duration of the bilateral currency swap, which is extendable.

#### 3.2 Econometric Methodology: Structural Gravity Model

The application of Gravity model to bilateral interactions among the pair of countries, predicts trade between two economies as directly proportional to the product of their sizes and inversely proportional to the trade frictions between them. Early applications of this model resort to physical science analogy of the Newtonian

Law of Gravitation without formal economic foundations (see Tinbergen, 1962; Linnemann, 1966; Aitken, 1973; and Sapir, 1981). In 1979, the formal theoretical economic foundations of gravity emanated, under the assumptions that place of origin differentiates goods as in Armington (1969) and that consumers preferences are homothetic, identical across countries, and approximated by a CES utility function. Anderson (1979) formally derives the fundamental foundation of economic gravity rooted in economic theory. Since then several studies surfaced (see Baier and Bergstrand, 2001; Eaton and Kortum, 2002) and later Anderson and Van Wincoop (2003) refine and popularize the idea in Anderson (1979). One notable attribute common to all these models is the explicit role for price levels or some form multilateral resistance term, for example, Balwin and Taglioni (2007) argued that ignoring the multilateral resistance term is tantamount to committing a gold medal mistake in the estimation of the gravity equation.<sup>15</sup> The framework of theoretical structural gravity system suggests the following;

$$X_{ij,t} = \frac{Y_i E_j}{Y} \left( \frac{\tau_{ij}}{\pi_i P_j} \right)^{1-\sigma} \quad (1)$$

$$\pi_i^{1-\sigma} = \sum_j \left( \frac{\tau_{ij}}{P_j} \right)^{1-\sigma} \frac{E_j}{Y} \quad (2)$$

$$P_j^{1-\sigma} = \sum_i \left( \frac{\tau_{ij}}{\pi_i} \right)^{1-\sigma} \frac{Y_i}{Y} \quad (3)$$

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<sup>15</sup>An important departure from the analogy of Newtonian gravity model is the multilateral resistance terms (MTR), which captures general equilibrium forces in a structural gravity system. Anderson and van Wincoop (2003) show that the more a country is resistant to trade with a given country, the more it shall trade with others, including itself and this captures the general equilibrium effect.

Equation (1) is the representation of the theoretical gravity system that derives trade flows between pair of countries, conveniently we can decompose the size term,  $Y_i E_j / Y$ , and the trade cost term,  $(\tau_{ij} / (\Pi_i P_j))^{1-\sigma}$

Here the interpretation of the size term,  $Y_i E_j / Y$ , denote the hypothetical level of frictionless trade between a pair of countries  $i$  and  $j$  without trade costs.

Mechanically, setting the bilateral frictions to equality ( $\tau_{ij} = 1$ ), and re-deriving the gravity model, will intuitively, imply a frictionless world where consumers face the same price for a few goods regardless of their physical location. Similarly, the expenditure share on goods from a country will be equal to the share of production trace to source destination country in the global economy (say  $X_{ij} / E_{ij} = Y_i / Y$ ). In effect, the economics size term carries a very useful information in relation to country size and bilateral trade flows. For example, large producers will naturally export more almost all destinations; richest and biggest markets also import more from almost all sources; also, trade flows between  $i$  and  $j$  will be larger if the pair countries are similar in size. Similarly, the trade cost term,  $(\tau_{ij} / (\Pi_i P_j))^{1-\sigma}$  captures the effect of trade costs that is the driving force of the realized and frictionless trade between a pair country. The literature divides the trade cost term into three components. First, the bilateral trade between a pair of country  $i$  and  $j$ ,  $\tau_{ij}$ , which is typically denoted by various historical, geographical variables. For example, bilateral distance, common border, language, colonizer, countries ever in colonial relationship and landlocked countries and trade policy variables regional trade agreement, (RTAs) between country pairs say  $i$  and  $j$  are the gravity controls in the literature. Secondly, the structural terms  $P_j$ , denotes the inward multilateral resistance term, which represents importer  $j$ 's ease access of market. Thirdly,  $\Pi_i$ , indicates the outward

multilateral resistance term that measures the exporter I's ease of market access. Primarily, the multilateral resistance term are vehicles that translate into the initial analysis of partial equilibrium effects of trade policy at the bilateral level to measure the country specific effects on consumer and producer prices. The initial effects of trade costs on trade flows account for the direct effect, while the taking into the trade cost changes into prices, incomes and expenditure is capture using the general equilibrium (Head and Mayer 2014 and Yotov et al., 2016). The structural gravity is multiplicative in nature, therefore, log-linearizing equation (1) with error term expansion we obtain the estimating equation thus:

$$\ln X_{ij,t} = \ln E_{j,t} + Y_{i,t} - \ln Y_t + (1 - \sigma) \ln \tau_{ij,t} - (1 - \sigma) \ln P_{j,t} - (1 - \sigma) \ln \Pi_{i,t} + \epsilon_{ij,t} \quad (4)$$

This specification (4) is core to our analysis of central bank bilateral currency swap agreement, trade flows and various determinants of bilateral trade.  $X_{ij,t}$  indicates the bilateral trade between country i and j at time t. Which depends positively on  $E_{j,t}$  and  $Y_{i,t}$  i.e., the importer expenditure and exporter income, and negatively on distance as a form of trade cost. The proxy of trade cost in the standard structural gravity system is  $(1 - \sigma) \ln \tau_{ij,t}$ , it incorporates all manner of a series of observables that approximate bilateral trade cost. Interchangeably, we replace  $(1 - \sigma) \ln \tau_{ij,t}$  with  $\ln \Gamma'_{ij,t}$  as a measure of all sort of trade cost (a vector of control variables that represent the trade costs) in equation (5), these geographical and historical variables such as common border, language, colonial ties, countries that are an island, landlocked, and prevalence of regional agreements. While  $\lambda'_{ij,t}$  (a dummy variable, 0/1 for swap status) which captures the central bank bilateral currency swap between China and

members signatory to the agreement. From equation (4)  $\ln P_{j,t}$  and  $\ln \Pi_{I,t}$  are unobservable, to obtain theoretically consistent estimates  $\pi_{I,t}$  and  $\chi_{j,t}$  captures exporter-time and importer-time fixed effects, which account for the outward and the inward multilateral resistance term, as well as other unobservable exporter-time and importer-time country specific attributes that influences trade. Constant term is not included in the presence of fixed effects.

$$\begin{aligned} \ln(X_{ij,t}) = & \pi_{i,t} + \chi_{j,t} + \rho_1 \ln Y_i + \rho_2 \ln E_j + \rho_3 \ln \Gamma'_{ij,t} + \rho_4 \lambda'_{ij,t} \\ & + \epsilon_{ij,t} \end{aligned} \quad (5)$$

While  $\mu_{ij}$ , in equation (6) captures the unobserved country-pair fixed effects, i.e., it controls bilateral country-pair unobserved heterogeneity and time-invariant unobservable trade-related factors that influence trade. Of relevance to note, all the time-invariant regressor lumped into the pair-specific fixed effects, absorbing all sort of similarities that are constant over time among the trading partners.

$$\begin{aligned} \ln(X_{ij,t}) = & \pi_{i,t} + \chi_{j,t} + \mu_{ij} + \rho_1 \ln Y_i + \rho_2 \ln E_j + \rho_3 \ln \Gamma'_{ij,t} + \\ & \rho_4 \lambda'_{ij,t} + \epsilon_{ij,t} \end{aligned} \quad (6)$$

In addition, this makes our regression to rely on time series variation, and it compares the pair observations of each country before and after swap line accession to determine the  $\lambda'_{ij,t}$  coefficient. In both equation (5) and (6),  $\lambda'_{ij,t}$  captures intra- $\lambda'_{ij,t}$  trade creation. The inclusion of fixed effects specification and country-pair fixed effects represent a theory consistent structural gravity formulation to account for unobserved heterogeneity (see Baier and Bergstrand, 2007; Feenstra, 2004; Anderson and Yotov, 2011; Olivero and Yotov, 2012). In the context of estimating average

treatment effects of swap agreement on trade across swap member countries, the specification is in line with Baier and Bergstrand (2007) to yield unbiased coefficient estimates.<sup>16</sup>For robust estimation, we also consider the following PPML regression:

$$X_{ij,t} = \exp[\pi_{i,t} + \chi_{j,t} + \mu_{ij} + \beta_1 \ln Y_i + \beta_2 \ln E_j + \rho_1 \ln \Gamma'_{ij,t} + \rho_2 \lambda'_{ij,t}] + \epsilon_{ij,t} \quad (7)$$

The preceded models applied OLS estimator in log linear form. Econometric theory suggests that pooled or cross section regression satisfy the classical assumptions. Hence, OLS is unbiased, consistent and efficient estimator. However, as discussed in Santos Silva and Tenreyro (2006) standard log linearization is inappropriate and infeasible. First, the dependent variable can be 0. Second, even if all the observations of the dependent variable are strictly positive, the expected value of the log-linearized error will overall the depend on the covariates and therefore OLS will be inconsistent (Santos Silva and Tenreyro, 2006, p.644). Similarly, the error terms are heteroskedastic and therefore its variance depends on the exponential function of the independent variable. Therefore, the pattern of heteroscedasticity, makes all the higher moments of the conditional distribution of the error term to affect the consistency of the estimator. In a nutshell, log linearization process drives the inconsistent estimates because of the correlation of the error term with explanatory variables.

Santos Silva and Tenreyro (2006) applied Poisson Pseudo Maximum Likelihood estimator to estimate gravity model; they show that the PPML estimator

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<sup>16</sup>Essentially, the omission of this control will make the  $\lambda'_{ij,t}$  coefficient to have upwards bias because they tend to pick up trade creation that is unrelated to  $\lambda'_{ij,t}$  simply due to unobservable factors. Therefore, the introduction of country-pair fixed effects absorbs all the non-time varying variables that are likely to bias our coefficient of interest.

performs reasonably well even in the presence of high proportion of zero.<sup>17</sup> Estimating the empirical gravity in multiplicative is the convenient way to deal with the significant amount of zeros, instead of logarithmic form. Similarly, heteroscedasticity is another major concern in dealing with trade data. The problem is important because in the presence of heteroscedasticity and Jensen's inequality as pointed by Silva and Tenreyro (2006), the gravity model estimates of the effects of trade policy and trade costs are likely to be biased and inconsistent with OLS estimator in logarithmic form.

For example, the mean of  $\ln \epsilon_{ij,t}$  depends on a higher moment of  $\ln \epsilon_{ij,t}$ , therefore, including its variance is important. Suppose  $\ln \epsilon_{ij,t}$  is heteroskedastic, and in practice this possibility might be prevalent. Then the expected mean of the error term depends on one or more covariates due to inclusion of variance term. Therefore, this tends to violate the first assumption of OLS which is suggestive of the fact that the estimator may be biased and inconsistent. More so, this kind of heteroskedasticity is not address simply by applying a covariance matrix estimator, because it affects the parameter estimates in addition to standard errors. Our investigation of currency swap on trade applied structural gravity using both OLS and PPML to gauge between the two alternative approaches.

The benchmark model is as follows, we estimate the gravity model and discusses the estimation results via pooled OLS and Poisson Pseudo likelihood (PPML) followed by alternative variations of the benchmark model. We further proceed to discuss estimates related to the theoretical (structural) gravity model à la Anderson and Van wincoop (2003) model. It is relevant to note that the

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<sup>17</sup>Silva and Tenreyro (2006) depicts the multiplicative gravity expressed as an exponential function of the gravity equation, which provides a nonlinear least square estimator (NLS).

significant variance between the two approaches is the way estimates rely on many controls using econometric panel techniques to account for the multilateral resistance term (price indices). Given that, the price indices derived from the theoretical model are not observable. We discussed these two sets of techniques in equation (6), i.e., the fixed effects and the first difference estimation. Subsequently, we address an important issue of concern especially in the estimation of gravity model for applied trade policy research, namely, the possibility that some of our explanatory variables may be endogenous in equation (6). Recalling equation (4) we depict the intuitive gravity in equation (8) and (9) shows all sort of trade cost incorporated in our model thus:

$$\ln X_{ij,t} = \alpha_0 + \alpha_1 \ln E_{j,t} + \alpha_2 \ln Y_{i,t} + \alpha_3 (1 - \sigma) \ln \tau_{ij,t} + \epsilon_{ij,t} \quad (8)$$

$$(1 - \sigma) \ln \tau_{ij,t} = \alpha_3 \ln DIST_{ij} + \alpha_4 \ln CNTG_{ij} + \alpha_5 \ln LANG_{ij} + \alpha_6 \ln CLNY_{ij} \\ + \alpha_7 \ln CMTRY_{ij} + \alpha_8 \ln LLD_{ij} + \alpha_9 \ln RTA_{ij,t} + \alpha_{10} \ln \lambda'_{ij,t} \quad (9)$$

In the standard literature, the  $X_{ij,t}$  variable indicates the logarithm of nominal bilateral international trade flows from exporter  $i$  to  $j$  at time  $t$ .  $\alpha_0$  is a constant term, its structural interpretation represent the world output. While  $\ln E_{i,t}$  and  $\ln Y_{j,t}$  denotes the logarithm of the exporter income and importer expenditure respectively.  $(1 - \sigma) \ln \tau_{ij,t}$  accounts for all sort of trade cost. Equation (11) above represent the trade costs with set of robust gravity proxies.<sup>18</sup> For example,  $\ln DIST_{ij}$  is the logarithm of bilateral distance between the trading partners  $i$  and  $j$ .  $\ln CNTG_{ij}$  captures the presence of contiguous border between a pair country  $i$  and  $j$ .

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<sup>18</sup>In the gravity model literature, there is evidence each of these of factors exert significant impact on trade, this is because they increase or decrease the costs of moving goods internationally.

$\ln LANG_{ij}$  represent a dummy taking values one and zero otherwise for common language.  $\ln CNLY_{ij}$  also represent a dummy equals unity and zero otherwise representing countries ever in colonial ties.  $\ln CMTRY_{ij}$  is another dummy equals unity and zero otherwise for common nations in bilateral data. Similarly,  $LLD_{ij}$  represent a dummy equal to unity and zero otherwise for landlocked countries. Finally,  $RTA_{ij,t}$  and  $\lambda'_{ij,t}$  are both trade policy variables,  $RTA_{ij,t}$  denotes the presence of regional trade agreement between a pair country at time t. While  $\lambda'_{ij,t}$  is the variable that accounts for the bilateral RMB-trade policy i.e., bilateral currency swap agreements between China and its counterparts at time t. Where  $\epsilon_{ij,t}$  is the random disturbance term (error). The key objective is to estimate the value  $\alpha$  as the unknown parameters, in the initial premise we start with the Pooled OLS, which is econometric equivalent to the line of best fit used to show the link between trade, economics sizes and trade costs. As an important econometric problem, it is suggestive that OLS minimizes the sum of squared error  $\epsilon$ . Econometric theory provides three necessary and sufficient conditions for pooled OLS estimates of the gravity model to yield unbiased results: first, the errors  $\epsilon_{ij,t}$  must have mean values zero and be uncorrelated with the explanatory variables (orthogonality assumption). Second, the errors  $\epsilon_{ij,t}$  must be drawn independently from a normal distribution with a given (fixed) variance (the homoscedasticity assumption). Thirdly, none of the explanatory variables is a linear combination of other explanatory variables (full rank assumption). Suppose all the three properties hold, the pooled OLS yield consistent, unbiased and efficient estimates of the gravity system within the class of a linear model.<sup>19</sup>

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<sup>19</sup> The consistency of our estimates denotes that the pooled OLS estimates converge to the population values as the sample size increases. Unbiasedness mean that the coefficient estimates do not systematically differ from the population values, though they are based on a sample rather than the full

## CHAPTER 4

### EMPIRICAL RESULTS

#### 4.1 Empirical Results

Table 2 present the results of intuitive gravity model using aggregate data. An interesting number feature is apparent from these estimates. First, it relatively fits well with R-squared of 0.51. This denotes that the explanatory variables account for over 50 percent of the variation observed in our bilateral trade data. The explanatory increases as we add more variables to the model using panel data. Furthermore, the economic sizes depict a positive association with trade as expected. One percent increase in exporter or importer size term (GDP) tend to have an approximately unity impact elasticity on bilateral trade, and this effect is statistically significant at 1 percent level. Similarly, the coefficient on distance is negative and statistically significant at 1 percent, an increase in distance reduces trade by 12%.

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population. Also, by efficiency we mean there is no other linear unbiased estimator that produces smaller standard errors for the coefficients estimates.

Table 2: Pooled OLS Intuitive Gravity Estimates

	[ 1 ]	[ 2 ]	[ 3 ]	[ 4 ]
Exporter Income	1.023*** (0.00823)	1.125*** (0.00635)	1.125*** (0.00635)	1.119*** (0.00639)
Importer Expenditure	0.768*** (0.00807)	0.841*** (0.00647)	0.841*** (0.00647)	0.835*** (0.00651)
Distance		-1.267*** (0.0181)	-1.267*** (0.0181)	-1.203*** (0.0185)
Border		0.778*** (0.0823)	0.778*** (0.0823)	0.766*** (0.0810)
Colony		1.644*** (0.0964)	1.644*** (0.0964)	1.656*** (0.0966)
Island		0.358*** (0.0303)	0.358*** (0.0303)	0.331*** (0.0303)
Landlocked		-0.686*** (0.0282)	-0.686*** (0.0282)	-0.691*** (0.0280)
Common language		0.727*** (0.0361)	0.727*** (0.0361)	0.716*** (0.0359)
Common nation				-0.0506 (0.177)
Regional				0.490*** (0.0351)
Currency swap				0.247 (0.196)
Observations	635,137	635,137	635,137	635,137
R-squared	0.432	0.547	0.547	0.548

Notes: the standard errors are clustered by the country pair and reported in parenthesis. The  $p$ -values reads \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Further, a cursory look to the determinants of bilateral trade in our data, we find that most of the coefficients have the expected signs except for commonnation variable that seems to have a negative impact on trade. For example, the existence of common border, colonial ties show an increase in trade of 78% and 91% ( $e^{0.76} - 1$  and  $e^{1.65} - 1$ ) respectively. The status of country been an island and land locked countries is also relatively important, the former boosted trade by 51% while the later decreases trade by 50%. Similarly, countries who share common language relatively

trade more by ( $e^{0.71} - 1 = 74\%$ ). Our regional trade dummy coefficient depicts a positive and economically large impact of ( $e^{0.49} - 1 = 63\%$ ). Of relevance to note that our currency swap is positive though insignificant. To ensure that our results obtained using OLS estimator are robust, we also estimate the Poisson as the alternative gravity model. Similarly, the Poisson estimator has a few desirable properties for applied trade policy using gravity model. Firstly, it has the usual properties of nonlinear maximum likelihood estimators. Second, the model is also consistent with fixed effects estimations, which is particularly important for theory consistent gravity modelling that requires inclusion of fixed effects. Moreover, Poisson estimator includes observations for which observed trade is zero, while such observations simply dropped from log of gravity since the logarithm of zero is undefined. Therefore, the ability of Poisson to consider zero observations is desirable without any variation to the basic model. The importance is reiterated because dropping zero observations may increase the potential problem of sample selection bias, which remained an important issue of concern in empirical analysis (see Silva and Tenreyro, 2006). This desirable property of Poisson estimator suggests the use of Poisson results rather than Pooled OLS. In this case, we present both Poisson estimates and Pooled OLS for comparable purpose and robustness check. Hence, the choice between the two is empirical one, for example, Silva and Tenreyro (2006) conduct a test to determine the most efficient estimator between Poisson pseudo maximum likelihood and Pooled OLS estimator and find a significant and robust scope in favor of Poisson pseudo maximum likelihood gravity equation.

Table 3: Poisson Pseudo Maximum Likelihood (PPML) Intuitive Gravity Estimates

	[ 1 ]	[ 2 ]	[ 3 ]	[ 4 ]
Exporter Income	0.806*** (0.0241)	0.850*** (0.0198)	0.851*** (0.0173)	0.834*** (0.0166)
Importer Expenditure	0.813*** (0.0273)	0.853*** (0.0234)	0.853*** (0.0218)	0.841*** (0.0210)
Distance		-0.831*** (0.0445)	-0.873*** (0.0345)	-0.740*** (0.0298)
Border		0.606*** (0.172)	0.429*** (0.117)	0.415*** (0.104)
Colony		0.574*** (0.0771)	0.161 (0.112)	0.229** (0.102)
Island		0.544*** (0.0783)	0.519*** (0.0784)	0.548*** (0.0747)
Landlocked			-0.355*** (0.0615)	-0.332*** (0.0611)
Common language			0.642*** (0.101)	0.592*** (0.0926)
Common nation			0.0398 (0.483)	0.00337 (0.492)
Regional				0.475*** (0.0488)
Currency swap				0.634** (0.270)
Observations	635,137	635,137	635,137	635,137
R-squared	0.322	0.595	0.676	0.727

*Notes:* the standard errors are clustered by the country pair and reported in parenthesis. The  $p$ -values reads \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

Comparatively, the PPML estimates derived from the specification (9) enlisted in column (4) of the table (3) points to an essential difference regarding significance and magnitude though signs are the same. Notably, Table 3 depicts the Poisson model, and it fits relatively well better than the previous OLS estimator. A quick comparison of the R-squared reveals the later around 72 percent, compared to 54 percent for the former. The difference in explanatory power suggests that an alternative estimator is crucial to pick up significant features of the data. Similarly, the coefficient estimates

under Poisson are statistically different compared with the Pooled OLS. For example, almost all the coefficients are smaller in absolute value, and this mainly reflects the probable impact of heteroskedasticity on the Pooled OLS estimates. Most of the covariates in table 3 are statistically significant with expected signs. The distance estimates are also statistically significant relatively at the conventional level and approximately equal to benchmark estimates of minus one as documented in Head and Mayer (2014). This confirms that distance poses a significant impediment to bilateral trade. In addition, the impact of common border, language, nation and colonial ties on trade are positive and statistically significant consistent with the literature. Income and expenditure estimates are close to one as expected, positive and statistically significant predicted mainly by structural gravity equation. One key possible explanation that may account for the unit elasticity of income and expenditure covariates is dynamic forces in the panel set up (see Yotov et al., 2016; and Olivero and Yotov, 2012). Estimates of bilateral currency swap obtained from the specification (10) and (9) are reported in table 2 and the PPML counterpart in table 3 respectively. The notable difference that stands out reveals a positive effect of the Pooled OLS results in table 2, but statistically insignificant. While the Poisson estimates in column (5) of table 3 reveal a positive, economically substantive, and statistically significant impact of currency swap on trade. This implies that countries that join China's bilateral currency swap trade more by 87% ( $e^{0.63} - 1$ ) compared to the absence of the currency swap agreement.

## **4.2 Addressing Potential Endogeneity Bias**

In the estimation of the gravity model, we must give attention to the likely problem of endogeneity, more especially the inclusion of policy variable in the model. From an econometric consideration, the existence endogeneity violates the

orthogonality assumption of pooled OLS, by creating a correlation between the right-hand variables and the error term. The potential sources of endogeneity bias of the right-hand side variable's coefficient estimates fall under omitted variable bias, simultaneity bias, and measurement error (see Wooldridge, 2002), believing that these factors can severely be a potential source of bias caused by the RMB-trade policy (swap line).<sup>20</sup> Similarly, reverse causality can ensue as another source of this type econometric problem. For instance, the accession trade policy like the renminbi currency swap may be determined by the degree of country's overall integration in the global markets. Similarly, open economies have incentives to subscribe more to liberal policies, in this case, one has to be cautious in drawing firm conclusion about the impact of such kind of policies on trade. Baier and Bergstrand (2004) empirically examine the economic determinants of RTAs and show that there is a robust cross-sectional evidence that most countries select well their partners, say country pairs are signing RTAs to some extent share some economic traits capable of enhancing the benefit of RTAs. Indeed, it is reasonable to note that there remains large unobserved heterogeneity, for example, suppose exporting firms from a given country suffers from inadequate sources of financing their business activity, because international trade requires additional cost such as shipping, foreign exchange risk among others. Here the anticipated gains from bilateral currency swap between China its counterparts would be substantial, and therefore, governments of countries with this type of weak financial depth would be more likely to select into the swap line. Similarly, as shown in Aizenman (2011) countries use the swap line as a way of complimenting reserves to guide against the unforeseen contingency of illiquidity or

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<sup>20</sup>This issue endogeneity of trade policy in the trade literature can be trace since (Trefler, 1993).

complimenting some fiscal spending in infrastructure since the swap funds are not restricted to trade financing.

In fact, these traits are unobservable to the econometrician, these factors may likely correlate with decision into Renminbi swap line. In this sense, swap line and goal of complimenting reserves of fiscal spending may exhibit a positive correlation in the cross-section of the data but create a negative error term  $\epsilon_{ij,t}$  in the gravity equation, and the swap line coefficient may be underestimated. Also, assuming unobserved cultural or historical features shared between China and its swap counterparts increase concomitantly with trade flows and the likelihood of entering into a bilateral swap agreement, by reducing cost-related barriers compared to when this type of corporation does not exist, this will make the estimated coefficients to exhibit upward bias. Since we care about the consistency, efficiency, and unbiasedness of our coefficient estimates, it is important to note that failure to account for potential endogeneity of  $\lambda'_{ij,t}$ , may bias our gravity estimates. Comparable to other trade policy analysis like currency unions (CUs), free trade agreements (FTAs), our approach of dealing with the problem follows that of Baier and Bergstrand (2007) to address some of the endogeneity in FTA regressions: they propose the use panel data with country-pair fixed effects and country-time fixed effects or using first differenced panel with country-and-time fixed effects. Showing that the inclusion of country-pair fixed effects or differencing the data removes the bias attributed to the omission of the unobserved variables affecting bilateral trade and the explaining variable

( $\lambda'_{ij,t}$  membership dummy) which also considers the endogeneity related to selection, since it's mainly a cross-sectional issue.<sup>21</sup>

Table 4: Structural Gravity Estimates

	Time Fixed effects	Bilateral Fixed Effects	Pair Fixed Effects	PPML Pair Fixed Effects	PPML Pair Fixed Effects
Currency Swap	1.714*** (0.198) (0.0195)	1.409*** (0.199)	1.409*** (0.199)	1.578*** (0.0612)	1.520*** (0.0747)
Currency Swap <sub>t-4</sub>					0.313*** (0.0684)
Observations	564,384	564,384	562,647	562,647	562,647
R-squared	0.713	0.689	0.689	0.672	0.678

Notes: the standard errors are clustered by the country pair and reported in parenthesis. The  $p$ -values reads \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Table 4 reports the estimates of structural gravity model with some controls, column (2) depicted results when bilateral fixed effects were included, i.e., both exporter-time and importer-time respectively in the specification (6). To obtain theory consistent estimates, these terms are particularly relevant to account for both outward and inward multilateral resistant terms properly and more inclusively to absorb other

<sup>21</sup> Using a cross section data, instrumental variable method is one of the recommended econometric approach to address the endogeneity problem. However, no exogenous, strong and reliable instrument are available. For example, (Magge, 2003; and Baier and Bergstrand 2004) were among the early studies that instruments with little success. Magge (2003) conclude, "We should be cautious in using gravity equation estimates to draw strong conclusions the effect of PTA on trade." Similarly, Baier and Bergstrand (2007) surveyed and summarize most of the existing findings of IV studies, at best, they found mixed evidence in trying to isolate the effect of FTAs on trade flows. However, same authors argued that one could draw strong and reliable influence about the average treatment effect of FTAs on trade using panel data. Particularly using country-pair fixed effects and first differencing eliminates or account for the likely unobserved linkages between the endogenous trade policy covariates and the error in the gravity regression. Egger and Nigai (2015) and Agnosteva et al. (2014) show that the country-pair fixed effects will absorb all bilateral time invariant covariates and therefore, account for any unobservable time invariant trade cost components, they argued that pair-fixed effects are a better measure of bilateral trade costs than the set of standard gravity regressors.

unobservable characteristics that are exporter and importer specific likely to influence bilateral trade. We noted earlier failure to account for the endogeneity of  $\lambda'_{ij,t}$  might bias the gravity estimates. Column (3) and (4) reports results that are augmented by pair fixed effects in the gravity equation to control for endogeneity in line with the specification (6) via alternative estimators (OLS and the PPML). The estimated coefficient of the  $\lambda'_{ij,t}$  variable is statistically significant and positive as much large as 1.409 and 1.578 in absolute value for the pooled OLS and PPML estimation results respectively, though with a difference from the specification that imposes time fixed effect. This suggests that all else equal, currency swap formation leads to an average increase in trade of  $[\exp(1.578)-1] = 3.80$  more than three times with members, though the magnitude is reasonably large but empirically closer to other existing findings of other type of international agreements in the literature. Column 3 of table 5 depict the results of the restricted sample (1990 – 2013) of the structural gravity estimates, all else constant currency swap increase trade at least three times  $[\exp(1.286)-1] = 3.61$ .

#### **4.3 Strict Exogeneity Test for Potential “Reverse Causality” Between Trade and Currency Swap**

We set to test equation (6) for the possibility of reverse causality because obtaining a reliable estimate is our major concern within the gravity model.<sup>22</sup> The trade policy  $\lambda'_{ij,t}$ , may suffer from reverse causality type of endogeneity i.e., assuming, all else constant, a country might choose to liberalize its trade with a trading partner that is hitherto a significant partner. This is known as the natural trading partner hypothesis. Therefore, we tend to have feedback from trade to our trade policy variable (swap) which is opposite to prior expectation. Through the pair fixed effects,

we further implement the strict exogeneity test of  $\lambda'_{ij,t}$  by adding a new future level of swaps,  $\lambda'_{ij,t+1}$ , to specification (6) (Wooldridge, 2002; and Baier and Bergstrand, 2007). Suppose the swap line variable is exogenous to trade flows, the coefficient of the parameter associated to  $\lambda'_{ij,t+1}$ , should be statistically and economically different from zero. If this is true, swap line is uncorrelated with the concurrent level of trade flow, which is suggestive of confirming the absence of this type endogeneity.

$$\ln(X_{ij,t}) = \pi_{I,t} + \chi_{j,t} + \mu_{ij} + \rho_4 \lambda'_{ij,t} + \rho_5 \lambda'_{ij,t+1} + \epsilon_{ij,t} (10)$$

In column (5) of table 5 we show the results of specification (10) that considers reverse causality between trade and currency swap agreement (trade policy) through pair fixed effects. This assessment is implemented through strict exogeneity test of  $\lambda'_{ij,t}$  by adding a new variable that captures the future level of  $\lambda'_{ij,t}$ . Suppose  $\lambda'_{ij,t}$  are exogenous to trade flows the parameter associated with the future level of currency swap in specification (10) should not be different from zero. Our result from the strict exogeneity test depicts a value that is economically and statistically not different from zero, which confirms the absence of reverse causality in the results related to specification (10). Therefore, it means future changes in currency swap has no significant effect on trade flows. Similarly, our panel estimates in the first difference that uses exporter-time and importer-time and pair fixed effects were negative though significant, and the results are omitted for brevity.

#### 4.4 Accounting for “Phasing in” Effect of Swap Line and Lagged Terms Trade Effects

We conjecture that swap line may exhibit phase in effect on trade in the manner of free trade agreements. For example, (Anderson and Yotov, 2011; and Baier and Bergstrand 2007) argued that free trade agreement has a strong phase in effect due to its institutional nature, and therefore capturing the lagged changes of FTA on trade provides more information about the impact. Baier and Bergstrand (2007) show that the entire economic treatment effect is hardly measured wholly in the concurrent year of which FTA came into force, and typical FTA “phase in” over ten years. Moreover, this type of agreements tends to alter terms of trade, is well known in the large empirical literature on international economics; terms of trade changes tend to have lagged effects on trade volumes. For instance, FTA entered legally in 2000 may not yield impact on the trade until 2010. In accounting for the phase in effect of this type of agreement, three lagged terms for the bilateral swap agreements are imposed in equation (11) with four years interval.

$$\ln(X_{ij,t}) = \pi_{l,t} + \chi_{j,t} + \mu_{ij} + \rho_1 \lambda'_{ij,t} + \rho_2 \lambda'_{ij,t-4} + \rho_3 \lambda'_{ij,t-8} + \rho_4 \lambda'_{ij,t-12} + \epsilon_{ij,t} \quad (11)$$

The motivation for the choice of alternative panel methodologies relied on conceptual and empirical grounds. We apply fixed effects estimation rather random effects estimations based on the following argument. Wooldridge (2002, p.252) show that in econometric parlance random effect is equivalent to assuming a zero correlation between the observed explanatory variable, say in our case the swap variable and the unobserved heterogeneity say  $v_{ij}$ , and that a strong conditional mean independence assumption is required to fully justify the statistical inference. In most applied

papers  $v_{ij}$ , or the individual random effect is assumed to be uncorrelated with the explanatory variable, which seems implausible in gravity equation. However, in the gravity equation the unobserved time invariant bilateral trade flows. Since the unobserved effect  $v_{ij}$ , are likely correlated with our policy variable (swap), therefore, bilateral fixed effects estimations best control for any unobservable effects in the gravity equation (see Baier and Bergstrand, 2007; Anderson and Yotov, 2011; Egger and Nigai, 2015 and Egger, 2003). Empirically, recent econometric investigation of the gravity equation using panel data revealed a striking evidence for the rejection of random effect gravity model in comparison to a fixed effects model, which applies the use of country-pair fixed effects. In addition, Wooldridge (2002, p.284) offer standard econometric discussions on the choice of fixed effect and first differencing estimations especially in the treatment of the endogeneity problem. Showing that the choice of fixed effects or first differencing hinges on the assumption of the idiosyncratic term,  $\epsilon_{ij,t}$ . The fixed effect estimator is more efficient under the assumption that the error term  $\epsilon_{ij,t}$  are serially uncorrelated, when  $(T)$  exceed two. On the Other hand, first difference estimator is more efficient when  $\epsilon_{ij,t}$  is assume follow a random walk (i.e., the difference in the error term follow a white noise,  $\epsilon_{ij,t} - \epsilon_{ij,t-1}$ ) when  $T > 2$ . Baier and Bergstrand (2007) shows first differencing panel data has some merits over fixed effects. For example, it is quite plausible and foreseeable that the unobserved effects in trade flows, and  $\epsilon_{ij,t}$ , exhibit contemporaneous correlation overtime. Given the high serial correlation, the inefficiency of fixed effects exacerbates, as  $T$  gets larger. In this case, first differencing the data enhance the efficiency of our estimation. Similarly, using fixed effects is almost equivalent to differencing the data around the mean, and this is problematic, as  $T$  targets large in our

panel, because the data may tend to follow unit root process, and cause the problem of spurious regression. Using first differencing yields data that departs from the previous period of our panel, which is close to unit root process. Nevertheless, choosing between these methods is difficult, therefore, as a form of robustness check, reporting both methods will offer reassuring estimates.<sup>23</sup>

The results in Table 5 somewhat corroborates those obtained from Table 4. More so, the impact of phase-in agreement was realized as captured by Currency Swap<sub>t-4</sub> variable in the second row of Table 4 and 5 respectively, which means that the bilateral currency swap agreement manifested a mild impact on trade [ $\exp(0.3)-1 = 34\%$ ] four years from the RMB-swap inception.

Table 5: Structural Gravity Estimate

	Pair Fixed Effects	Bilateral Fixed Effects	Pair Fixed Effects	PPML	PPML
Currency swap	0.740*** (0.0969)	1.229** (0.612)	3.078*** (0.269)	0.740** (0.0969)	0.676*** (0.116)
Observations	22,980	22,984	22,984	22,980	22,980
R-squared	0.671	0.619	0.643	0.611	0.622

Standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

It is important to note that the positive and highly significant effects of the currency swap (RMB-trade policy) found are relatively in accordance with the impacts of other kind of trade agreements like the Currency Union (CU). In studies such as Glick and Rose (2016) who found a fairly large impact currency union on trade in the magnitude of 114%. Earliest literature began with Rose (2001) that found triple effects CUs on trade, though this sound suspiciously large, and preceded

<sup>23</sup>Wooldridge (2003) recommends reporting results using both. However, if the number of periods is large enough; first differencing is likely to be more efficient especially when the error terms exhibit substantial positive serial correlation.

empirical findings even set out a more dampening effect. For example, Glick and Rose (2002) responded with a larger data sets, and still found that currency unions double trade even with the inclusion of country-pair fixed effects.<sup>24</sup> Thom and Walsh (2002) took into consideration several CU exits and argued that omitted variable bias lingers, such as wars of independence and communist takeovers. Klein and Shambaugh (2006) found a striking evidence that hard currency pegs have a more significant impact on trade than currency unions and show that indirect pegs do not affect trade. Baier and Bergstrand (2007) addressed econometrically the endogeneity of free trade agreements (FTAs), and further demonstrate that control function and instrumental variable techniques over time do not work reasonably well for endogeneity, but panel data does. Accounting econometrically the endogeneity of FTAs, they found yet another striking empirical evidence of quintupled impact of FTAs on trade flows. Similarly, accounting for phase-in effect on the average FTAs doubles members' bilateral trade after ten years. Barro and Teneyro (2007) relied on the use of some geographic instrumental variables technique and found that CUs increases trade up to 14 folds. Baldwin (2006) discussed several reasons why the more significant impact of currency union on trade may likely be suspicious and concluded that on the average Euro increased trade in the magnitude of 5-10%. More so, Bun and Klaassen (2007) incorporate dynamic controls to shrink the high impact of currency union on trade, and the effect is still relatively substantial at 25%. Campbell (2013) also apparently showed the impact of currency unions on trade to have declined over ten years. The findings were the sensitive to exclusion of the CU observations coterminous with

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<sup>24</sup>The findings of Rose (2000) was so robust and remarkable, in 2005 Harvard's Jeffrey Frankel called the large and significant impact of currency union on trade the most significant finding in international macroeconomics in the preceding 10 years. Rose himself has this to say "I have always maintained that the measured effect of a single currency on trade appears implausibly large...."

some political events or missing data. Similarly, the paper included UK colony time trend, thus accounting for the negative pre-trend, one could find a point estimates of currency unions on trade that is negative and insignificant. The mixed findings in the literature of currency unions made Glick and Rose (2016) respond again with updated data set from 1997 to 2013 and considering some modifications such as switches of around 423 compared to 136 in Glick and Rose (2002).

Nonetheless, some level of doubt lingers, Nitsch (2005) found the absence impact for currency union entries on trade. Similarly, for dollarization episode, Klein (2005) found that their no strong evidence that dollarized countries of western hemisphere have seen an increase in trade with the United States. Also, Santos and Tenreyro (2009) showed that euro has no effect on trade, using meta-analysis Havranek (2010) found a great deal of publication bias for euro studies, and a low impact of 3.8% compared to old 60% for non-euro episodes. We allow for non-linear effects of  $\lambda'$  and attempt to capture the possibility that the effects of  $\lambda'$  variable may change over time, results are based on the specification (11), and we impose three lags with four years interval up to 12 years of the currency swap agreement. At a glance, column (5) of table 4 shows the estimated coefficients  $\lambda'$  at lag four. While lag eight and twelve were not different from zero, and we omit the values for brevity. Notably, the results suggest a relatively mild average treatment effects of  $\lambda'$  over the first four years from the inception of the bilateral currency swap of China (RMB-trade policy). Hence, the effects  $\lambda'_{ij,t}$  maintain significance over four years after the commencement of the RMB-trade policy which explains that currency swap (RMB-trade policy) is economically and statistically buoyant in increasing the level of trade flows.

#### 4.5 Trade-Diversion Effect of Bilateral Currency Swap Agreement

Our econometric specification that investigates trade diversion effect of RMB currency swap agreement of China follows Ghosh and Yamarik (2004), Dai, et al. (2014), Baier and Bergstrand (2007) that seek to identify the impact of FTAs on trade flows which generally based on gravity model. The approach fits the recent development in the application of empirical gravity to account for multilateral resistant term which had proven efficiency in the prediction of trade flows. The framework is given by:

$$X_{ij,t} = \exp[\pi_{i,t} + \chi_{j,t} + \mu_{ij} + \rho_1 \lambda'_{ij,t}{}^{in} + \rho_2 \lambda'_{ij,t}{}^{out}] + \epsilon_{ij,t} \quad (12)$$

Here,  $\ln(X_{ij,t})$ , is the bilateral trade between partners  $i$  and  $j$  at time  $t$ .  $\pi_{i,t}$ , is a set of timevarying exporter (destination) fixed effects. They also control for all unobservable inward multilateral resistances including all total expenditure in line with structural model of Anderson and van Wincoop (2003). In similar vein,  $\chi_{j,t}$ , indicates all set of time varying exporter (source) fixed effects, which also account for outward multilateral resistances and total shipments form the structural gravity model. Consequently,  $\mu_{ij}$ , represent a set country-pair fixed effects that follow Baier and Bergstrand (2007), are utilized to address endogeneity of bilateral currency swap. While  $\ln Y_i$ ,  $\ln E_j$ , and  $\ln \Gamma'_{ij,t}$  captures the economic sizes and all trade cost related variables conventional considered within the intuitive gravity structure. To robustly confirm our empirical investigation on trade diversion and trade-creation effects we adopt both the intuitive and structural economic gravity as in specification (12) and (13) using the PPML estimator.

$$X_{ij,t} = \exp[\pi_{i,t} + \chi_{j,t} + \mu_{ij} + \rho_1 \lambda'_{ij,t}{}^{in} + \rho_2 \lambda'_{ij,t}{}^{out}] + \epsilon_{ij,t} \quad (13)$$

We include two set of zero-one dummy variables to depict whether two trading partners are join the RMB swap agreement in year  $t$ ,  $\lambda'_{ij,t}^{in}$ , or whether only one trading partner has joined,  $\lambda'_{ij,t}^{outimp}$ . These dummies allow us to isolate.

Table 7: Structural Gravity: Trade Diversion Effects of Chinas' Currency Swap

	Time Fixed Effects	Bilateral Fixed Effects	Pair Fixed Effects	Pair Fixed Effects PPML	Pair Fixed Effects PPML
Currency Swap	1.974*** (0.201)	1.681*** (0.203)	1.681*** (0.203)	1.823*** (0.101)	1.775*** (0.118)
TD_Swap	1.968*** (0.0531)	1.697*** (0.0542)	1.697*** (0.0542)	1.805*** (0.0781)	1.804*** (0.0781)
Currency Swap <sub>t-4</sub>					0.256*** (0.0954)
Observations	731,826	731,826	730,063	730,063	730,063
R-squared	0.687	0.690	0.6541	0.711	0.685

Notes: the standard errors are clustered by the country pair and reported in parenthesis. The  $p$ -values reads \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

three effects swaps may exert on the level of trade flows.<sup>25</sup> In effect, a positive coefficient on both  $\lambda'_{ij,t}^{in}$ , and  $\lambda'_{ij,t}^{out}$  captures trade creation among the swap recipients, while trade diversion is suggestive of negative coefficient in  $\lambda'_{ij,t}^{out}$ . Table B8 in the appendix report the results of the intuitive gravity equation without country-pair fixed effects, this is to allow us to compare the alternative variation in specification 13 to gauge the robustness of the findings. The coefficients of the intuitive gravity relatively

<sup>25</sup>See Anderson (2001) for in depth review of the theoretical foundation of economic gravity. Our analysis follows the literature of FTAs for our empirical investigation of bilateral currency configured as a form of trade policy (Frankel 1997; Magee, 2003; Baier and Bergstrand, 2002, 2004; and Baier and Bargstrand, 20007). Recently, Baier and Bergstrand (2007) utilize a gravity set up with fixed effects and successfully account for the endogeneity of FTAs. They showed that on the average, FTAs doubles member countries trade with phase-in effect of ten years. Similarly, Anderson and Yotov (2011) use structural gravity model to estimate terms of trade and efficiency gains form FTAs in the world. The central objective of this paper is to obtain trade diversion and trade-creation effects of a newly emerging trade agreement (RMB bilateral currency swap route of China) within the same similar framework.

have the expected signs as shown in Table 6 in the appendix. Equation (13) is used following the recommendation Santos Silva and Tenreyro (2006), we estimate an alternative model using Poisson Pseudo Maximum-likelihood (PPML) estimator to account for the pattern of heteroskedasticity imbedded in trade data. The gravity equation provides an avenue for revealed evidence of trade diversion through an ex-post analysis of trade flow. Our empirical results confirm that RMB bilateral currency swap network is trade-creating, without evidence of trade diversion. Specifically, we find that RMB bilateral currency swap network rarely divert the trade signatories to the swap agreement away from the non-member countries. Specification 13 in Table 7 maintains that bilateral currency swap have significant effects on trade creation, this is evidenced by the positive signs of both currency swap and TD\_swap with magnitude of  $[\exp(1.775)-1] = 4.9$  and  $[\exp(1.804)-1] = 5.07$  respectively.<sup>26</sup>

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<sup>26</sup>Swap captures trade-creation while Td\_Swap denotes the variables represent trade diversion.

## **CHAPTER 5**

### **FINANCIAL DEVELOPMENT MEASURES AND TRADE FLOWS IN THE LIGHT OF CHINA'S CENTRAL BANK BILATERAL CURRENCY SWAP**

#### **5.1 Introduction**

The spread of Central Bank foreign currency swap since the financial crisis of 2007 has received substantial recognition around the global economy amongst Central Banks (Aizenman et al., 2011; Lin et al., 2016; Destais, 2016; Aizenman et al., 2008; Kwon, 2015; Liao and McDowell, 2015; and Aizenman et al., 2010). The agreement allows a Central Bank in one country to exchange currency, usually its domestic currency, for a determined amount of foreign currency from the Peoples' Bank of China (PBOC). While the recipient Central Bank offer lending facility to its domestic banks from the foreign currency obtained from the provider (Peoples' Bank of China (PBOC)) on its own predetermined terms and conditions and risk. Swaps involving the Peoples' Bank of China (PBOC) were one of the most important and rapidly growing swap networks as a response to the 2007 global financial crisis (Lin et al., 2016 and Lai, E. L., and Yu, X. 2015). It is not yet clear to what extent this sort of interaction of between currency swap and trade is driven by the financial development of both the recipient and provider country, while it is equally relevant to understand financial development and trade within the currency swap network. Similarly, a large empirical literature has established the importance of financial development for growth, trade performance and equity of economies, at the same time fragile and overleveraged financial system perhaps brings about major crisis as experienced in 2007 (Cihák M., Demirgüç-Kunt A., Feyen E. and Levine R. 2013). First, our

empirical investigation seeks to assess the extent to which the mixture of financial institutions and markets exerts influence on trade. In the bid to examine whether too much or little finance drives the bilateral currency swap agreement, we visually inspect the graphical plots of financial development index for the 27 RMB currency swap recipients in both advanced and emerging economies. The data depicts that their financial structure differs markedly (see Figure 3).<sup>27</sup> Therefore, the assessment of the depth (size), access (activity), and efficiency of the financial system is fundamental in shedding light on what lies behind the bilateral currency swap agreement, trade and overall financial development.<sup>28</sup> Secondly, currency swaps usage provides buffer against financial crisis in recent time. Which allows countries that subscribe to the arrangement to boost liquidity access in their financial systems. Therefore, it is important to assess financial development of these economies in terms of the fundamental functions of the financial system: (1) producing and processing information about possible investments and allocation of capital; (2) monitoring individuals and firms in the exertion of corporate governance; (3) facilitation of trade and risk management and diversification; (4) pooling and mobilizing savings; and (5) the degree with which exchange of goods, services and financial instruments is carried out with ease (Cihák, et al., 2013 and Svirydzenka, 2016). Moreover, financial institutions and markets across the globe differ markedly in the way they provide these vital financial services. In this manner, it will be relevant to understand and shed light on the underlying state of the economies that subscribe the cross-currency swap line (RMB swap line) since 2008 as a form of international financial derivative. Thus, the Peoples' Bank of Chinas' (PBOC's) RMB swap line and the counterparties

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<sup>27</sup>The proper assessment and understanding of the financial systems are at the core of a robust analysis of macroeconomic fundamentals (see Svirydzenka, 2016).

<sup>28</sup>This informs the question do financial institutions and markets development matter for trade?

(signatories) to the agreement will be the focal point of our empirical investigation, in terms of financial development and trade openness.

This paper, to the best of our knowledge, is the first study which tackles the issue of financial development and trade in the light of Central Bank bilateral currency swap network by highlighting the role of financial institutions and market size (depth), activity (access), and efficiency. In addition, we seek to overcome the drawback in major empirical work that largely focus on ratio of private credit to GDP as a key proxy of financial development (see Kiendrebeogo, 2012; Arcand, Berkes, and Panizza, 2011 and Cavallo and Scartascini, 2012). Recently, Cihák M., Demirgüç-Kunt A., Feyen E. and Levine R. (2013), Svirydzenka (2016) introduces and expanded version of financial development and recent trend in the database structure of development in financial institutions and markets across countries. The database provides measures of size, access, and efficiency of financial institution (such as banks and insurance companies, mutual funds, and pension funds) and financial markets (including stock markets, bond markets, and derivative markets) exert a powerful influence on trade and investment, growth and economic development, poverty alleviation, and economic stability (Levine, 2004 and Cihák et al., 2012). These new measures of financial development more comprehensively capture differences in the domestic financial system across countries and time.<sup>29</sup> Thus, we seek to enhance our understanding on the relationship between trade and financial development in the light

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<sup>29</sup>World and IMF database provides statistics on size, activity, and efficiency of banks and non-banks, equity markets and bonds markets across abroad range of countries. More so, it contains many indicators of financial globalization that include statistics on international bond issues, international loans offshore deposits and remittance flows. The database is drawn on a wide array of primary sources that cover several dimensions of the financial system(<http://econ.worldbank.org/programs/finance>).

of Chinas' bilateral swap network in different countries with diverse of financial system within the framework of panel data.<sup>30</sup>

## 5.2 Literature Review

In both theoretical and empirical literature financial development and the degree of international trade openness are among key variables the economic growth literature highlights as being highly connected with growth performance across countries (e.g. Beck et al., 2002; 2000; Beck 2002; Demetriades and Andrianova, 2004; Darrat et al., 2006; Ductor and Grechyna, 2015; Levine, 2003; Guariglia and Ponchet 2008 and Levine, 1997). An important source of financial development documented in the small but growing literature is trade openness. The related literature focuses on two variable relation between trade openness and financial development as in “Braun and Raddaiz, 2005; Do and Levchenko, 2004; Mishikin, 2009; and Beck, 2002”. Trade openness greatly differs in the world's most open and least open countries. For example, Argentina, one of the relatively least open economies witnessed a trade volume of some 20% as a percentage of GDP compared to Singapore that had around 440% over the period of 1971 – 2010. For example, the average financial development as traditionally measured by the domestic credit private sector (% of GDP) is apparently more than 22 times higher in the most financially developed country like Japan in comparison to least developed such as Ghana (see Kiendrebeogo, 2012).

Rajan and Zingales (2003) suggests that empirical findings based on the two-variable relationship are likely to be misleading and invariably incomplete. Furthermore, the Rajan and Zingales studies suggested three variable relationship

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<sup>30</sup>We depart from the realization that financial development affects trade patterns, the paper poses the question: will external finance through RMB bilateral currency swap matter for international trade.

among financial development, trade openness and financial openness. Particularly, they maintained that trade openness without financial openness may not yield higher financial development and they verified the hypothesis using data for 24 industrialized countries from the span of 1913 – 1999. Rajan and Zingales (2003) utilizes the interest group theory to benchmark their findings. Their results argued that Interest groups, particularly industrial and financial incumbents perhaps stand to lose from financial development. Since financial development provides new opportunities for new entrant firms into the market, this propels competition and erodes the incumbents' interests. They argued that financial development will be weaker when the economy is open to trade and finance.

Baltagi et al. (2009) verifies the Rajan Zingales's (2003) hypothetical assertion using data drawn for both developing and industrialized countries. They show the interactive effects of trade and financial openness on financial development in investigating the dual openness hypothesis. The interaction between trade openness, financial openness and trade can be used to investigate the marginal effect of increasing trade (financial) openness on financial development conditional on financial (trade) openness.

In addition, the financial system is considered as an endowment and therefore disparities across country lead to different levels of trade performance. With identical technology and factor endowments between countries, comparative cost varies when countries differ in their respective institution of credit enforcement (see Kiendrebeogo, 2012). Since financial services provided by the endogenous financial systems are unique across countries, and as such the pattern of industrial specialization is influenced by the level of financial intermediation. Recently, theoretical developments on the relationship between finance and international trade patterns

underpins the relevance of external finance in production (see for example Beck, 2002; Manova, 2006; Matsuyama, 2005; and Antras and Caballero, 2009). Similarly, many studies find that international trade is largely propelled by financial development (Manova, 2006; Becker and Greenberg, 2007; and Svaleryd and Vlachos, 2005). Recently a growing body of literature underscore that the demand for a well-developed financial center is higher in countries with industrial structures that heavily depends on external finance. In contrast, demand for external finance tends to be lower in countries that specialize in goods that do not require external finance (Huang and Temple, 2005; Klein and Olivei, 2008; and Baltagi et al., 2009).

Furthermore, in this strand of empirical literature, except for Kiendrebeogo, (2012) and Ju and Wei (2011), less emphasis has been placed on the relevance of institutions in relation to finance and trade. Ju and Wei (2011) develop a general equilibrium framework and show that finance is passive in countries with relatively high-quality institutions and seems to be an important source of comparative advantage for countries with low-quality institutions. Kiendrebeogo, (2012) argued that countries with high quality institutions makes transaction in financial and goods markets better cleared owing to better information and increased competition. Similarly, when shareholders and property rights are well secured firms tend to have improved levels of governance and greater efficiency in the allocation of productive resources. Thus, higher quality of institutions might enhance perceived positive impact of financial development on international trade flows (Huang and Temple, 2005; Klein and Olivei, 2008).

More so, a recent expanding literature stresses the impact of financial markets and institutions on economic development and allocation of productive economic activities (Levine, 1997; Baltagi et al., 2009; Demirgüç-Kunt and Levine, 2009). The

studies show that a well-functioning financial system constitutes a potential mechanism for economic growth. Especially, where information related to profitable projects, diversifying risks, lesser liquidity risks, rationing the allocation of resources towards more productive utilization, resource mobilization and corporate monitoring. In addition, a well-functioning financial system enhances capital formation and efficiency in the allocation, promotion of resources, and consequently higher economic growth (see Hondroyannis et al., 2005; King and Levine, 1993; Levine, 1997; Levine and Zervos, 1998; Rousseau and Wachtel, 2000; and Beck and Levine, 2004). Finance constraints prevent less developed countries from taking full advantage of technology transfer and that leads to divergent growth rate. Less developed countries with underdeveloped financial system are trapped into a vicious circle, where deficient financial development leads to low economic performance and in turn more deficient financial development (Aghion et al., 2005 and Fung, 2009).

In contrast, economies with a well-developed financial system tend to have a faster growth and consequently finance is not only pro-growth but also pro-poor economies suggesting that financial development can serve well the less developed economies to catch up with the rest of the world (Demirgüç-Kunt and Levine, 2009; Baltagi et al., 2009; Niroomand et al., 2014; and Menyah et al., 2014). Furthermore, the theory of endogenous growth as articulated by Greenwood and Javanovic (1990) and Bencivenga and Bruce (1991) among others maintained that financial development is a vital factor in strengthening long run growth given that finance helps in fostering growth via efficient intertemporal allocation of resources, technological innovation and capital accumulation.<sup>31</sup> Similarly, cross country evidence establishes

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<sup>31</sup>Moreover, several empirical and theoretical studies analyzed finance growth nexus and provides more supportive evidence. For example, the theoretical model in Blackburn and Hung (1998) and

the coexistence of positive long run and negative short run relationship between trade flows and financial development as in Loayaza and Ranciere (2006) and Kim (2010).

The negative short run impact was linked to financial fragility and the positive effect to long run impacts of financial liberalization. In addition, the study further investigates the dual role of financial liberalization effects on heterogeneous long and short run responses of trade openness to financial development. Supposing that financial intermediation affects trade openness this perhaps offer one mechanism through which the impact of financial development exerts influences on long run growth and short run fluctuation of economic activities. Levine (2004) stressed that financial development is accompanied by the enhancement of production *ex ante* information on possible investment opportunities, pooling savings, mobilization and exchange of goods and services for efficient utilization of resources and this influence trade flows and translates into growth.

### **5.3 Data Measurement and Stylized Facts**

This section describes the data employed in the empirical analysis. We consider six different measures of financial development namely, financial institutions size (depth) (FID), access (activity) (FIA), and efficiency (FIE) and financial markets size (depth) (FMD) access (activity) (FMA), and efficiency (FME). The six sub-indices measure how deep, accessible, and efficient financial markets and institutions are overall across countries and time. In addition, these sub-indices are aggregated into a higher-level sub-indices FI and FM, which captures how developed financial institutions and markets are across the globe. Overall, FI and FM sub-indices are aggregated into the overall measure of financial development (FD index). We

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Blackburn et al. (2005) also opines that trade liberalization and financial development foster economic growth.

compile data from IMF database for the analyses of the effects of trade openness on these different measures of financial development in 27 countries that signed China's currency swap network over the span of 1980 to 2013 obtained from IMF's international financial statistics database. Similarly, we use the respective economic sizes (GDP) and per capita income of these economies. Trade openness (TO) depict the degree to which countries allow trade with other countries measured by the ratio of total trade (i.e., exports plus imports) to the nominal GDP in each country. In the data set, trade data relies on the direction of trade statistics (DOTs), real GDP come from the World Bank's *World Development Indicators (WDI)*.

#### **5.4 Measures of Financial Development**

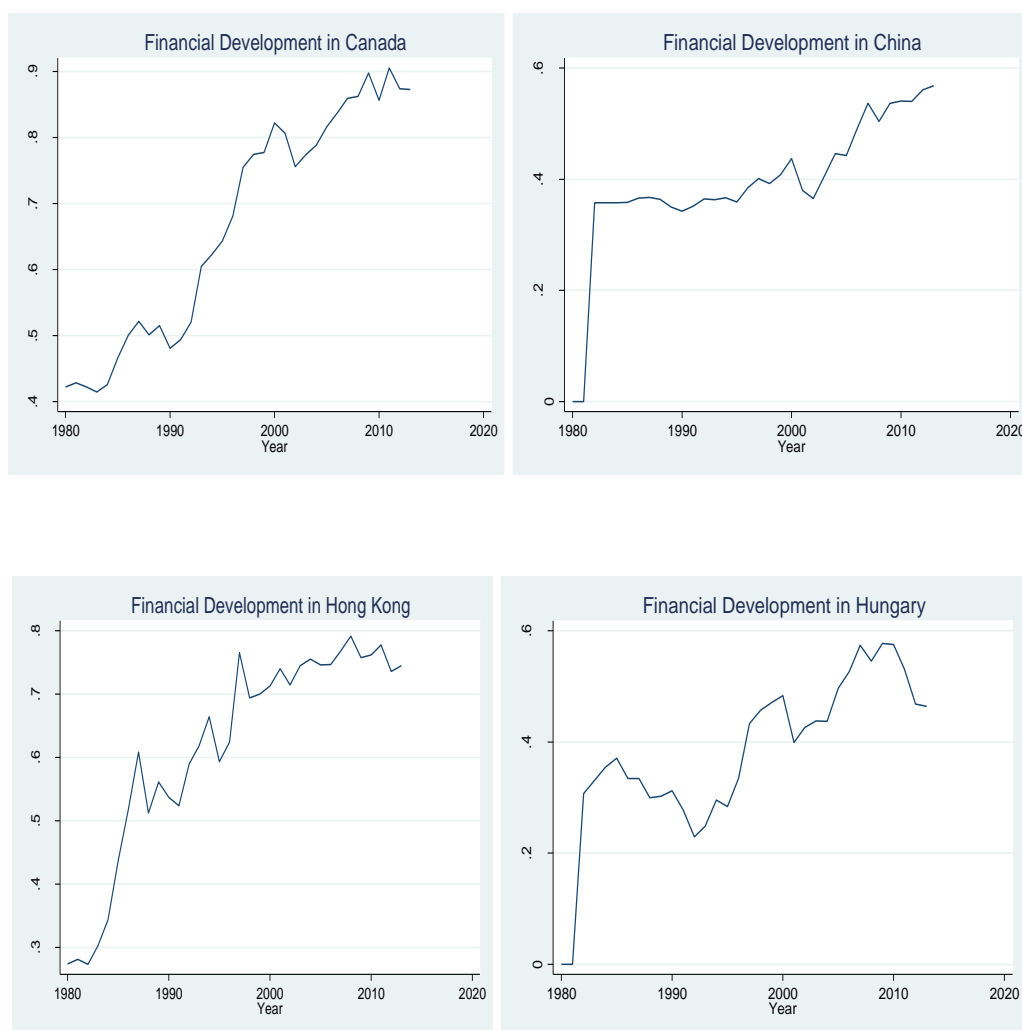
The debate about financial development and trade-cum growth is yet unsettled. One central concern relates to the question whether there is too much financial development, or too little. Also, can economists measure it well? Arcand, Berkes, and Panizza (2011), used the private credit to GDP to examine whether there is too much finance; and Cavallo and Scartascini (2012) pointed out that several countries still have too little finance. Čihák et al. (2012) argued that the commonly used measures of financial development are poor proxies of the functioning of the financial system. Traditionally, the researchers often focused on the ratio of private credit to GDP in measuring financial development. For example, suppose one visit a doctor for a medical check-up usually involves one being weighed. Weight could provide a useful information that may indicate something about the persons' eating habit, exercise, and other behaviors. However, this is not enough basis to assess the overall persons' medical state, health and wellbeing. Normally, Doctors resort to measure pulse, temperature and a series of other vital medical examination to well establish the person health. Although this seems fine, however, looking only at the ratio of private

credit to GDP does not provide adequate and sufficient yardstick for the assessment of financial development. But doing so, would be equivalent to the analogy of “weighing in” at a Doctor’s office at first glance. The ratio of private credit to GDP is an essential form of credit available and an important category of financial of service.

The ratio of private credit to GDP also captures the size of banks’ loan book relative to the economic size (output), yet this does not say anything about the financial sector and its stability. However, focusing only on one characteristic (financial depth) would mean missing out some vital aspect of financial system. Apparently, a large amount of credit may not tally with the broader use of financial sizes, since the credit spread can be skewed among the largest firms and wealthy entrepreneurs (Cihák, et al., 2013 and Svirydzenka, 2016). Figure 2 shows the use of formal accounts been imperfectly correlated with the common measure of financial depth. For instance, Vietnam has a very high domestic credit to the private sector corresponding to 125% of GDP, but only 21% of adults possess formal account. Conversely, an economy may have relatively modest financial depth (private credit to GDP at 56%) like Czech Republic but have high financial access i.e. relatively high account penetration amounting to (81% adults have access to finance). Therefore, this suggested that financial depth and financial access or inclusion are distinct characteristics and dimensions of financial development (Cihák, et al., 2013). Similar vein, a financial system can be deep without inclusivity and providing access to all. More so, figure 2 also indicates the absence of significant correlation between financial access and financial stability.

Figure 2: Financial Development of Bilateral Currency Swap Recipients





Source: Authors' Computation.

Most often researchers lack solid measures of the degree to which financial system perform its functions. Beck et al. (2010), Cihák, et al. (2013), World Bank (2012) and Svirydzenka (2016) introduced financial development and incorporated in the both IMF and World Bank database structure, which presents the expanded and updated trends in structure and development of financial institution and markets across time and countries. The database provides new multi-dimensional measure of financial development that comprises size (depth) of financial institutions and markets, degree of which individuals do use financial services (access), and efficiency of financial intermediaries and markets in intermediating resources and facilitating financial

transactions (efficiency) of the financial system (see Čihák, Demirgüç-Kunt, Feyen, and Levine 2013). All the newly constructed dimensions of the financial development measured both financial institutions such as banks and insurance companies and financial markets such as bond and stock markets take account of the overall financial system.

**Table 1: 3 x 2 Matrix of Financial System Characteristics**

	<b>Financial Institutions</b>	<b>Financial Markets</b>
<b>Depth</b>	<b>Private credit to GDP</b> Pension fund to GDP Mutual fund to GDP Insurance premiums, (life and non-life to GDP Gross value-added of the financial sector to GDP	<b>Stock market capitalization plus outstanding domestic private debt securities to GDP</b> Private debt securities to GDP Public debt securities to GDP International debt securities to GDP Stock market capitalization to GDP Stocks traded to GDP
<b>Access</b>	<b>Accounts per thousand adults</b> (commercial banks) Branches per 100,000 adults (commercial banks) % of people with a bank account  % of firms with line of credit (all firms)  % of firms with line of credit (small firms)	<b>Percent of market capitalization outside of top 10 largest companies</b> Percent of value traded outside of top 10 traded companies  Government bond yields (3 month and 10 years) Ratio of domestic to total debt securities  Ratio of private to total debt securities (domestic) Ratio of new corporate bond issues to GDP
<b>Efficiency</b>	<b>Net interest margin</b> Lending-deposits spread Non-interest income to total income Overhead costs (% of total assets) Profitability (return on assets, return on equity) Boone indicator (or Herfindahl or H-statistics)	<b>Turnover ratio</b> (turnover/capitalization) for stock market Price synchronicity (co-movement) Private information trading Price impact Liquidity/transaction costs Quoted bid-ask spread for government bonds Turnover of bonds (private, public) on securities exchange Settlement efficiency

Source: Calculations based on the Global Financial Development Database and Čihák et al. (2013) and World Bank (2012) and (Svirydzenka, 2016).

The matrix above in table 1 contains a subset measures of financial development for the dimensions defined the 3x2 matrix. The measures were highlighted in bold. The financial institution depth sub-index used the standard banking sector depth i.e. private credit to GDP captures the domestic private credit to the real sector by deposit money banks to GDP and then add indicators for other non-bank financial institutions: the assets of mutual fund and pension funds industries and the size of insurance premium (life and non-life). Financial institution access is proxied by the accounts per thousand adults i.e. number of depositors with commercial banks per 1,000 adults for each type of institution, computed as the (reported number of depositors) \*1000/adult population is each country. While financial institution efficiency of intermediating savings to investment is measured by the net interest margin (the accounting value of banks' net interest revenue as of its average interest bearing (total earnings) assets and lending deposit spread; which captures operational efficiency measures, such as non-interest income to total income and overhead costs to total assets; and measure of profitability such as return on assets and return on equity.

The financial markets depth indicator relies on stock market and debt market development. The depth sub-index includes the size of the stock market i.e. stock market capitalization plus outstanding domestic private debt securities to GDP defined as the value of listed shares to GDP plus amount of outstanding domestic private debt securities to GDP. While financial markets access is measured by the percentage of market capitalization outside the top 10 largest companies. The financial markets efficiency measure is captured by turnover ratio

(turnover/capitalization) for stock markets is defined by the ratio of the value of total shares traded to market capitalization (see for example, Svirydzienka, 2016)<sup>32</sup>.

Čihák et al. (2013) shows that financial system across the world exhibits a striking and huge disparity. They argued that even if the financial systems were to be rescaled by the corresponding economic size (i.e. by their GDP), the deepest financial system is some 110 times bigger than the smallest (least deep) ones. For instance, Denmark has 99.7% of adults were covered by bank accounts, in comparison Turkmenistan only 0.4% have access to bank accounts (this shows a huge disparity). Interestingly, Denmark is also a country with the highest turnover/capitalization ratio in the securities markets at, 538 while most countries stood at a ratio below 1. This is enough to demonstrate the huge degree of unevenness in the size of financial system. Similarly, the cartogram in Figure 2 depicts the unevenness of development in of financial system around the world. For instance, Russia's financial system far exceed that of China, and Germany's alone is bigger than the combined financial systems of the entire sub-Saharan Africa, indeed, the disparities are huge.

## **5.5 Empirical Evidence**

The econometric model aims to examine the effect of financial development on trade flows in the light bilateral currency swap line of China. We seek to investigate the general relationship between financial development and trade, the following panel regressions à la structural gravity in line with Head and Mayer (2014) as follows:

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<sup>32</sup>For example, Do and Levchenko (2004) theoretically show that each country's financial system is an endogenous outcome of the level at which entrepreneurs demand for external finance. Similarly, when a poor and rich country open to international trade, poorer countries tend to import financially dependent good, as against producing it domestically, and by implication demand for external finance decrease and that deteriorates the domestic financial system. Indeed, the relevance of financial development in strengthening long run growth and reduction of output volatility has received substantial attention literature (see Levine, 2004; Cavallo and Scartascini, 2012; Arcand, Berkes, and Panizza, 2011; Manova, 2006; Becker and Greenberg, 2007).

$$X_{ni} = \frac{Y_i}{\underbrace{\Omega_i}_{S_i}} \frac{X_n}{\underbrace{\Phi_n}_{M_n}} \phi_{ni}, \quad (1)$$

Where  $Y_i = \sum_n X_{ni}$  is exporter income  $X_n = \sum_i X_{ni}$  is importer expenditure on all source destination,  $\Omega_i$  and  $\Phi_n$  are “multilateral resistance” term defined as follows:

$$\Phi_n = \sum_{\ell} \frac{\phi_{n\ell} Y_{\ell}}{\Omega_{\ell}} \quad \text{and} \quad \Omega_{\ell} = \sum_{\ell} \frac{\phi_{n\ell} X_{\ell}}{\Phi_{\ell}} \quad (2)$$

The key and apparent feature of structural gravity is its multiplicative form. After taking logs, this denotes that the effect of multilateral resistance term can be captured by exporter and importer fixed effects. While  $\phi_{ni}$  captures a vector of bilateral trade costs variables, which includes RTAs and bilateral currency swaps:

$$\ln X_{ni} = \ln G + \ln S_i + \ln M_n + \ln \phi_{ni}. \quad (3)$$

Moreover, another key characteristic of the structural gravity is that trade flows between n and i is affected by third countries, only through  $\Omega_i$  and  $\Phi_n$  terms, that are specific to n and i respectively. Once armed with measures of income and expenditure for each country and bilateral trade costs for all country pairs, those terms can be solved easily. In what follows we incorporate the disaggregated measures of financial development to feature into the structural gravity set up.

$$\begin{aligned} \ln X_{ni,t} = & \beta_1 \ln S_i + \beta_2 \ln M_n + \beta_3 FIA_{i,t} + \beta_4 FIA_{n,t} + \beta_5 \lambda'_{ni,t} + \beta_6 FIA_{i,t} \\ & * \lambda'_{ni,t} + \beta_7 FIA_{n,t} * \lambda'_{ni,t} + \gamma_{ni} + \rho_i + \mu_n + \varepsilon_{it} \end{aligned} \quad (4)$$

Where  $X_{ni,t}$  is the measure of bilateral trade between country I and n.  $FIA_{i,t}$  and  $FIA_{n,t}$  denotes financial institution access for both country I and n respectively, i.e. degree to which firms can and do use financial services. We use the

percentage of firms with lines of credit to measure access. The  $\ln S_i$  factor represents “capabilities” of exporter  $i$  as a supplier to all destinations.  $\ln M_n$  captures all characteristics of destination market  $n$  that promote imports from all sources, in other words the respective exporter income and importer expenditure of country  $i$  and  $n$ .<sup>33</sup>  $FID_{i,t}$  and  $FID_{n,t}$  captures the financial institution depth is measured by the standard banking sector depth proxy (private credit to GDP), which is defined as domestic private credit to real sector by deposit money banks excluding credits issued by central banks, and credit issued to government agencies and public enterprises.  $FIE_{i,t}$  and  $FIE_{n,t}$  denotes the financial institution efficiency measures the banking sector efficiency in intermediating savings to investment, as proxied by the net interest margin (an equivalent of an accounting value of banks’ net interest revenue as a share of its average interest – bearing assets) and lending – deposit spread. The index is integrated to profitability measures as return on assets and equity, and operational efficiency measures as a non – interest income to total income and overhead cost to total assets.  $\lambda'_{ni,t}$ , is a dummy variable that captures central bank bilateral currency swap of China (Renminbi swap line) signed by both Advanced and Emerging economies to exchange principal and interest payments in two different currencies at fixed interval.<sup>34</sup> During the life of the cross-currency swap each offers interest in the currency of the principal received. While at the maturity of the swap, both parties make exchange of the principal amount back to back.<sup>35</sup> The  $FID * \lambda'_{ni,t}$ , is an

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<sup>33</sup> (See Head and Maye, 2014)

<sup>34</sup>  $\ln X_{ni,t} = \beta_1 \ln S_i + \beta_2 \ln M_n + \beta_3 FID_{i,t} + \beta_4 FID_{n,t} + \beta_5 \lambda'_{ni,t} + \beta_6 FID_{i,t} * \lambda'_{ni,t} + \beta_7 FID_{n,t} * \lambda'_{ni,t} + \gamma_{ni} + \rho_i + \mu_n + \varepsilon_{it}$  (5)

$\ln X_{ni,t} = \beta_1 \ln S_i + \beta_2 \ln M_n + \beta_3 FIE_{i,t} + \beta_4 FIE_{n,t} + \beta_5 \lambda'_{ni,t} + \beta_6 FIE_{i,t} * \lambda'_{ni,t} + \beta_7 FIE_{n,t} * \lambda'_{ni,t} + \gamma_{ni} + \rho_i + \mu_n + \varepsilon_{it}$  (6)

<sup>35</sup> The exchange of the notional amount is aimed at boosting liquidity, and eliminates the uncertainty associated to foreign exchange fluctuation, and therefore hedge fully exchange rate risks. Moreover, the cross-currency swap is an over the counter international financial derivative in a form of agreement.

interaction term between financial institution depth and the currency swap variable to investigate how deep financial institutions with the existence of the bilateral currency swap line.  $\gamma_{ni}$ , captures the country pair fixed effects,  $\rho_i$ , denotes country i fixed effects and  $\mu_n$ , denotes country n fixed effects.<sup>36</sup>

## 5.6 Empirical Results

The estimate equations (1) to (6) for countries that signed the RMB bilateral currency swap line. Overall, the alternative measures of financial development have if anything Table 2 depicts the estimation results for the gravity equation with disaggregated measures of financial development index across the countries that are signatories to the bilateral currency swap line. Our data for financial development is divided into two: the financial development of China as swap provider (which we called financial development in the origin country) and the recipient of China's RMB swap line (destination countries). The RMB currency swap network include some Advance economies, Emerging markets, and developing countries. All things been equal exporter income and importer income predicted a positive impact on trade in line with the conventional trade gravity equation literature. Furthermore, the results show that the estimated parameters of the disaggregated measures of financial development are statistically significant at 1 percent level, although the magnitude of each component of financial development relatively differ. First, Currency swap results suggests a high impact on trade. Also, the results in Table 2 depicts positive effect on trade for both

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This type of currency swap is used to take advantage of comparative advantages. For instance, suppose a Chinese firm is looking to acquire New Zealand dollar and a New Zealand firm is seeking to acquire Chinese Renminbi, these two firms could engage into a swap. This is due to the fact New Zealand firms are likely to have better access to New Zealand debt market and could get a more favorable term on a New Zealand dollar than if Chinese firms went in directly to the New Zealand debt market itself, the situation is for China if New Zealand if firms require Renminbi liquidity (Detais, 2016 and Khurshedi, 2012).

<sup>36</sup>(see Zhang and Lu, 2015; Svirydenka, 2016; Demirgüç-Kunt, et al., 2012 and Cihák, et al., 2013).

the swap provider (financial development in origin country) and signatories (financial development in the destination country). Our empirical model utilizes data on financial development for the sample of sample 27 countries that signed China's swap line. The key effect that our model illustrates is that swap and alternative measures of financial development affects trade differently.<sup>37</sup> For example, swap-financial development interaction term is negative and significant at 1% level. Row 5 and 7 indicates full set of swap interaction terms paired with financial institution and markets sub-indices that include access, depth, and efficiency. This allow the effect of other regressors on trade to be affected differentially for countries with high and low level of financial development. The results indicate that RMB currency swap matter for trade differentially based on countries level of financial development. It is evident and well documented in the literature that differences in financial development amongst countries are substantial and these differences are key determinants of trade patterns. We also discern that negative impact of our financial development and swap interaction on trade should be attributed to disparity in terms of financial development a cross China's swap line partners with varying level of financial development.

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<sup>37</sup>The extend of financial access, depth and efficiency of a country's financial system determines the local demand and supply for external finance currency swap lines. Therefore, the impact on swap on trade is expected to be differential across countries. Suppose trade results to increase specialization in financially dependent commodities, that leads to growth of the financial system. Conversely, countries that relies on the imports of financially dependent commodities rather than produce them domestically, the financial system weaken because of trade opening, *ceteris paribus*.

**Table 2: Currency swap and Alternative Measures of Financial Development**

	[1]	[2]	[3]	[4]	[5]	[6]
	FIAI	FIDI	F1EI	FMAI	FMDI	FMEI
ExporterIncome	0.900*** (0.111)	0.993*** (0.105)	1.030*** (0.0999)	1.044*** (0.106)	1.022*** (0.102)	1.087*** (0.106)
Importer Income	0.880*** (0.0895)	0.991*** (0.0848)	1.092*** (0.0877)	1.047*** (0.0890)	1.058*** (0.0903)	1.067*** (0.0910)
FinDev_Destination	0.394*** (0.0540)	0.303*** (0.0545)	0.363*** (0.0954)	0.0778*** (0.0299)	0.0820*** (0.0290)	0.00338 (0.0194)
FinDev_Origin	0.161** (0.0724)	0.0364 (0.0648)	0.131 (0.0856)	-0.0107 (0.0284)	0.0127 (0.0283)	-0.0358* (0.0190)
FinDev_Destination#Swap	0.0317 (0.155)	-0.233** (0.0992)	0.969*** (0.296)	-0.0868 (0.0824)	-0.225*** (0.0645)	-0.158*** (0.0505)
FinDev_Origin#Swap	-0.0246 (0.147)	-1.514* (0.865)	-14.61 (9.404)	0.313 (0.326)	-0.749 (0.645)	0 (0)
Currency Swap	0.695*** (0.117)	0.889*** (0.102)	0.889*** (0.103)	0.897*** (0.117)	0.805*** (0.103)	0.903*** (0.104)
Observations	15,300	15,300	15,300	14,565	15,300	13,582
R-squared	0.671	0.616	0.673	0.611	0.652	0.613

Robust standard errors in parentheses

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

Overall, results further suggest that financial access, depth and efficiency has different impacts on trade both in China and its trading partners that are in the renminbi swap line. We also note that the negative coefficients of the interaction enter with negative results, which means that low level of financial development is likely to drive currency swap line. This is the case when the global financial crisis deepens, many countries flexibly embrace the swap line to either substitute or compliment reserves and use it for self-insurance motive. Broadly, swaps can also substitute or compliment reserve apart from its lubricative usage for trade, which is a safety verve in case of unexpected shortages in international liquidity. Although, there could be a limit to which swap line can be use, however, the usage is determined by the recipient's level of financial development and the credibility of the provider. Another evidence suggests that swap lines are motivated essentially by self-interest of the provider (China), but in fact the benefits are substantial for recipient countries. For instance, a provider like China, swaps are useful in safeguarding the economic interest they have in countries they extend the swap lines. We believe that the interests may take different dimension for provider – e.g. significant export share or market in the swap destinations. For recipient countries swaps can foster financial stability especially when reserves cannot reassure markets during the financial crisis mainly for countries with low level of financial development and weak macroeconomic fundamentals. Therefore, it is possible that swaps possess mutual benefits that is not mainly resort to in the period of crisis, but also in good times. Swap lines can be formalized or institutionalize from a temporary anti-crisis measure to a long-term financial tool to boost liquidity especially when the need for precautionary reserve holding becomes necessary.

Moreover, our empirical evidence reaffirms the relevance of both financial institutions and markets access, depth and efficiency for trade as positively depicted row 3 and 4 of Table 2. Notably, large declines in the access and depth index reflects the volatility of returns by financial institutions in many countries and most financial markets. Figure A2 in the appendix also show that overall financial development has decline in recent times and to some extent that translates to other sub-indices, such as access and depth to finance and reduction in efficiency, especially, in financial markets. Disparities in financial system during the global crisis in many low- and medium-income countries incentivize countries to resort to swaps during the liquidity shock. On the average financial institutions rebounded faster than financial markets, with improvement in depth and efficiency after the crisis.<sup>38</sup> Another implication of the positive impact of financial institutions and market access, depth and efficiency on trade openness of China indicates high financial requirement for China and its trading partners. More so, industrial incumbents have an incentive to face competition in financial markets and demand for more external finance like swaps. This will push for greater access and efficiency for firms that intend to recover investments or main the status quo.

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<sup>38</sup> Many European countries exhibit a high level of financial institution depth. But United States and Korea financial markets are deeper. While financial systems tend to be less efficient and provide less access.

## CHAPTER 6

### 6.1 Conclusions

The central objective of this thesis was devoted to answering the question: Do bilateral currency swap agreements (RMB-trade policy of China) increases international trade of signatories to this emerging international trade agreement. Interestingly, the key motivation was to explore the novelty of documenting empirical evidence using gravity equation to estimate the average treatment effect of currency swaps on trade flows, rarely due to the absence of well documented empirical evidence in the literature. Therefore, this is seemingly important in the light of the proliferation of currency swap arrangement with a myriad of central banks across the globe, particularly those agreements that are contingent with the of motive trade expansion of which China's swap line remain an excellent specimen to date in the aftermath of the global financial crisis in 2008. In achieving this goal, our empirical analysis also relies on the on large panel data of over 200 countries, spanning from 1948 – 2013, and the general theoretical foundation of the gravity equation that is consistent with the econometric technique of estimating the average treatment effects of trade policy. The outcome of our empirical findings reveals an apparently large impact of bilateral currency swaps on trade flows. Succinctly, on the average, the estimates suggest that bilateral currency swap increases counterparts trade more than three times  $[\exp(1.578)-1] = 3.80$ . Comparably, our intuitive gravity estimate shows  $[\exp(0.63)-1] = 87\%$  increase. An important caveat we hold is that currency swap might be different from another form of international trade agreements, such as the currency unions, currency peg, and dollarization, and indeed they have a different

impact on trade. In a similar vein, we also acknowledged that different econometric technique delivers different results. Our analysis relies on a panel approach which accounts for country-pair fixed effects solely to circumvent the embedded endogeneity in trade policy analysis, and phase in effects of the bilateral currency swap agreement, which has important implication for future significance of swaps on trade.

The magnitude of the measured effects of the findings might skeptically rise concerns merely weighing the effects to have been too large to conceive. However, we square the results with other forms of international trade agreements in the literature to gauge a possibility that lies in between. For example, Glick and Rose (2016) found a fairly large impact currency union on trade in the magnitude of 114%. Earliest literature began with Rose (2000) that found triple effects CUs on trade though this sound suspiciously large, and subsequent empirical finding even set out a more dampening effect. Baeir and Bergstrand (2007) addressed econometrically the endogeneity of free trade agreements (FTAs), and further demonstrate that control function and instrumental variable techniques over time do not work fairly well for addressing endogeneity bias, but panel data does. Accounting econometrically the endogeneity of FTAs, they for found yet another striking empirical evidence of the quintupled impact of FTAs on trade flows. In addition, Barro and Tenreyro (2007) relied on the use of some geographic instrumental variables technique and found that CUs increases trade up to 14 folds. Baldwin (2006) discussed several reasons why the larger impact of currency union on trade may likely be suspicious and concluded that on the average Euro increased trade in the magnitude of 5-10%. While Bun and Klaassen (2007) incorporate dynamic controls to shrink the high impact of currency union on trade, and the effect is still relatively substantial at 25%. Another empirical

finding that relative differs away from other studies on currency unions was evidenced in Campbell (2013) who apparently showed the impact of currency unions on trade to have declined over ten years. The findings were sensitive to the exclusion of the CU observations coterminous with some political events or missing data. Similarly, the paper included UK colony time trend, thus accounting for the negative pre-trend, one could find a point estimates of currency unions on trade that are negative and insignificant. Although the results are quantifiably remarkable, we believe they are relatively reasonable in the light of why various international trade policies appeared to have a varied impact on trade flows. However, though we have addressed the (multilateral resistance) terms of a given country pair using the exporter-time and importer-time fixed effects, which technically accounts for outward and inward multilateral resistances. We have not address general equilibrium “comparative statics” effects of bilateral currency swaps on two members’ trade nor the effects of the agreement on non-members’ trade and the possible welfare implication of currency swaps. These possible limitations are left for future research. Our centrifugal focus in this study has mainly been to explore a novelty that the provides policymakers and academics alike an unbiased estimate of the average treatment effect of currency swaps on trade flows of signatories to this emerging international trade agreement. Similarly, we provide empirical evidence that currency swap is important for trade especially for countries with relatively low level of financial development. It is well documented that the differences in development amongst countries are substantial, and such differences are important in the determination of trade pattern. The level of financial development was proxied by the interaction term of disaggregated measure of financial development such access, depth, and efficiency each interacted with swaps. We provide empirical evidence that

differential level of financial development can be a key determinant of whether a country can use swap lines for international trade or not. In rich countries, strong financial system promote trade, the opposite is the case in poorer ones. Perhaps, empirical tests on the influence of financial system and on trade remain on the research agenda especially looking at industry-level import and export data.

## APPENDIX

We further incorporate variables, to investigate whether financial markets development matter for trade flows? In seeking to answer this question we specify a modified version of equation (1), (2), and (3), as follows:

$$\begin{aligned} \ln X_{ni,t} = & \beta_1 \ln S_i + \beta_2 \ln M_n + \beta_3 FMA_{i,t} + \beta_4 FMA_{ni,t} + \beta_5 \lambda'_{ni,t} + \\ & \beta_6 FMA_{i,t} * \lambda'_{i,t} + \beta_7 FMA_{n,t} * \lambda'_{n,t} + \gamma_{ni} + \rho_i + \mu_n + \varepsilon_{it} \end{aligned} \quad (1)$$

$$\begin{aligned} \ln X_{ni,t} = & \beta_1 \ln S_i + \beta_2 \ln M_n + \beta_3 FMD_{i,t} + \beta_4 FMD_{n,t} + \beta_5 \lambda'_{ni,t} + \beta_6 FMD_{i,t} \\ & * \lambda'_{ni,t} + \beta_7 FMD_{n,t} * \lambda'_{ni,t} + \gamma_{ni} + \rho_i + \mu_n + \varepsilon_{it} \end{aligned} \quad (2)$$

$$\begin{aligned} \ln X_{ni,t} = & \beta_1 S_i + \beta_2 \ln M_n + \beta_3 FME_{i,t} + \beta_4 FME_{n,t} + \beta_5 \lambda'_{ni,t} FME_{i,t} \\ & * \lambda'_{ni,t} + \beta_7 FME_{n,t} * \lambda'_{ni,t} + \gamma_{ni} + \rho_i + \mu_n + \varepsilon_{it} \end{aligned} \quad (3)$$

Financial market access, it measured the percentage of market capitalization outside top 10 largest companies to proxy access to markets.

Table A

Table A1: Bilateral Exports Shares of China and United Kingdom

<b>Years Before Swap</b>	<b>China</b>	<b>Partner UK</b>	<b>Average Share of China's Exports</b>	<b>United Kingdom</b>	<b>Partner China</b>	<b>Average Share of UK's Exports</b>
<b>1948</b>	924	112		112	924	0.0058092
<b>1949</b>	924	112		112	924	0.0015473
<b>1950</b>	924	112		112	924	0.0017187
<b>1951</b>	924	112		112	924	0.0011142
<b>1952</b>	924	112		112	924	0.0018494
<b>1953</b>	924	112		112	924	0.0025622
<b>1954</b>	924	112		112	924	0.0027585
<b>1955</b>	924	112		112	924	0.0028856
<b>1956</b>	924	112		112	924	0.0035802
<b>1957</b>	924	112		112	924	0.0038726
<b>1958</b>	924	112		112	924	0.008408
<b>1959</b>	924	112		112	924	0.0072166
<b>1960</b>	924	112		112	924	0.0087221
<b>1961</b>	924	112	0.167092	112	924	0.0033953
<b>1962</b>	924	112		112	924	0.0021794
<b>1963</b>	924	112		112	924	0.0031411
<b>1964</b>	924	112		112	924	0.0040062
<b>1965</b>	924	112		112	924	0.0054146
<b>1966</b>	924	112		112	924	0.0064248
<b>1967</b>	924	112		112	924	0.0075575
<b>1968</b>	924	112		112	924	0.0045628
<b>1969</b>	924	112		112	924	0.0074924
<b>1970</b>	924	112		112	924	0.0055736
<b>1971</b>	924	112		112	924	0.0031296
<b>1972</b>	924	112		112	924	0.0032232
<b>1973</b>	924	112		112	924	0.0068311
<b>1974</b>	924	112		112	924	0.0043461
<b>1975</b>	924	112		112	924	0.0040741
<b>1976</b>	924	112		112	924	0.0027247
<b>1977</b>	924	112		112	924	0.0019634
<b>1978</b>	924	112	0.042447	112	924	0.0026058
<b>1979</b>	924	112	0.038593	112	924	0.0052839
<b>1980</b>	924	112	0.03331	112	924	0.0036007
<b>1981</b>	924	112	0.019234	112	924	0.0024844
<b>1982</b>	924	112	0.014085	112	924	0.0018511
<b>1983</b>	924	112	0.0272	112	924	0.0026728

<b>1984</b>	924	112	0.013271	112	924	0.0045369
<b>1985</b>	924	112	0.013103	112	924	0.0051096
<b>1986</b>	924	112	0.045932	112	924	0.0074213
<b>1987</b>	924	112	0.0135	112	924	0.005228
<b>1988</b>	924	112	0.013871	112	924	0.0050827
<b>1989</b>	924	112	0.012229	112	924	0.0044924
<b>1990</b>	924	112	0.01074	112	924	0.0044602
<b>1991</b>	924	112	0.010196	112	924	0.0031274
<b>1992</b>	924	112	0.01096	112	924	0.0039979
<b>1993</b>	924	112	0.021394	112	924	0.0065098
<b>1994</b>	924	112	0.020357	112	924	0.0065241
<b>1995</b>	924	112	0.019136	112	924	0.0056846
<b>1996</b>	924	112	0.021566	112	924	0.0046794
<b>1997</b>	924	112	0.021286	112	924	0.0059701
<b>1998</b>	924	112	0.025759	112	924	0.0060988
<b>1999</b>	924	112	0.02555	112	924	0.0073547
<b>2000</b>	924	112	0.025846	112	924	0.0079001
<b>2001</b>	924	112	0.025934	112	924	0.0095134
<b>2002</b>	924	112	0.025261	112	924	0.0083756
<b>2003</b>	924	112	0.025221	112	924	0.0105726
<b>2004</b>	924	112	0.025829	112	924	0.0131518
<b>2005</b>	924	112	0.025466	112	924	0.0130031
<b>2006</b>	924	112	0.025493	112	924	0.0136099
<b>2007</b>	924	112	0.026521	112	924	0.0173471

<b>Years After Swap</b>	<b>China</b>	<b>Partner UK</b>	<b>Average Share of China's Exports</b>	<b>United Kingdom</b>	<b>Partner China</b>	<b>Average Share of UK's Exports</b>
<b>2008</b>	924	112	0.025737	112	924	0.0193528
<b>2009</b>	924	112	0.026517	112	924	0.0231004
<b>2010</b>	924	112	0.025104	112	924	0.0214324
<b>2011</b>	924	112	0.023727	112	924	0.0213049
<b>2012</b>	924	112	0.023032	112	924	0.0231462
<b>2013</b>	924	112	0.023509	112	924	0.0213999

**Table A2: Bilateral Exports Shares of China and Switzerland**

<b>Years Before Swap</b>	<b>China</b>	<b>Partner Switzerland</b>	<b>Average Share of China's Exports</b>	<b>Switzerland</b>	<b>Partner China</b>	<b>Average Share of Switzerland's Exports</b>
<b>1948</b>	924	146		146	924	0.0155374
<b>1949</b>	924	146		146	924	0.0165739
<b>1950</b>	924	146		146	924	0.0201494
<b>1951</b>	924	146		146	924	0.0244686

<b>1952</b>	924	146		146	924	0.0167848
<b>1953</b>	924	146		146	924	0.022493
<b>1954</b>	924	146		146	924	0.0193818
<b>1955</b>	924	146		146	924	0.0185548
<b>1956</b>	924	146		146	924	0.0250071
<b>1957</b>	924	146		146	924	0.0282791
<b>1958</b>	924	146		146	924	0
<b>1959</b>	924	146		146	924	0
<b>1960</b>	924	146		146	924	0.0043117
<b>1961</b>	924	146	0.018306	146	924	0.0026015
<b>1962</b>	924	146		146	924	0.001623
<b>1963</b>	924	146		146	924	0.0016164
<b>1964</b>	924	146		146	924	0.0040206
<b>1965</b>	924	146		146	924	0.0061829
<b>1966</b>	924	146		146	924	0.0064965
<b>1967</b>	924	146		146	924	0.0060843
<b>1968</b>	924	146		146	924	0.0048721
<b>1969</b>	924	146		146	924	0.0031359
<b>1970</b>	924	146		146	924	0.0040487
<b>1971</b>	924	146		146	924	0.0029476
<b>1972</b>	924	146		146	924	0.002845
<b>1973</b>	924	146		146	924	0.0043796
<b>1974</b>	924	146		146	924	0.0046306
<b>1975</b>	924	146		146	924	0.0043828
<b>1976</b>	924	146		146	924	0.0035075
<b>1977</b>	924	146		146	924	0.0032387
<b>1978</b>	924	146	0.01185	146	924	0.0040247
<b>1979</b>	924	146	0.013643	146	924	0.0047239
<b>1980</b>	924	146	0.012138	146	924	0.0047174
<b>1981</b>	924	146	0.005484	146	924	0.00456
<b>1982</b>	924	146	0.004954	146	924	0.0049447
<b>1983</b>	924	146	0.003687	146	924	0.0048802
<b>1984</b>	924	146	0.00419	146	924	0.0047791
<b>1985</b>	924	146	0.005527	146	924	0.0089809
<b>1986</b>	924	146	0.005781	146	924	0.0111789
<b>1987</b>	924	146	0.004794	146	924	0.0096473
<b>1988</b>	924	146	0.004265	146	924	0.0081319
<b>1989</b>	924	146	0.003458	146	924	0.0075073
<b>1990</b>	924	146	0.002657	146	924	0.00475
<b>1991</b>	924	146	0.00237	146	924	0.0053963
<b>1992</b>	924	146	0.001895	146	924	0.0068379
<b>1993</b>	924	146	0.003094	146	924	0.010291
<b>1994</b>	924	146	0.003015	146	924	0.0089818
<b>1995</b>	924	146	0.002836	146	924	0.0088918
<b>1996</b>	924	146	0.003166	146	924	0.0089433

<b>1997</b>	924	146	0.003436	146	924	0.0088131
<b>1998</b>	924	146	0.003526	146	924	0.0073793
<b>1999</b>	924	146	0.003534	146	924	0.0082734
<b>2000</b>	924	146	0.003064	146	924	0.0104445
<b>2001</b>	924	146	0.002495	146	924	0.0121776
<b>2002</b>	924	146	0.002001	146	924	0.0146438
<b>2003</b>	924	146	0.001962	146	924	0.017826
<b>2004</b>	924	146	0.002609	146	924	0.0205693
<b>2005</b>	924	146	0.002624	146	924	0.0214682
<b>2006</b>	924	146	0.002658	146	924	0.0223801
<b>2007</b>	924	146	0.003024	146	924	0.02653
<b>Years After Swap</b>	<b>China</b>	<b>Partner Switzerl and</b>	<b>Average Share of China's Exports</b>	<b>Switzer land</b>	<b>Partner China</b>	<b>Average Share of Switzerlan d's Exports</b>
<b>2008</b>	924	146	0.002792	146	924	0.0286008
<b>2009</b>	924	146	0.002259	146	924	0.0296942
<b>2010</b>	924	146	0.001967	146	924	0.0371801
<b>2011</b>	924	146	0.001998	146	924	0.0429697
<b>2012</b>	924	146	0.001746	146	924	0.0373084
<b>2013</b>	924	146	0.001629	146	924	0.0416496

**Table A3: Bilateral Exports Shares of China and Canada**

<b>Years Before Swap</b>	<b>China</b>	<b>Partner Canada</b>	<b>Average Share of China's Exports</b>	<b>Canada</b>	<b>Partner China</b>	<b>Average Share of Canada's Exports</b>
<b>1948</b>	924	156		156	924	0.0113015
<b>1949</b>	924	156		156	924	0.0047718
<b>1950</b>	924	156		156	924	0.0006338
<b>1951</b>	924	156		156	924	0.0182839
<b>1952</b>	924	156		156	924	0.0002496
<b>1953</b>	924	156		156	924	0
<b>1954</b>	924	156		156	924	0.0000249
<b>1955</b>	924	156		156	924	0.0002286
<b>1956</b>	924	156		156	924	0.0005092
<b>1957</b>	924	156		156	924	0.0002934
<b>1958</b>	924	156		156	924	0.0014409
<b>1959</b>	924	156		156	924	0.0003156
<b>1960</b>	924	156		156	924	0.0016615
<b>1961</b>	924	156	0.006811	156	924	0.0210144
<b>1962</b>	924	156		156	924	0.0231909
<b>1963</b>	924	156		156	924	0.0150596
<b>1964</b>	924	156		156	924	0.0164682

<b>1965</b>	924	156		156	924	0.012026
<b>1966</b>	924	156		156	924	0.0179392
<b>1967</b>	924	156		156	924	0.0080244
<b>1968</b>	924	156		156	924	0.0120513
<b>1969</b>	924	156		156	924	0.0082454
<b>1970</b>	924	156		156	924	0.0084685
<b>1971</b>	924	156		156	924	0.011448
<b>1972</b>	924	156		156	924	0.0130763
<b>1973</b>	924	156		156	924	0.0114446
<b>1974</b>	924	156		156	924	0.0137986
<b>1975</b>	924	156		156	924	0.0116279
<b>1976</b>	924	156		156	924	0.0051651
<b>1977</b>	924	156		156	924	0.0083253
<b>1978</b>	924	156	0.010864	156	924	0.0095823
<b>1979</b>	924	156	0.011693	156	924	0.0092151
<b>1980</b>	924	156	0.008119	156	924	0.0115793
<b>1981</b>	924	156	0.008496	156	924	0.0112608
<b>1982</b>	924	156	0.00785	156	924	0.0148326
<b>1983</b>	924	156	0.009426	156	924	0.0176607
<b>1984</b>	924	156	0.010388	156	924	0.0111378
<b>1985</b>	924	156	0.008536	156	924	0.0107107
<b>1986</b>	924	156	0.00981	156	924	0.0089098
<b>1987</b>	924	156	0.010369	156	924	0.0115882
<b>1988</b>	924	156	0.008208	156	924	0.0190127
<b>1989</b>	924	156	0.007927	156	924	0.0083982
<b>1990</b>	924	156	0.007163	156	924	0.0104947
<b>1991</b>	924	156	0.007778	156	924	0.0124966
<b>1992</b>	924	156	0.007759	156	924	0.0137369
<b>1993</b>	924	156	0.013282	156	924	0.0092969
<b>1994</b>	924	156	0.011777	156	924	0.0098743
<b>1995</b>	924	156	0.010511	156	924	0.0121352
<b>1996</b>	924	156	0.010896	156	924	0.0103804
<b>1997</b>	924	156	0.010618	156	924	0.0073376
<b>1998</b>	924	156	0.011812	156	924	0.0061567
<b>1999</b>	924	156	0.012739	156	924	0.0070724
<b>2000</b>	924	156	0.012935	156	924	0.0089026
<b>2001</b>	924	156	0.012801	156	924	0.0101672
<b>2002</b>	924	156	0.013493	156	924	0.0101276
<b>2003</b>	924	156	0.013126	156	924	0.0118739
<b>2004</b>	924	156	0.014082	156	924	0.0160004
<b>2005</b>	924	156	0.015639	156	924	0.0165715
<b>2006</b>	924	156	0.016377	156	924	0.0177786
<b>2007</b>	924	156	0.016223	156	924	0.0212723

<b>Years After Swap</b>	<b>China</b>	<b>Partner Canada</b>	<b>Average Share of China's Exports</b>	<b>Canada</b>	<b>Partner China</b>	<b>Average Share of Canada's Exports</b>
<b>2008</b>	924	156	0.015544	156	924	0.0218153
<b>2009</b>	924	156	0.014981	156	924	0.0309681
<b>2010</b>	924	156	0.014377	156	924	0.0333618
<b>2011</b>	924	156	0.013581	156	924	0.0377076
<b>2012</b>	924	156	0.013988	156	924	0.0427426
<b>2013</b>	924	156	0.013475	156	924	0.0436106

**Table A4: Bilateral Exports Shares of China and Iceland**

<b>Years Before Swap</b>	<b>China</b>	<b>Partner Iceland</b>	<b>Average Share of China's Exports</b>	<b>Iceland</b>	<b>Partner China</b>	<b>Average Share of Iceland's Exports</b>
<b>1948</b>	924	176		176	924	0.0016694
<b>1949</b>	924	176		176	924	0
<b>1950</b>	924	176		176	924	0
<b>1951</b>	924	176		176	924	0
<b>1952</b>	924	176		176	924	0
<b>1953</b>	924	176		176	924	0
<b>1954</b>	924	176		176	924	0
<b>1955</b>	924	176		176	924	0
<b>1956</b>	924	176		176	924	0
<b>1957</b>	924	176		176	924	0
<b>1958</b>	924	176		176	924	0
<b>1959</b>	924	176		176	924	0
<b>1960</b>	924	176		176	924	0
<b>1961</b>	924	176	0	176	924	0
<b>1962</b>	924	176		176	924	0
<b>1963</b>	924	176		176	924	0
<b>1964</b>	924	176		176	924	0
<b>1965</b>	924	176		176	924	0
<b>1966</b>	924	176		176	924	0
<b>1967</b>	924	176		176	924	0
<b>1968</b>	924	176		176	924	0
<b>1969</b>	924	176		176	924	0
<b>1970</b>	924	176		176	924	0
<b>1971</b>	924	176		176	924	0
<b>1972</b>	924	176		176	924	0.005822
<b>1973</b>	924	176		176	924	0.004736
<b>1974</b>	924	176		176	924	0.0004588
<b>1975</b>	924	176		176	924	0.0364904
<b>1976</b>	924	176		176	924	0

<b>1977</b>	924	176		176	924	0.0204889
<b>1978</b>	924	176	0	176	924	0.0171921
<b>1979</b>	924	176	0	176	924	0
<b>1980</b>	924	176	4.73E-05	176	924	0
<b>1981</b>	924	176	3.73E-05	176	924	0
<b>1982</b>	924	176	4.12E-05	176	924	0.0010563
<b>1983</b>	924	176	4.98E-05	176	924	0
<b>1984</b>	924	176	4.44E-05	176	924	0
<b>1985</b>	924	176	0.000022	176	924	2.45E-06
<b>1986</b>	924	176	2.56E-05	176	924	0.0000319
<b>1987</b>	924	176	4.31E-05	176	924	0.0001356
<b>1988</b>	924	176	0.000021	176	924	0.0034037
<b>1989</b>	924	176	1.51E-05	176	924	0.0008696
<b>1990</b>	924	176	1.96E-05	176	924	0.000171
<b>1991</b>	924	176	2.27E-05	176	924	0.0000278
<b>1992</b>	924	176	1.77E-05	176	924	0.0000672
<b>1993</b>	924	176	4.38E-05	176	924	0.0000936
<b>1994</b>	924	176	1.91E-05	176	924	0.0002411
<b>1995</b>	924	176	2.94E-05	176	924	0.0014196
<b>1996</b>	924	176	2.42E-05	176	924	0.0005723
<b>1997</b>	924	176	2.62E-05	176	924	0.0040682
<b>1998</b>	924	176	2.97E-05	176	924	0.0041777
<b>1999</b>	924	176	3.51E-05	176	924	0.0025131
<b>2000</b>	924	176	7.21E-05	176	924	0.0059285
<b>2001</b>	924	176	0.00013	176	924	0.0044945
<b>2002</b>	924	176	0.000058	176	924	0.0065422
<b>2003</b>	924	176	0.000106	176	924	0.0073438
<b>2004</b>	924	176	7.93E-05	176	924	0.0055485
<b>2005</b>	924	176	0.0001	176	924	0.0090405
<b>2006</b>	924	176	0.000082	176	924	0.0112296
<b>2007</b>	924	176	7.73E-05	176	924	0.007832

<b>Years After Swap</b>	<b>China</b>	<b>Partner Iceland</b>	<b>Average Share of China's Exports</b>	<b>Iceland</b>	<b>Partner China</b>	<b>Average Share of Iceland's Exports</b>
<b>2008</b>	924	176	6.64E-05	176	924	0.021306
<b>2009</b>	924	176	0.000046	176	924	0.0248649
<b>2010</b>	924	176	0.000046	176	924	0.0061394
<b>2011</b>	924	176	4.04E-05	176	924	0.0088388
<b>2012</b>	924	176	4.75E-05	176	924	0.0120794
<b>2013</b>	924	176	6.79E-05	176	924	0.0114876

**Table A5: Bilateral Exports Shares of China and Turkey**

<b>Years Before Swap</b>	<b>China</b>	<b>Partner Turkey</b>	<b>Average Share of China's Exports</b>	<b>Turkey</b>	<b>Partner China</b>	<b>Average Share of Turkey's Exports</b>
<b>1948</b>	924	186		186	924	0
<b>1949</b>	924	186		186	924	0
<b>1950</b>	924	186		186	924	0
<b>1951</b>	924	186		186	924	0
<b>1952</b>	924	186		186	924	0.0002794
<b>1953</b>	924	186		186	924	0
<b>1954</b>	924	186		186	924	0
<b>1955</b>	924	186		186	924	0
<b>1956</b>	924	186		186	924	0
<b>1957</b>	924	186		186	924	0
<b>1958</b>	924	186		186	924	0
<b>1959</b>	924	186		186	924	0
<b>1960</b>	924	186		186	924	0
<b>1961</b>	924	186	0	186	924	0
<b>1962</b>	924	186		186	924	0
<b>1963</b>	924	186		186	924	0
<b>1964</b>	924	186		186	924	0
<b>1965</b>	924	186		186	924	0.005102
<b>1966</b>	924	186		186	924	0
<b>1967</b>	924	186		186	924	0.0011503
<b>1968</b>	924	186		186	924	0.0020198
<b>1969</b>	924	186		186	924	0.0001868
<b>1970</b>	924	186		186	924	0.0015013
<b>1971</b>	924	186		186	924	0.0034147
<b>1972</b>	924	186		186	924	0.0213826
<b>1973</b>	924	186		186	924	0.0233634
<b>1974</b>	924	186		186	924	0.01089
<b>1975</b>	924	186		186	924	0.0011363
<b>1976</b>	924	186		186	924	0.0011976

<b>1977</b>	924	186		186	924	0.0032545
<b>1978</b>	924	186	0	186	924	0.0066497
<b>1979</b>	924	186	0	186	924	0.0041806
<b>1980</b>	924	186	0	186	924	0.0007004
<b>1981</b>	924	186	6.06E-05	186	924	0.0037621
<b>1982</b>	924	186	7.32E-05	186	924	0.0030432
<b>1983</b>	924	186	0.000168	186	924	0.0030102
<b>1984</b>	924	186	9.27E-05	186	924	0.0056195
<b>1985</b>	924	186	0.002555	186	924	0.0042313
<b>1986</b>	924	186	0.002262	186	924	0.0160154
<b>1987</b>	924	186	0.001863	186	924	0.010125
<b>1988</b>	924	186	0.0019	186	924	0.0193653
<b>1989</b>	924	186	0.00109	186	924	0.0059975
<b>1990</b>	924	186	0.000793	186	924	0.0112778
<b>1991</b>	924	186	0.000776	186	924	0.001502
<b>1992</b>	924	186	0.000818	186	924	0.010654
<b>1993</b>	924	186	0.001838	186	924	0.0342943
<b>1994</b>	924	186	0.001555	186	924	0.0202317
<b>1995</b>	924	186	0.002953	186	924	0.0031103
<b>1996</b>	924	186	0.002753	186	924	0.0030225
<b>1997</b>	924	186	0.003383	186	924	0.0017819
<b>1998</b>	924	186	0.003662	186	924	0.0014681
<b>1999</b>	924	186	0.003333	186	924	0.0014481
<b>2000</b>	924	186	0.004415	186	924	0.003671
<b>2001</b>	924	186	0.002584	186	924	0.0068115
<b>2002</b>	924	186	0.003414	186	924	0.008001
<b>2003</b>	924	186	0.004812	186	924	0.011296
<b>2004</b>	924	186	0.004867	186	924	0.0065547
<b>2005</b>	924	186	0.005704	186	924	0.0079155
<b>2006</b>	924	186	0.00771	186	924	0.0085605
<b>2007</b>	924	186	0.008783	186	924	0.0102154

<b>Years After Swap</b>	<b>China</b>	<b>Partner Turkey</b>	<b>Average Share of China's Exports</b>	<b>Turkey</b>	<b>Partner China</b>	<b>Average Share of Turkey's Exports</b>
<b>2008</b>	924	186	0.00756	186	924	0.0114147
<b>2009</b>	924	186	0.007067	186	924	0.0162597
<b>2010</b>	924	186	0.007743	186	924	0.0205875
<b>2011</b>	924	186	0.008401	186	924	0.0188813
<b>2012</b>	924	186	0.007759	186	924	0.0190767
<b>2013</b>	924	186	0.008194	186	924	0.0244275

**Table A6: Bilateral Exports Shares of China and Australia**

<b>Years Before Swap</b>	<b>China</b>	<b>Partner</b>	<b>Average Share of China's Exports</b>	<b>Australia</b>	<b>Partner China</b>	<b>Average Share of Australia's Exports</b>
<b>1948</b>	924	193		193	924	0.0051554
<b>1949</b>	924	193		193	924	0.0015673
<b>1950</b>	924	193		193	924	0.001197
<b>1951</b>	924	193		193	924	0.0005147
<b>1952</b>	924	193		193	924	0.0003106
<b>1953</b>	924	193		193	924	0.0025765
<b>1954</b>	924	193		193	924	0.0020325
<b>1955</b>	924	193		193	924	0.0037706
<b>1956</b>	924	193		193	924	0.0056368
<b>1957</b>	924	193		193	924	0.0098063
<b>1958</b>	924	193		193	924	0.0170569
<b>1959</b>	924	193		193	924	0.0159496
<b>1960</b>	924	193		193	924	0.0118519
<b>1961</b>	924	193	0.015113	193	924	0.0703851
<b>1962</b>	924	193		193	924	0.0429494
<b>1963</b>	924	193		193	924	0.0747854
<b>1964</b>	924	193		193	924	0.05229
<b>1965</b>	924	193		193	924	0.0573839
<b>1966</b>	924	193		193	924	0.0268471
<b>1967</b>	924	193		193	924	0.0564804
<b>1968</b>	924	193		193	924	0.0257039
<b>1969</b>	924	193		193	924	0.0287272
<b>1970</b>	924	193		193	924	0.0275639
<b>1971</b>	924	193		193	924	0.0053535
<b>1972</b>	924	193		193	924	0.0072657
<b>1973</b>	924	193		193	924	0.014758

<b>1974</b>	924	193		193	924	0.0297146
<b>1975</b>	924	193		193	924	0.0281298
<b>1976</b>	924	193		193	924	0.0203804
<b>1977</b>	924	193		193	924	0.0350819
<b>1978</b>	924	193	0.013477	193	924	0.0343003
<b>1979</b>	924	193	0.01258	193	924	0.0426313
<b>1980</b>	924	193	0.013213	193	924	0.0370862
<b>1981</b>	924	193	0.00809	193	924	0.030293
<b>1982</b>	924	193	0.010224	193	924	0.0401861
<b>1983</b>	924	193	0.008208	193	924	0.0203973
<b>1984</b>	924	193	0.008807	193	924	0.0325974
<b>1985</b>	924	193	0.006715	193	924	0.0404587
<b>1986</b>	924	193	0.006682	193	924	0.0497701
<b>1987</b>	924	193	0.00755	193	924	0.0424319
<b>1988</b>	924	193	0.007607	193	924	0.0278085
<b>1989</b>	924	193	0.008147	193	924	0.0269296
<b>1990</b>	924	193	0.007577	193	924	0.0261376
<b>1991</b>	924	193	0.007766	193	924	0.0298299
<b>1992</b>	924	193	0.007847	193	924	0.0347159
<b>1993</b>	924	193	0.011875	193	924	0.0389012
<b>1994</b>	924	193	0.012546	193	924	0.0465481
<b>1995</b>	924	193	0.011152	193	924	0.0464598
<b>1996</b>	924	193	0.01128	193	924	0.053871
<b>1997</b>	924	193	0.011443	193	924	0.0503085
<b>1998</b>	924	193	0.01301	193	924	0.0461674
<b>1999</b>	924	193	0.014161	193	924	0.0513436
<b>2000</b>	924	193	0.014044	193	924	0.062151
<b>2001</b>	924	193	0.013656	193	924	0.0667631
<b>2002</b>	924	193	0.014385	193	924	0.0746025
<b>2003</b>	924	193	0.014593	193	924	0.0888922
<b>2004</b>	924	193	0.015246	193	924	0.0975037
<b>2005</b>	924	193	0.014844	193	924	0.1216677
<b>2006</b>	924	193	0.014379	193	924	0.1299071
<b>2007</b>	924	193	0.015079	193	924	0.1492094
<b>2008</b>	924	193	0.015868	193	924	0.1536463
<b>2009</b>	924	193	0.017516	193	924	0.227983
<b>2010</b>	924	193	0.017627	193	924	0.2629287
<b>2011</b>	924	193	0.018238	193	924	0.2864797
<b>2012</b>	924	193	0.018793	193	924	0.3076813
<b>2013</b>	924	193	0.017333	193	924	0.3789717

**Table A7: Bilateral Exports Shares of China and New Zealand**

<b>Years Before Swap</b>	<b>China</b>	<b>Partner New Zealand</b>	<b>Average Share of China's Exports</b>	<b>New Zealand</b>	<b>Partner China</b>	<b>Average Share of New Zealand's Exports</b>
<b>1948</b>	924	196		196	924	0
<b>1949</b>	924	196		196	924	0
<b>1950</b>	924	196		196	924	0
<b>1951</b>	924	196		196	924	0
<b>1952</b>	924	196		196	924	0
<b>1953</b>	924	196		196	924	0
<b>1954</b>	924	196		196	924	0
<b>1955</b>	924	196		196	924	0.0005602
<b>1956</b>	924	196		196	924	0.0005232
<b>1957</b>	924	196		196	924	0.0022304
<b>1958</b>	924	196		196	924	0.0038877
<b>1959</b>	924	196		196	924	0
<b>1960</b>	924	196		196	924	0
<b>1961</b>	924	196	0.002554	196	924	0.0047194
<b>1962</b>	924	196		196	924	0
<b>1963</b>	924	196		196	924	0.005672
<b>1964</b>	924	196		196	924	0.0063404
<b>1965</b>	924	196		196	924	0.0073608
<b>1966</b>	924	196		196	924	0.0070158
<b>1967</b>	924	196		196	924	0.0114384
<b>1968</b>	924	196		196	924	0.0062413
<b>1969</b>	924	196		196	924	0.004951
<b>1970</b>	924	196		196	924	0.0039536
<b>1971</b>	924	196		196	924	0.0006881
<b>1972</b>	924	196		196	924	0.0018186
<b>1973</b>	924	196		196	924	0.0035982
<b>1974</b>	924	196		196	924	0.0117836
<b>1975</b>	924	196		196	924	0.0072206
<b>1976</b>	924	196		196	924	0.0091117
<b>1977</b>	924	196		196	924	0.012146
<b>1978</b>	924	196	0	196	924	0.0179503
<b>1979</b>	924	196	0	196	924	0.0196926
<b>1980</b>	924	196	0.00179	196	924	0.0309226
<b>1981</b>	924	196	0.001329	196	924	0.0228561
<b>1982</b>	924	196	0.001455	196	924	0.0201252
<b>1983</b>	924	196	0.001137	196	924	0.0215825
<b>1984</b>	924	196	0.001234	196	924	0.0240886

<b>1985</b>	924	196	0.001158	196	924	0.0251385
<b>1986</b>	924	196	0.000895	196	924	0.0368269
<b>1987</b>	924	196	0.001124	196	924	0.0277664
<b>1988</b>	924	196	0.000827	196	924	0.0481962
<b>1989</b>	924	196	0.000763	196	924	0.0206685
<b>1990</b>	924	196	0.000837	196	924	0.0103652
<b>1991</b>	924	196	0.000919	196	924	0.0175951
<b>1992</b>	924	196	0.001039	196	924	0.021939
<b>1993</b>	924	196	0.001453	196	924	0.0213631
<b>1994</b>	924	196	0.001586	196	924	0.0298547
<b>1995</b>	924	196	0.001592	196	924	0.0269429
<b>1996</b>	924	196	0.00156	196	924	0.0269168
<b>1997</b>	924	196	0.001324	196	924	0.0292924
<b>1998</b>	924	196	0.001528	196	924	0.0305394
<b>1999</b>	924	196	0.001795	196	924	0.0281017
<b>2000</b>	924	196	0.001705	196	924	0.0311811
<b>2001</b>	924	196	0.001664	196	924	0.0418727
<b>2002</b>	924	196	0.001869	196	924	0.0481188
<b>2003</b>	924	196	0.00187	196	924	0.050365
<b>2004</b>	924	196	0.001859	196	924	0.0593
<b>2005</b>	924	196	0.001816	196	924	0.0531544
<b>2006</b>	924	196	0.00171	196	924	0.0567087
<b>2007</b>	924	196	0.00181	196	924	0.055635

<b>Years After Swap</b>	<b>China</b>	<b>Partner New Zealand</b>	<b>Average Share of China's Exports</b>	<b>New Zealand</b>	<b>Partner China</b>	<b>Average Share of Newland's Exports</b>
<b>2008</b>	924	196	0.001787	196	924	0.0608585
<b>2009</b>	924	196	0.001768	196	924	0.0960073
<b>2010</b>	924	196	0.001789	196	924	0.1160612
<b>2011</b>	924	196	0.00201	196	924	0.1306495
<b>2012</b>	924	196	0.001929	196	924	0.1559109
<b>2013</b>	924	196	0.001907	196	924	0.215362

**Table A8: Bilateral Exports Shares of China and Argentina**

<b>Years Before Swap</b>	<b>China</b>	<b>Partner Argentina</b>	<b>Average Share of China's Exports</b>	<b>Argentina</b>	<b>Partner China</b>	<b>Average Share of Argentina's Exports</b>
<b>1948</b>	924	213		213	924	0
<b>1949</b>	924	213		213	924	
<b>1950</b>	924	213		213	924	

<b>1951</b>	924	213		213	924	
<b>1952</b>	924	213		213	924	0
<b>1953</b>	924	213		213	924	0
<b>1954</b>	924	213		213	924	0
<b>1955</b>	924	213		213	924	0.0007586
<b>1956</b>	924	213		213	924	0.000855
<b>1957</b>	924	213		213	924	0.0007249
<b>1958</b>	924	213		213	924	0
<b>1959</b>	924	213		213	924	0
<b>1960</b>	924	213		213	924	0.0013915
<b>1961</b>	924	213	0.000426	213	924	0.0043846
<b>1962</b>	924	213		213	924	0.0213274
<b>1963</b>	924	213		213	924	0.0022727
<b>1964</b>	924	213		213	924	0.0651047
<b>1965</b>	924	213		213	924	0.0561368
<b>1966</b>	924	213		213	924	0.0527473
<b>1967</b>	924	213		213	924	0.0044387
<b>1968</b>	924	213		213	924	0.0005127
<b>1969</b>	924	213		213	924	0.0001987
<b>1970</b>	924	213		213	924	0.0014261
<b>1971</b>	924	213		213	924	0.0037523
<b>1972</b>	924	213		213	924	0.0013309
<b>1973</b>	924	213		213	924	0.0049895
<b>1974</b>	924	213		213	924	0.0231131
<b>1975</b>	924	213		213	924	0.0072749
<b>1976</b>	924	213		213	924	0.0007041
<b>1977</b>	924	213		213	924	0.0155291
<b>1978</b>	924	213	0.000264	213	924	0.0097094
<b>1979</b>	924	213	0.001306	213	924	0.0248413
<b>1980</b>	924	213	0.001785	213	924	0.0236152
<b>1981</b>	924	213	0.001147	213	924	0.0100923
<b>1982</b>	924	213	0.000252	213	924	0.0179598
<b>1983</b>	924	213	0.000181	213	924	0.063997
<b>1984</b>	924	213	0.000157	213	924	0.0092632
<b>1985</b>	924	213	0.00011	213	924	0.0371522
<b>1986</b>	924	213	0.000316	213	924	0.0369125
<b>1987</b>	924	213	0.000241	213	924	0.0418805
<b>1988</b>	924	213	0.000133	213	924	0.0401155
<b>1989</b>	924	213	0.000172	213	924	0.0429852
<b>1990</b>	924	213	0.000215	213	924	0.0195846
<b>1991</b>	924	213	0.000725	213	924	0.0207958
<b>1992</b>	924	213	0.001475	213	924	0.0106586

<b>1993</b>	924	213	0.002742	213	924	0.0125281
<b>1994</b>	924	213	0.002455	213	924	0.0142304
<b>1995</b>	924	213	0.001876	213	924	0.014894
<b>1996</b>	924	213	0.002269	213	924	0.0257799
<b>1997</b>	924	213	0.002592	213	924	0.0356385
<b>1998</b>	924	213	0.003056	213	924	0.0270656
<b>1999</b>	924	213	0.002597	213	924	0.0222776
<b>2000</b>	924	213	0.0025	213	924	0.0308642
<b>2001</b>	924	213	0.002194	213	924	0.0430505
<b>2002</b>	924	213	0.000581	213	924	0.0430972
<b>2003</b>	924	213	0.001042	213	924	0.0842844
<b>2004</b>	924	213	0.00147	213	924	0.0771884
<b>2005</b>	924	213	0.001778	213	924	0.0806426
<b>2006</b>	924	213	0.002114	213	924	0.0761838
<b>2007</b>	924	213	0.002988	213	924	0.0942085
<b>Years After Swap</b>	<b>China</b>	<b>Partner Argentina</b>	<b>Average Share of China's Exports</b>	<b>Argentina</b>	<b>Partner China</b>	<b>Average Share of Argentina's Exports</b>
<b>2008</b>	924	213	0.003596	213	924	0.0928456
<b>2009</b>	924	213	0.002954	213	924	0.0671258
<b>2010</b>	924	213	0.003961	213	924	0.0878719
<b>2011</b>	924	213	0.004574	213	924	0.0750414
<b>2012</b>	924	213	0.003918	213	924	0.0654385
<b>2013</b>	924	213	0.004038	213	924	0.07292

**Table A9: Bilateral Exports Shares of China and Qatar**

<b>Years Before Swap</b>	<b>China</b>	<b>Partner Qatar</b>	<b>Average Share of China's Exports</b>	<b>Qatar</b>	<b>Partner China</b>	<b>Average Share of Qatar's Exports</b>
<b>1948</b>	924	453		453	924	
<b>1949</b>	924	453		453	924	
<b>1950</b>	924	453		453	924	
<b>1951</b>	924	453		453	924	
<b>1952</b>	924	453		453	924	
<b>1953</b>	924	453		453	924	
<b>1954</b>	924	453		453	924	
<b>1955</b>	924	453		453	924	
<b>1956</b>	924	453		453	924	
<b>1957</b>	924	453		453	924	
<b>1958</b>	924	453		453	924	

<b>1959</b>	924	453		453	924	
<b>1960</b>	924	453		453	924	
<b>1961</b>	924	453	0	453	924	
<b>1962</b>	924	453		453	924	
<b>1963</b>	924	453		453	924	
<b>1964</b>	924	453		453	924	
<b>1965</b>	924	453		453	924	
<b>1966</b>	924	453		453	924	
<b>1967</b>	924	453		453	924	
<b>1968</b>	924	453		453	924	
<b>1969</b>	924	453		453	924	
<b>1970</b>	924	453		453	924	
<b>1971</b>	924	453		453	924	
<b>1972</b>	924	453		453	924	0
<b>1973</b>	924	453		453	924	0
<b>1974</b>	924	453		453	924	
<b>1975</b>	924	453		453	924	
<b>1976</b>	924	453		453	924	0.0035222
<b>1977</b>	924	453		453	924	
<b>1978</b>	924	453	0	453	924	0
<b>1979</b>	924	453	0	453	924	0.0039247
<b>1980</b>	924	453	0	453	924	0.0080099
<b>1981</b>	924	453	0.000396	453	924	0.0022494
<b>1982</b>	924	453	0.000366	453	924	0.0022494
<b>1983</b>	924	453	0.000263	453	924	0.0022494
<b>1984</b>	924	453	0.000246	453	924	0.0022494
<b>1985</b>	924	453	0.000136	453	924	0.0022494
<b>1986</b>	924	453	0.000153	453	924	0.0125522
<b>1987</b>	924	453	0.000239	453	924	0.0103368
<b>1988</b>	924	453	0.000149	453	924	0.0216823
<b>1989</b>	924	453	9.68E-05	453	924	0.016602
<b>1990</b>	924	453	9.41E-05	453	924	0.0072377
<b>1991</b>	924	453	8.96E-05	453	924	0.0237424
<b>1992</b>	924	453	9.87E-05	453	924	0.0183169
<b>1993</b>	924	453	0.000121	453	924	0.0120636
<b>1994</b>	924	453	0.000088	453	924	0.0145035
<b>1995</b>	924	453	6.53E-05	453	924	0.0235493
<b>1996</b>	924	453	0.000141	453	924	0.0107175
<b>1997</b>	924	453	8.32E-05	453	924	0.0203761
<b>1998</b>	924	453	9.02E-05	453	924	0.0088127

<b>1999</b>	924	453	0.000146	453	924	0.0094995
<b>2000</b>	924	453	0.000128	453	924	0.0303313
<b>2001</b>	924	453	0.000121	453	924	0.0302136
<b>2002</b>	924	453	0.000155	453	924	0.0111719
<b>2003</b>	924	453	0.000144	453	924	0.0207831
<b>2004</b>	924	453	0.000179	453	924	0.0123367
<b>2005</b>	924	453	0.000273	453	924	0.017203
<b>2006</b>	924	453	0.000461	453	924	0.0133538
<b>2007</b>	924	453	0.000521	453	924	0.0083531
<b>Years After Swap</b>	<b>China</b>	<b>Partner Qatar</b>	<b>Average Share of China's Exports</b>	<b>Qatar</b>	<b>Partner China</b>	<b>Average Share of Qatar's Exports</b>
<b>2008</b>	924	453	0.000766	453	924	0.011721
<b>2009</b>	924	453	0.00074	453	924	0.0304115
<b>2010</b>	924	453	0.000557	453	924	0.0373145
<b>2011</b>	924	453	0.000645	453	924	0.0443637
<b>2012</b>	924	453	0.0006	453	924	0.060572
<b>2013</b>	924	453	0.000789	453	924	0.0696754

**Table A10: Bilateral Exports Shares of China and United Arab Emirate**

<b>Years Before Swap</b>	<b>China</b>	<b>Partner United Arab Emirate</b>	<b>Average Share of China's Exports</b>	<b>United Arab Emirate</b>	<b>Partner China</b>	<b>Average Share of UAE's Exports</b>
<b>1948</b>	924	466		466	924	
<b>1949</b>	924	466		466	924	
<b>1950</b>	924	466		466	924	
<b>1951</b>	924	466		466	924	
<b>1952</b>	924	466		466	924	
<b>1953</b>	924	466		466	924	
<b>1954</b>	924	466		466	924	
<b>1955</b>	924	466		466	924	
<b>1956</b>	924	466		466	924	
<b>1957</b>	924	466		466	924	
<b>1958</b>	924	466		466	924	
<b>1959</b>	924	466		466	924	
<b>1960</b>	924	466		466	924	
<b>1961</b>	924	466	0	466	924	
<b>1962</b>	924	466		466	924	
<b>1963</b>	924	466		466	924	
<b>1964</b>	924	466		466	924	

<b>1965</b>	924	466		466	924	
<b>1966</b>	924	466		466	924	
<b>1967</b>	924	466		466	924	
<b>1968</b>	924	466		466	924	
<b>1969</b>	924	466		466	924	
<b>1970</b>	924	466		466	924	
<b>1971</b>	924	466		466	924	
<b>1972</b>	924	466		466	924	
<b>1973</b>	924	466		466	924	
<b>1974</b>	924	466		466	924	
<b>1975</b>	924	466		466	924	
<b>1976</b>	924	466		466	924	0
<b>1977</b>	924	466		466	924	0
<b>1978</b>	924	466	0	466	924	0
<b>1979</b>	924	466	0	466	924	0
<b>1980</b>	924	466	0	466	924	0
<b>1981</b>	924	466	0.002182	466	924	0
<b>1982</b>	924	466	0.003628	466	924	0
<b>1983</b>	924	466	0.003098	466	924	0
<b>1984</b>	924	466	0.002528	466	924	0
<b>1985</b>	924	466	0.002335	466	924	0
<b>1986</b>	924	466	0.002866	466	924	0.0009472
<b>1987</b>	924	466	0.003124	466	924	0.0023768
<b>1988</b>	924	466	0.003886	466	924	0.0061045
<b>1989</b>	924	466	0.004704	466	924	0.0034448
<b>1990</b>	924	466	0.003987	466	924	0.0019962
<b>1991</b>	924	466	0.005718	466	924	0.0030477
<b>1992</b>	924	466	0.006449	466	924	0.0030326
<b>1993</b>	924	466	0.007891	466	924	0.0053882
<b>1994</b>	924	466	0.007268	466	924	0.0018735
<b>1995</b>	924	466	0.007551	466	924	0.0053919
<b>1996</b>	924	466	0.007264	466	924	0.0026323
<b>1997</b>	924	466	0.007249	466	924	0.0029041
<b>1998</b>	924	466	0.007161	466	924	0.0070009
<b>1999</b>	924	466	0.00756	466	924	0.0074177
<b>2000</b>	924	466	0.008514	466	924	0.0108789
<b>2001</b>	924	466	0.009099	466	924	0.0123602
<b>2002</b>	924	466	0.010819	466	924	0.0126473
<b>2003</b>	924	466	0.011738	466	924	0.0166804
<b>2004</b>	924	466	0.011803	466	924	0.0201322
<b>2005</b>	924	466	0.011715	466	924	0.0226069

<b>2006</b>	924	466	0.012042	466	924	0.0255257
<b>2007</b>	924	466	0.014274	466	924	0.0242193

<b>Years After Swap</b>	<b>China</b>	<b>Partner United Arab Emirate</b>	<b>Average Share of China's Exports</b>	<b>United Arab Emirate</b>	<b>Partner China</b>	<b>Average Share of UAE's Exports</b>
<b>2008</b>	924	466	0.016809	466	924	0.0255947
<b>2009</b>	924	466	0.015799	466	924	0.0233263
<b>2010</b>	924	466	0.013749	466	924	0.0267593
<b>2011</b>	924	466	0.014425	466	924	0.0363494
<b>2012</b>	924	466	0.014719	466	924	0.0443426
<b>2013</b>	924	466	0.015413	466	924	0.0509536

**Table A11: Bilateral Exports Shares of China and Sri Lanka**

<b>Years Before Swap</b>	<b>China</b>	<b>Partner Sri Lanka</b>	<b>Average Share of China's Exports</b>	<b>Sri Lanka</b>	<b>Partner China</b>	<b>Average Share of Sri Lanka's Exports</b>
<b>1948</b>	924	524		524	924	0
<b>1949</b>	924	524		524	924	0.0014728
<b>1950</b>	924	524		524	924	0
<b>1951</b>	924	524		524	924	0.02
<b>1952</b>	924	524		524	924	0.0895265
<b>1953</b>	924	524		524	924	0.1650959
<b>1954</b>	924	524		524	924	0.1287019
<b>1955</b>	924	524		524	924	0.0662166
<b>1956</b>	924	524		524	924	0.1115642
<b>1957</b>	924	524		524	924	0.106152
<b>1958</b>	924	524		524	924	0.0473287
<b>1959</b>	924	524		524	924	0.0551234
<b>1960</b>	924	524		524	924	0.0795097
<b>1961</b>	924	524	0.014049	524	924	0.0576923
<b>1962</b>	924	524		524	924	0.0878845
<b>1963</b>	924	524		524	924	0.0682627
<b>1964</b>	924	524		524	924	0.0762359
<b>1965</b>	924	524		524	924	0.1043956
<b>1966</b>	924	524		524	924	0.1259762
<b>1967</b>	924	524		524	924	0.1060249
<b>1968</b>	924	524		524	924	0.1146966
<b>1969</b>	924	524		524	924	0.1458952

<b>1970</b>	924	524		524	924	0.1433174
<b>1971</b>	924	524		524	924	0.1174113
<b>1972</b>	924	524		524	924	0.1412574
<b>1973</b>	924	524		524	924	0.1671528
<b>1974</b>	924	524		524	924	0.0896488
<b>1975</b>	924	524		524	924	0.1382822
<b>1976</b>	924	524		524	924	0.1149588
<b>1977</b>	924	524		524	924	0.0761405
<b>1978</b>	924	524	0.006154	524	924	0.0764329
<b>1979</b>	924	524	0.007656	524	924	0.0621485
<b>1980</b>	924	524	0.003593	524	924	0.0559181
<b>1981</b>	924	524	0.001436	524	924	0.0492358
<b>1982</b>	924	524	0.001706	524	924	0.0093089
<b>1983</b>	924	524	0.001046	524	924	0.016328
<b>1984</b>	924	524	0.001194	524	924	0.0147187
<b>1985</b>	924	524	0.002228	524	924	0.0144729
<b>1986</b>	924	524	0.00239	524	924	0.0151786
<b>1987</b>	924	524	0.001282	524	924	0.0128122
<b>1988</b>	924	524	0.001429	524	924	0.0168214
<b>1989</b>	924	524	0.001332	524	924	0.0023977
<b>1990</b>	924	524	0.001535	524	924	0.001754
<b>1991</b>	924	524	0.001655	524	924	0.0023758
<b>1992</b>	924	524	0.001234	524	924	0.0006194
<b>1993</b>	924	524	0.00152	524	924	0.0010954
<b>1994</b>	924	524	0.001228	524	924	0.0006402
<b>1995</b>	924	524	0.00164	524	924	0.0008058
<b>1996</b>	924	524	0.001291	524	924	0.003009
<b>1997</b>	924	524	0.001368	524	924	0.0018506
<b>1998</b>	924	524	0.001626	524	924	0.0020203
<b>1999</b>	924	524	0.001356	524	924	0.0007974
<b>2000</b>	924	524	0.001825	524	924	0.0009987
<b>2001</b>	924	524	0.00151	524	924	0.0011025
<b>2002</b>	924	524	0.001058	524	924	0.0028197
<b>2003</b>	924	524	0.001175	524	924	0.0034384
<b>2004</b>	924	524	0.0012	524	924	0.003955
<b>2005</b>	924	524	0.001263	524	924	0.0049786
<b>2006</b>	924	524	0.001169	524	924	0.0041006
<b>2007</b>	924	524	0.001161	524	924	0.0045066

<b>Years After Swap</b>	<b>China</b>	<b>Partner Sri Lanka</b>	<b>Average Share of China's Exports</b>	<b>Sri Lanka</b>	<b>Partner China</b>	<b>Average Share of Sri Lanka's Exports</b>
<b>2008</b>	924	524	0.001159	524	924	0.0058448
<b>2009</b>	924	524	0.001331	524	924	0.0078813
<b>2010</b>	924	524	0.001292	524	924	0.0086253
<b>2011</b>	924	524	0.001608	524	924	0.0100397
<b>2012</b>	924	524	0.001498	524	924	0.0117793
<b>2013</b>	924	524	0.001586	524	924	0.0174329

**Table A12: Bilateral Exports Shares of China and Hong Kong**

<b>Years Before Swap</b>	<b>China</b>	<b>Partner Hong Kong</b>	<b>Average Share of China's Exports</b>	<b>Hong Kong</b>	<b>Partner China</b>	<b>Average Share of Hong Kong's Exports</b>
<b>1948</b>	924	532		532	924	0.2475456
<b>1949</b>	924	532		532	924	0.3542889
<b>1950</b>	924	532		532	924	0.5133027
<b>1951</b>	924	532		532	924	0.5268613
<b>1952</b>	924	532		532	924	0.2617952
<b>1953</b>	924	532		532	924	0.2778594
<b>1954</b>	924	532		532	924	0.2427253
<b>1955</b>	924	532		532	924	0.1043992
<b>1956</b>	924	532		532	924	0.0575714
<b>1957</b>	924	532		532	924	
<b>1958</b>	924	532		532	924	1
<b>1959</b>	924	532		532	924	0.4158004
<b>1960</b>	924	532		532	924	0.037234
<b>1961</b>	924	532	0.348233	532	924	0.0305978
<b>1962</b>	924	532		532	924	0.0233542
<b>1963</b>	924	532		532	924	0.0168678
<b>1964</b>	924	532		532	924	0.0118803
<b>1965</b>	924	532		532	924	0.0124156
<b>1966</b>	924	532		532	924	0.0094046
<b>1967</b>	924	532		532	924	0.0056505
<b>1968</b>	924	532		532	924	0.0043691
<b>1969</b>	924	532		532	924	0.0028733
<b>1970</b>	924	532		532	924	0.0043414
<b>1971</b>	924	532		532	924	0.0037565
<b>1972</b>	924	532		532	924	0.0055698

<b>1973</b>	924	532		532	924	0.0110136
<b>1974</b>	924	532		532	924	0.010294
<b>1975</b>	924	532		532	924	0.0058177
<b>1976</b>	924	532		532	924	0.0036709
<b>1977</b>	924	532		532	924	0.0047722
<b>1978</b>	924	532	0.290233	532	924	0.0057123
<b>1979</b>	924	532	0.268219	532	924	0.0263878
<b>1980</b>	924	532	0.257239	532	924	0.0660934
<b>1981</b>	924	532	0.24539	532	924	0.0932798
<b>1982</b>	924	532	0.236991	532	924	0.0963943
<b>1983</b>	924	532	0.262566	532	924	0.1179335
<b>1984</b>	924	532	0.265591	532	924	0.1840843
<b>1985</b>	924	532	0.261992	532	924	0.2683767
<b>1986</b>	924	532	0.312402	532	924	0.2206242
<b>1987</b>	924	532	0.349289	532	924	0.2422288
<b>1988</b>	924	532	0.383784	532	924	0.2811604
<b>1989</b>	924	532	0.421962	532	924	0.2685554
<b>1990</b>	924	532	0.439556	532	924	0.2596799
<b>1991</b>	924	532	0.450384	532	924	0.2840486
<b>1992</b>	924	532	0.445577	532	924	0.3090333
<b>1993</b>	924	532	0.244805	532	924	0.3337558
<b>1994</b>	924	532	0.272883	532	924	0.3371651
<b>1995</b>	924	532	0.246872	532	924	0.3430244
<b>1996</b>	924	532	0.221807	532	924	0.3520886
<b>1997</b>	924	532	0.244008	532	924	0.3584445
<b>1998</b>	924	532	0.215646	532	924	0.3535717
<b>1999</b>	924	532	0.193181	532	924	0.3422291
<b>2000</b>	924	532	0.182349	532	924	0.3543709
<b>2001</b>	924	532	0.177706	532	924	0.3783558
<b>2002</b>	924	532	0.183312	532	924	0.4023314
<b>2003</b>	924	532	0.177763	532	924	0.4372471
<b>2004</b>	924	532	0.174414	532	924	0.4514666
<b>2005</b>	924	532	0.167022	532	924	0.4606308
<b>2006</b>	924	532	0.164018	532	924	0.4802987
<b>2007</b>	924	532	0.154405	532	924	0.4967288
<b>2008</b>	924	532	0.136087	532	924	0.4948626
<b>2009</b>	924	532	0.140933	532	924	0.5232499
<b>2010</b>	924	532	0.141264	532	924	0.5396678
<b>2011</b>	924	532	0.144172	532	924	0.5374305
<b>2012</b>	924	532	0.161073	532	924	0.5542297
<b>2013</b>	924	532	0.177626	532	924	0.5600377

**Table A13: Bilateral Exports Shares of China and Indonesia**

<b>Years Before Swap</b>	<b>China</b>	<b>Partner Indonesia</b>	<b>Average Share of China's Exports</b>	<b>Indonesia</b>	<b>Partner China</b>	<b>Average Share of Indonesia's Exports</b>
<b>1948</b>	924	536		536	924	0.0057595
<b>1949</b>	924	536		536	924	0
<b>1950</b>	924	536		536	924	0
<b>1951</b>	924	536		536	924	0.0001272
<b>1952</b>	924	536		536	924	0
<b>1953</b>	924	536		536	924	0
<b>1954</b>	924	536		536	924	0.0046327
<b>1955</b>	924	536		536	924	0.0096225
<b>1956</b>	924	536		536	924	0.0181733
<b>1957</b>	924	536		536	924	0.0399029
<b>1958</b>	924	536		536	924	
<b>1959</b>	924	536		536	924	
<b>1960</b>	924	536		536	924	0
<b>1961</b>	924	536	0	536	924	0.0485657
<b>1962</b>	924	536		536	924	0.0537584
<b>1963</b>	924	536		536	924	0.0661338
<b>1964</b>	924	536		536	924	0.078579
<b>1965</b>	924	536		536	924	0.064537
<b>1966</b>	924	536		536	924	0.0146718
<b>1967</b>	924	536		536	924	0.0010897
<b>1968</b>	924	536		536	924	0
<b>1969</b>	924	536		536	924	0
<b>1970</b>	924	536		536	924	0
<b>1971</b>	924	536		536	924	0
<b>1972</b>	924	536		536	924	0
<b>1973</b>	924	536		536	924	0.0001354
<b>1974</b>	924	536		536	924	0
<b>1975</b>	924	536		536	924	0
<b>1976</b>	924	536		536	924	0
<b>1977</b>	924	536		536	924	0
<b>1978</b>	924	536	2.29E-05	536	924	0
<b>1979</b>	924	536	0	536	924	0
<b>1980</b>	924	536	0.001217	536	924	4.64E-06
<b>1981</b>	924	536	0.002537	536	924	0.0003555
<b>1982</b>	924	536	0.002091	536	924	0.0006382
<b>1983</b>	924	536	0.002201	536	924	0.001291
<b>1984</b>	924	536	0.002839	536	924	0.0003588
<b>1985</b>	924	536	0.004545	536	924	0.0046248

<b>1986</b>	924	536	0.004557	536	924	0.0095992
<b>1987</b>	924	536	0.004776	536	924	0.0205765
<b>1988</b>	924	536	0.004972	536	924	0.0261052
<b>1989</b>	924	536	0.004291	536	924	0.0251206
<b>1990</b>	924	536	0.006484	536	924	0.0336595
<b>1991</b>	924	536	0.006743	536	924	0.0424532
<b>1992</b>	924	536	0.0056	536	924	0.0429176
<b>1993</b>	924	536	0.007692	536	924	0.0355531
<b>1994</b>	924	536	0.008867	536	924	0.0344744
<b>1995</b>	924	536	0.00986	536	924	0.0400244
<b>1996</b>	924	536	0.009629	536	924	0.0429042
<b>1997</b>	924	536	0.010274	536	924	0.0439207
<b>1998</b>	924	536	0.006514	536	924	0.039645
<b>1999</b>	924	536	0.009316	536	924	0.0428408
<b>2000</b>	924	536	0.012541	536	924	0.04636
<b>2001</b>	924	536	0.010881	536	924	0.0407137
<b>2002</b>	924	536	0.010741	536	924	0.0527569
<b>2003</b>	924	536	0.010441	536	924	0.0646761
<b>2004</b>	924	536	0.010792	536	924	0.0670177
<b>2005</b>	924	536	0.011226	536	924	0.0800985
<b>2006</b>	924	536	0.009979	536	924	0.0851397
<b>2007</b>	924	536	0.010572	536	924	0.0868102
<b>Years After Swap</b>	<b>China</b>	<b>Partner Indonesia</b>	<b>Average Share of China's Exports</b>	<b>Indonesia</b>	<b>Partner China</b>	<b>Average Share of Indonesia's Exports</b>
<b>2008</b>	924	536	0.01228	536	924	0.0869672
<b>2009</b>	924	536	0.012498	536	924	0.1017056
<b>2010</b>	924	536	0.014226	536	924	0.1026544
<b>2011</b>	924	536	0.015736	536	924	0.1165502
<b>2012</b>	924	536	0.017066	536	924	0.1178718
<b>2013</b>	924	536	0.01705	536	924	0.1279438

**Table A14: Bilateral Exports Shares of China and Korea**

<b>Years Before Swap</b>	<b>China</b>	<b>Partner Korea</b>	<b>Average Share of China's Exports</b>	<b>Korea</b>	<b>Partner China</b>	<b>Average Share of Korea's Exports</b>
<b>1948</b>	924	542		542	924	
<b>1949</b>	924	542		542	924	0
<b>1950</b>	924	542		542	924	
<b>1951</b>	924	542		542	924	
<b>1952</b>	924	542		542	924	

<b>1953</b>	924	542		542	924	
<b>1954</b>	924	542		542	924	
<b>1955</b>	924	542		542	924	0
<b>1956</b>	924	542		542	924	0
<b>1957</b>	924	542		542	924	0
<b>1958</b>	924	542		542	924	0
<b>1959</b>	924	542		542	924	0
<b>1960</b>	924	542		542	924	0
<b>1961</b>	924	542	0	542	924	0
<b>1962</b>	924	542		542	924	0
<b>1963</b>	924	542		542	924	0
<b>1964</b>	924	542		542	924	0
<b>1965</b>	924	542		542	924	0
<b>1966</b>	924	542		542	924	0
<b>1967</b>	924	542		542	924	0
<b>1968</b>	924	542		542	924	0
<b>1969</b>	924	542		542	924	0
<b>1970</b>	924	542		542	924	0
<b>1971</b>	924	542		542	924	0
<b>1972</b>	924	542		542	924	0
<b>1973</b>	924	542		542	924	0
<b>1974</b>	924	542		542	924	0
<b>1975</b>	924	542		542	924	0
<b>1976</b>	924	542		542	924	0
<b>1977</b>	924	542		542	924	0
<b>1978</b>	924	542	0	542	924	0
<b>1979</b>	924	542	0	542	924	0
<b>1980</b>	924	542	0	542	924	0
<b>1981</b>	924	542	0	542	924	0
<b>1982</b>	924	542	0	542	924	0
<b>1983</b>	924	542	0	542	924	0
<b>1984</b>	924	542	0	542	924	0
<b>1985</b>	924	542	0	542	924	0
<b>1986</b>	924	542	0	542	924	0
<b>1987</b>	924	542	0	542	924	0
<b>1988</b>	924	542	0	542	924	0
<b>1989</b>	924	542	0	542	924	0
<b>1990</b>	924	542	0.007002	542	924	0
<b>1991</b>	924	542	0.030533	542	924	0.0143977
<b>1992</b>	924	542	0.028955	542	924	0.0361432
<b>1993</b>	924	542	0.031728	542	924	0.0646502

<b>1994</b>	924	542	0.036895	542	924	0.0666959
<b>1995</b>	924	542	0.045858	542	924	0.0757011
<b>1996</b>	924	542	0.05074	542	924	0.0909675
<b>1997</b>	924	542	0.050897	542	924	0.1033733
<b>1998</b>	924	542	0.034841	542	924	0.0941388
<b>1999</b>	924	542	0.040887	542	924	0.1000035
<b>2000</b>	924	542	0.046253	542	924	0.1129277
<b>2001</b>	924	542	0.047938	542	924	0.1267448
<b>2002</b>	924	542	0.048609	542	924	0.1533991
<b>2003</b>	924	542	0.046828	542	924	0.1894301
<b>2004</b>	924	542	0.047964	542	924	0.2050213
<b>2005</b>	924	542	0.047109	542	924	0.2277645
<b>2006</b>	924	542	0.047019	542	924	0.2235174
<b>2007</b>	924	542	0.047027	542	924	0.2306395
<b>Years After Swap</b>	<b>China</b>	<b>Partner Korea</b>	<b>Average Share of China's Exports</b>	<b>Korea</b>	<b>Partner China</b>	<b>Average Share of Korea's Exports</b>
<b>2008</b>	924	542	0.05272	542	924	0.2254598
<b>2009</b>	924	542	0.045468	542	924	0.2530846
<b>2010</b>	924	542	0.044548	542	924	0.2637615
<b>2011</b>	924	542	0.044603	542	924	0.2539205
<b>2012</b>	924	542	0.043619	542	924	0.2544784
<b>2013</b>	924	542	0.042078	542	924	0.2723156

**Table A15: Bilateral Exports Shares of China and Malaysia**

<b>Years Before Swap</b>	<b>China</b>	<b>Partner Malaysia</b>	<b>Average Share of China's Exports</b>	<b>Malaysia</b>	<b>Partner China</b>	<b>Average Share of Malaysia's Exports</b>
<b>1948</b>	924	548		548	924	
<b>1949</b>	924	548		548	924	
<b>1950</b>	924	548		548	924	
<b>1951</b>	924	548		548	924	
<b>1952</b>	924	548		548	924	
<b>1953</b>	924	548		548	924	
<b>1954</b>	924	548		548	924	
<b>1955</b>	924	548		548	924	
<b>1956</b>	924	548		548	924	
<b>1957</b>	924	548		548	924	
<b>1958</b>	924	548		548	924	
<b>1959</b>	924	548		548	924	
<b>1960</b>	924	548		548	924	

<b>1961</b>	924	548	0	548	924	
<b>1962</b>	924	548		548	924	
<b>1963</b>	924	548		548	924	
<b>1964</b>	924	548		548	924	
<b>1965</b>	924	548		548	924	
<b>1966</b>	924	548		548	924	
<b>1967</b>	924	548		548	924	0.0054913
<b>1968</b>	924	548		548	924	0.0187868
<b>1969</b>	924	548		548	924	0.0277138
<b>1970</b>	924	548		548	924	0.0131324
<b>1971</b>	924	548		548	924	0.011305
<b>1972</b>	924	548		548	924	0.0159947
<b>1973</b>	924	548		548	924	0.0274567
<b>1974</b>	924	548		548	924	0.0208017
<b>1975</b>	924	548		548	924	0.0139822
<b>1976</b>	924	548		548	924	0.0086206
<b>1977</b>	924	548		548	924	0.0200611
<b>1978</b>	924	548	0.018703	548	924	0.0152168
<b>1979</b>	924	548	0.013813	548	924	0.0167217
<b>1980</b>	924	548	0.010897	548	924	0.0170572
<b>1981</b>	924	548	0.008887	548	924	0.0076946
<b>1982</b>	924	548	0.008289	548	924	0.0094207
<b>1983</b>	924	548	0.008425	548	924	0.0113793
<b>1984</b>	924	548	0.007884	548	924	0.0101787
<b>1985</b>	924	548	0.006821	548	924	0.0107073
<b>1986</b>	924	548	0.006481	548	924	0.0119802
<b>1987</b>	924	548	0.006466	548	924	0.0160518
<b>1988</b>	924	548	0.006494	548	924	0.0202813
<b>1989</b>	924	548	0.006782	548	924	0.0196586
<b>1990</b>	924	548	0.005989	548	924	0.0215167
<b>1991</b>	924	548	0.007398	548	924	0.0191092
<b>1992</b>	924	548	0.007667	548	924	0.0196308
<b>1993</b>	924	548	0.007812	548	924	0.0264326
<b>1994</b>	924	548	0.009423	548	924	0.033919
<b>1995</b>	924	548	0.008784	548	924	0.026583
<b>1996</b>	924	548	0.009263	548	924	0.0251051
<b>1997</b>	924	548	0.010703	548	924	0.0245587
<b>1998</b>	924	548	0.008865	548	924	0.0283061
<b>1999</b>	924	548	0.008764	548	924	0.0287329
<b>2000</b>	924	548	0.010506	548	924	0.0320785
<b>2001</b>	924	548	0.012318	548	924	0.045002
<b>2002</b>	924	548	0.015595	548	924	0.0584638
<b>2003</b>	924	548	0.01431	548	924	0.067316

<b>2004</b>	924	548	0.013945	548	924	0.0691668
<b>2005</b>	924	548	0.014244	548	924	0.0678997
<b>2006</b>	924	548	0.014288	548	924	0.0745489
<b>2007</b>	924	548	0.014831	548	924	0.0901882

<b>Years After Swap</b>	<b>China</b>	<b>Partner Malaysia</b>	<b>Average Share of China's Exports</b>	<b>Malaysia</b>	<b>Partner China</b>	<b>Average Share of Malaysia's Exports</b>
<b>2008</b>	924	548	0.015254	548	924	0.0979314
<b>2009</b>	924	548	0.016644	548	924	0.1254121
<b>2010</b>	924	548	0.015419	548	924	0.1295179
<b>2011</b>	924	548	0.015008	548	924	0.1358025
<b>2012</b>	924	548	0.018178	548	924	0.1304691
<b>2013</b>	924	548	0.021199	548	924	0.1385633

**Table A16: Bilateral Exports Shares of China and Pakistan**

<b>Years Before Swap</b>	<b>China</b>	<b>Partner Pakistan</b>	<b>Average Share of China's Exports</b>	<b>Pakistan</b>	<b>Partner China</b>	<b>Average Share of Pakistan's Exports</b>
<b>1948</b>	924	564		564	924	0.0161028
<b>1949</b>	924	564		564	924	0.0140751
<b>1950</b>	924	564		564	924	0.0160725
<b>1951</b>	924	564		564	924	0.0622338
<b>1952</b>	924	564		564	924	0.1648957
<b>1953</b>	924	564		564	924	0.0172662
<b>1954</b>	924	564		564	924	0.0787568
<b>1955</b>	924	564		564	924	0.0823377
<b>1956</b>	924	564		564	924	0.0475194
<b>1957</b>	924	564		564	924	0.0284858
<b>1958</b>	924	564		564	924	0.025824
<b>1959</b>	924	564		564	924	0.0022414
<b>1960</b>	924	564		564	924	0.0388758
<b>1961</b>	924	564	0.006811	564	924	0.0261506
<b>1962</b>	924	564		564	924	0.0064213
<b>1963</b>	924	564		564	924	0.0285651
<b>1964</b>	924	564		564	924	0.0842744
<b>1965</b>	924	564		564	924	0.085002
<b>1966</b>	924	564		564	924	0.0522842
<b>1967</b>	924	564		564	924	0.0598202
<b>1968</b>	924	564		564	924	0.0380824
<b>1969</b>	924	564		564	924	0.0448688
<b>1970</b>	924	564		564	924	0.0564619

<b>1971</b>	924	564		564	924	0.0467631
<b>1972</b>	924	564		564	924	0.0260185
<b>1973</b>	924	564		564	924	0.0143122
<b>1974</b>	924	564		564	924	0.0103446
<b>1975</b>	924	564		564	924	0.0131283
<b>1976</b>	924	564		564	924	0.0147595
<b>1977</b>	924	564		564	924	0.015027
<b>1978</b>	924	564	0.010234	564	924	0.0207182
<b>1979</b>	924	564	0.009816	564	924	0.012245
<b>1980</b>	924	564	0.008261	564	924	0.0849519
<b>1981</b>	924	564	0.009834	564	924	0.0955442
<b>1982</b>	924	564	0.009291	564	924	0.0614203
<b>1983</b>	924	564	0.010137	564	924	0.0485052
<b>1984</b>	924	564	0.010525	564	924	0.0160709
<b>1985</b>	924	564	0.006792	564	924	0.0217151
<b>1986</b>	924	564	0.006612	564	924	0.0043749
<b>1987</b>	924	564	0.007621	564	924	0.0060673
<b>1988</b>	924	564	0.006946	564	924	0.0118406
<b>1989</b>	924	564	0.007087	564	924	0.0379767
<b>1990</b>	924	564	0.007927	564	924	0.0125764
<b>1991</b>	924	564	0.008382	564	924	0.0098488
<b>1992</b>	924	564	0.00655	564	924	0.0076953
<b>1993</b>	924	564	0.008345	564	924	0.0090335
<b>1994</b>	924	564	0.005108	564	924	0.0077459
<b>1995</b>	924	564	0.005409	564	924	0.0155534
<b>1996</b>	924	564	0.004203	564	924	0.0134364
<b>1997</b>	924	564	0.003858	564	924	0.0174953
<b>1998</b>	924	564	0.002917	564	924	0.01843
<b>1999</b>	924	564	0.00304	564	924	0.0216234
<b>2000</b>	924	564	0.002746	564	924	0.0268563
<b>2001</b>	924	564	0.002744	564	924	0.0319672
<b>2002</b>	924	564	0.003895	564	924	0.0240248
<b>2003</b>	924	564	0.004322	564	924	0.0218914
<b>2004</b>	924	564	0.004252	564	924	0.0226747
<b>2005</b>	924	564	0.004592	564	924	0.027243
<b>2006</b>	924	564	0.004475	564	924	0.0561993
<b>2007</b>	924	564	0.004847	564	924	0.0542439
<b>Years After Swap</b>	<b>China</b>	<b>Partner Pakistan</b>	<b>Average Share of China's Exports</b>	<b>Pakistan</b>	<b>Partner</b>	<b>Average Share of Pakistan's Exports</b>
<b>2008</b>	924	564	0.004274	564	924	0.0428365
<b>2009</b>	924	564	0.004677	564	924	0.0566667

<b>2010</b>	924	564	0.00449	564	924	0.0755298
<b>2011</b>	924	564	0.004539	564	924	0.0774346
<b>2012</b>	924	564	0.004618	564	924	0.1143209
<b>2013</b>	924	564	0.005084	564	924	0.1128554

**Table A17: Bilateral Exports Shares of China and Singapore**

<b>Years Before Swap</b>	<b>China</b>	<b>Partner Singapore</b>	<b>Average Share of China's Exports</b>	<b>Singapore</b>	<b>Partner China</b>	<b>Average Share of Singapore's Exports</b>
<b>1948</b>	924	576		576	924	
<b>1949</b>	924	576		576	924	
<b>1950</b>	924	576		576	924	
<b>1951</b>	924	576		576	924	
<b>1952</b>	924	576		576	924	
<b>1953</b>	924	576		576	924	
<b>1954</b>	924	576		576	924	
<b>1955</b>	924	576		576	924	
<b>1956</b>	924	576		576	924	
<b>1957</b>	924	576		576	924	
<b>1958</b>	924	576		576	924	
<b>1959</b>	924	576		576	924	
<b>1960</b>	924	576		576	924	0
<b>1961</b>	924	576	0	576	924	
<b>1962</b>	924	576		576	924	0
<b>1963</b>	924	576		576	924	0
<b>1964</b>	924	576		576	924	
<b>1965</b>	924	576		576	924	
<b>1966</b>	924	576		576	924	
<b>1967</b>	924	576		576	924	
<b>1968</b>	924	576		576	924	0.0212674
<b>1969</b>	924	576		576	924	0.0380081
<b>1970</b>	924	576		576	924	0.0151371
<b>1971</b>	924	576		576	924	0.0090081
<b>1972</b>	924	576		576	924	0.0096864
<b>1973</b>	924	576		576	924	0.0150472
<b>1974</b>	924	576		576	924	0.0091933
<b>1975</b>	924	576		576	924	0.0078724
<b>1976</b>	924	576		576	924	0.0061132
<b>1977</b>	924	576		576	924	0.0075237
<b>1978</b>	924	576	0.028409	576	924	0.0059377
<b>1979</b>	924	576	0.023894	576	924	0.012358

<b>1980</b>	924	576	0.024872	576	924	0.0164896
<b>1981</b>	924	576	0.030658	576	924	0.0088292
<b>1982</b>	924	576	0.029634	576	924	0.0119218
<b>1983</b>	924	576	0.025678	576	924	0.0101052
<b>1984</b>	924	576	0.048742	576	924	0.0104166
<b>1985</b>	924	576	0.07562	576	924	0.0151076
<b>1986</b>	924	576	0.038873	576	924	0.026561
<b>1987</b>	924	576	0.033568	576	924	0.0270118
<b>1988</b>	924	576	0.031428	576	924	0.0319376
<b>1989</b>	924	576	0.032579	576	924	0.0281338
<b>1990</b>	924	576	0.032617	576	924	0.016054
<b>1991</b>	924	576	0.028227	576	924	0.0153659
<b>1992</b>	924	576	0.024123	576	924	0.0187097
<b>1993</b>	924	576	0.0249	576	924	0.0271908
<b>1994</b>	924	576	0.02161	576	924	0.022814
<b>1995</b>	924	576	0.023997	576	924	0.0243581
<b>1996</b>	924	576	0.0253	576	924	0.0282752
<b>1997</b>	924	576	0.024074	576	924	0.0339084
<b>1998</b>	924	576	0.02169	576	924	0.0387239
<b>1999</b>	924	576	0.023576	576	924	0.0359615
<b>2000</b>	924	576	0.023598	576	924	0.0415365
<b>2001</b>	924	576	0.022145	576	924	0.0462248
<b>2002</b>	924	576	0.021843	576	924	0.0578299
<b>2003</b>	924	576	0.020665	576	924	0.0663642
<b>2004</b>	924	576	0.021896	576	924	0.0811254
<b>2005</b>	924	576	0.022425	576	924	0.0898946
<b>2006</b>	924	576	0.024469	576	924	0.1013442
<b>2007</b>	924	576	0.024867	576	924	0.100112

<b>Years After Swap</b>	<b>China</b>	<b>Partner Singapore</b>	<b>Average Share of China's Exports</b>	<b>Singapore</b>	<b>Partner China</b>	<b>Average Share of Singapore's Exports</b>
<b>2008</b>	924	576	0.023059	576	924	0.0951565
<b>2009</b>	924	576	0.025506	576	924	0.1015231
<b>2010</b>	924	576	0.020932	576	924	0.1081961
<b>2011</b>	924	576	0.018986	576	924	0.1102792
<b>2012</b>	924	576	0.020067	576	924	0.1125056
<b>2013</b>	924	576	0.02105	576	924	0.1232361

**Table A18: Bilateral Exports Shares of China and Thailand**

<b>Years Before Swap</b>	<b>China</b>	<b>Partner Thailand</b>	<b>Average Share of China's Exports</b>	<b>Thailand</b>	<b>Partner China</b>	<b>Average Share of Thailand's Exports</b>
<b>1948</b>	924	578		578	924	
<b>1949</b>	924	578		578	924	
<b>1950</b>	924	578		578	924	
<b>1951</b>	924	578		578	924	
<b>1952</b>	924	578		578	924	
<b>1953</b>	924	578		578	924	
<b>1954</b>	924	578		578	924	
<b>1955</b>	924	578		578	924	
<b>1956</b>	924	578		578	924	0.0053405
<b>1957</b>	924	578		578	924	0.0132797
<b>1958</b>	924	578		578	924	0.0121473
<b>1959</b>	924	578		578	924	0
<b>1960</b>	924	578		578	924	0.0014899
<b>1961</b>	924	578	0	578	924	0
<b>1962</b>	924	578		578	924	0
<b>1963</b>	924	578		578	924	0.0010658
<b>1964</b>	924	578		578	924	0
<b>1965</b>	924	578		578	924	0
<b>1966</b>	924	578		578	924	0
<b>1967</b>	924	578		578	924	0
<b>1968</b>	924	578		578	924	0
<b>1969</b>	924	578		578	924	0
<b>1970</b>	924	578		578	924	0
<b>1971</b>	924	578		578	924	0
<b>1972</b>	924	578		578	924	0
<b>1973</b>	924	578		578	924	0
<b>1974</b>	924	578		578	924	0.0000877
<b>1975</b>	924	578		578	924	0.0089118
<b>1976</b>	924	578		578	924	0.0212518
<b>1977</b>	924	578		578	924	0.0306185
<b>1978</b>	924	578	0.008079	578	924	0.0190532
<b>1979</b>	924	578	0.017077	578	924	0.0147114
<b>1980</b>	924	578	0.018407	578	924	0.0192817
<b>1981</b>	924	578	0.010645	578	924	0.0268539
<b>1982</b>	924	578	0.007699	578	924	0.0447665
<b>1983</b>	924	578	0.00881	578	924	0.0170933
<b>1984</b>	924	578	0.010102	578	924	0.025096
<b>1985</b>	924	578	0.004263	578	924	0.0388

<b>1986</b>	924	578	0.005084	578	924	0.0316167
<b>1987</b>	924	578	0.007638	578	924	0.0340629
<b>1988</b>	924	578	0.010769	578	924	0.0304015
<b>1989</b>	924	578	0.009625	578	924	0.0273826
<b>1990</b>	924	578	0.013827	578	924	0.0118853
<b>1991</b>	924	578	0.011882	578	924	0.0119824
<b>1992</b>	924	578	0.010625	578	924	0.0123151
<b>1993</b>	924	578	0.008321	578	924	0.0120188
<b>1994</b>	924	578	0.009776	578	924	0.0212566
<b>1995</b>	924	578	0.012015	578	924	0.0305699
<b>1996</b>	924	578	0.008488	578	924	0.0354518
<b>1997</b>	924	578	0.008368	578	924	0.0320798
<b>1998</b>	924	578	0.006504	578	924	0.0346691
<b>1999</b>	924	578	0.007518	578	924	0.0335311
<b>2000</b>	924	578	0.009189	578	924	0.0423867
<b>2001</b>	924	578	0.009567	578	924	0.0453594
<b>2002</b>	924	578	0.009275	578	924	0.0537611
<b>2003</b>	924	578	0.00892	578	924	0.0736074
<b>2004</b>	924	578	0.010004	578	924	0.0760131
<b>2005</b>	924	578	0.010489	578	924	0.0850075
<b>2006</b>	924	578	0.010302	578	924	0.0930913
<b>2007</b>	924	578	0.010036	578	924	0.0990552
<b>Years After Swap</b>	<b>China</b>	<b>Partner Thailand</b>	<b>Average Share of China's Exports</b>	<b>Thailand</b>	<b>Partner</b>	<b>Average Share of Thailand's Exports</b>
<b>2008</b>	924	578	0.011072	578	924	0.0931303
<b>2009</b>	924	578	0.011296	578	924	0.1079881
<b>2010</b>	924	578	0.01279	578	924	0.1135511
<b>2011</b>	924	578	0.013823	578	924	0.1206805
<b>2012</b>	924	578	0.015539	578	924	0.1198525
<b>2013</b>	924	578	0.015107	578	924	0.1219844

**Table A19: Bilateral Exports Shares of China and Belarus**

<b>Years Before Swap</b>	<b>China</b>	<b>Partner Belarus</b>	<b>Average Share of China's Exports</b>	<b>Belarus</b>	<b>Partner China</b>	<b>Average Share of Belarus's Exports</b>
<b>1948</b>	924	913		913	924	
<b>1949</b>	924	913		913	924	
<b>1950</b>	924	913		913	924	
<b>1951</b>	924	913		913	924	
<b>1952</b>	924	913		913	924	

<b>1953</b>	924	913		913	924	
<b>1954</b>	924	913		913	924	
<b>1955</b>	924	913		913	924	
<b>1956</b>	924	913		913	924	
<b>1957</b>	924	913		913	924	
<b>1958</b>	924	913		913	924	
<b>1959</b>	924	913		913	924	
<b>1960</b>	924	913		913	924	
<b>1961</b>	924	913	0	913	924	
<b>1962</b>	924	913		913	924	
<b>1963</b>	924	913		913	924	
<b>1964</b>	924	913		913	924	
<b>1965</b>	924	913		913	924	
<b>1966</b>	924	913		913	924	
<b>1967</b>	924	913		913	924	
<b>1968</b>	924	913		913	924	
<b>1969</b>	924	913		913	924	
<b>1970</b>	924	913		913	924	
<b>1971</b>	924	913		913	924	
<b>1972</b>	924	913		913	924	
<b>1973</b>	924	913		913	924	
<b>1974</b>	924	913		913	924	
<b>1975</b>	924	913		913	924	
<b>1976</b>	924	913		913	924	
<b>1977</b>	924	913		913	924	
<b>1978</b>	924	913	0	913	924	
<b>1979</b>	924	913	0	913	924	
<b>1980</b>	924	913	0	913	924	
<b>1981</b>	924	913	0	913	924	
<b>1982</b>	924	913	0	913	924	
<b>1983</b>	924	913	0	913	924	
<b>1984</b>	924	913	0	913	924	
<b>1985</b>	924	913	0	913	924	
<b>1986</b>	924	913	0	913	924	
<b>1987</b>	924	913	0	913	924	
<b>1988</b>	924	913	0	913	924	
<b>1989</b>	924	913	0	913	924	
<b>1990</b>	924	913	0	913	924	
<b>1991</b>	924	913	0	913	924	
<b>1992</b>	924	913	0.000107	913	924	0.0083196
<b>1993</b>	924	913	0.000222	913	924	0.0145477
<b>1994</b>	924	913	7.98E-05	913	924	0.016197

<b>1995</b>	924	913	6.86E-05	913	924	0.0034517
<b>1996</b>	924	913	6.38E-05	913	924	0.0131023
<b>1997</b>	924	913	9.39E-05	913	924	0.0097926
<b>1998</b>	924	913	3.59E-05	913	924	0.0141296
<b>1999</b>	924	913	2.79E-05	913	924	0.0288529
<b>2000</b>	924	913	0.000168	913	924	0.018738
<b>2001</b>	924	913	3.35E-05	913	924	0.0193442
<b>2002</b>	924	913	5.08E-05	913	924	0.027329
<b>2003</b>	924	913	7.51E-05	913	924	0.0164228
<b>2004</b>	924	913	0.000112	913	924	0.0207184
<b>2005</b>	924	913	0.000109	913	924	0.0271445
<b>2006</b>	924	913	0.000228	913	924	0.0203287
<b>2007</b>	924	913	0.00019	913	924	0.0200641
<b>Years After Swap</b>	<b>China</b>	<b>Partner Belarus</b>	<b>Average Share of China's Exports</b>	<b>Belarus</b>	<b>Partner China</b>	<b>Average Share of Belarus's Exports</b>
<b>2008</b>	924	913	0.000258	913	924	0.0188737
<b>2009</b>	924	913	0.000238	913	924	0.0081979
<b>2010</b>	924	913	0.000515	913	924	0.019066
<b>2011</b>	924	913	0.000379	913	924	0.0155418
<b>2012</b>	924	913	0.000458	913	924	0.0095661
<b>2013</b>	924	913	0.000402	913	924	0.0126085

**Table A20: Bilateral Exports Shares of China and Albania**

<b>Years Before Swap</b>	<b>China</b>	<b>Partner Albania</b>	<b>Average Share of China's Exports</b>	<b>Albania</b>	<b>Partner China</b>	<b>Average Share of Albania's Exports</b>
<b>1948</b>	924	914		914	924	
<b>1949</b>	924	914		914	924	
<b>1950</b>	924	914		914	924	
<b>1951</b>	924	914		914	924	
<b>1952</b>	924	914		914	924	
<b>1953</b>	924	914		914	924	
<b>1954</b>	924	914		914	924	
<b>1955</b>	924	914		914	924	
<b>1956</b>	924	914		914	924	
<b>1957</b>	924	914		914	924	
<b>1958</b>	924	914		914	924	
<b>1959</b>	924	914		914	924	
<b>1960</b>	924	914		914	924	
<b>1961</b>	924	914	0	914	924	
<b>1962</b>	924	914		914	924	

<b>1963</b>	924	914		914	924	
<b>1964</b>	924	914		914	924	
<b>1965</b>	924	914		914	924	
<b>1966</b>	924	914		914	924	
<b>1967</b>	924	914		914	924	
<b>1968</b>	924	914		914	924	
<b>1969</b>	924	914		914	924	
<b>1970</b>	924	914		914	924	
<b>1971</b>	924	914		914	924	
<b>1972</b>	924	914		914	924	
<b>1973</b>	924	914		914	924	
<b>1974</b>	924	914		914	924	
<b>1975</b>	924	914		914	924	
<b>1976</b>	924	914		914	924	
<b>1977</b>	924	914		914	924	
<b>1978</b>	924	914	0.002281	914	924	
<b>1979</b>	924	914	0	914	924	
<b>1980</b>	924	914	0	914	924	
<b>1981</b>	924	914	4.66E-06	914	924	0
<b>1982</b>	924	914	0	914	924	0.0150544
<b>1983</b>	924	914	0.000181	914	924	0.0280041
<b>1984</b>	924	914	0.000113	914	924	0.0073456
<b>1985</b>	924	914	0.000356	914	924	0.0256739
<b>1986</b>	924	914	0.000278	914	924	0.0416301
<b>1987</b>	924	914	0.000386	914	924	0.0750561
<b>1988</b>	924	914	0.000739	914	924	0.0760236
<b>1989</b>	924	914	0.000296	914	924	0.0707938
<b>1990</b>	924	914	0.000429	914	924	0.0568669
<b>1991</b>	924	914	0.000203	914	924	0.0168484
<b>1992</b>	924	914	1.89E-05	914	924	0.0016264
<b>1993</b>	924	914	0.000108	914	924	0.0006163
<b>1994</b>	924	914	0.000088	914	924	0.000779
<b>1995</b>	924	914	0.000139	914	924	0.0082425
<b>1996</b>	924	914	4.92E-05	914	924	0
<b>1997</b>	924	914	0.000037	914	924	0
<b>1998</b>	924	914	4.91E-05	914	924	0
<b>1999</b>	924	914	5.45E-05	914	924	0
<b>2000</b>	924	914	5.87E-05	914	924	0
<b>2001</b>	924	914	6.17E-05	914	924	0
<b>2002</b>	924	914	5.86E-05	914	924	0.0000194
<b>2003</b>	924	914	0.000075	914	924	0.0035494
<b>2004</b>	924	914	0.00011	914	924	0.0010075
<b>2005</b>	924	914	0.000112	914	924	0.0051224

<b>2006</b>	924	914	6.97E-05	914	924	0.0120401
<b>2007</b>	924	914	7.42E-05	914	924	0.0271481

<b>Years After Swap</b>	<b>China</b>	<b>Partner Albania</b>	<b>Average Share of China's Exports</b>	<b>Albania</b>	<b>Partner China</b>	<b>Average Share of Albania's Exports</b>
<b>2008</b>	924	914	0.000137	914	924	0.0288496
<b>2009</b>	924	914	0.000176	914	924	0.0485792
<b>2010</b>	924	914	0.000129	914	924	0.0561795
<b>2011</b>	924	914	0.000151	914	924	0.0256416
<b>2012</b>	924	914	0.000171	914	924	0.0274701
<b>2013</b>	924	914	0.000149	914	924	0.0982751

**Table A21: Bilateral Exports Shares of China and Kazakhstan**

<b>Years Before Swap</b>	<b>China</b>	<b>Partner Kazakhstan</b>	<b>Average Share of China's Exports</b>	<b>Kazakhstan</b>	<b>Partner China</b>	<b>Average Share of Kazakhstan's Exports</b>
<b>1948</b>	924	916		916	924	
<b>1949</b>	924	916		916	924	
<b>1950</b>	924	916		916	924	
<b>1951</b>	924	916		916	924	
<b>1952</b>	924	916		916	924	
<b>1953</b>	924	916		916	924	
<b>1954</b>	924	916		916	924	
<b>1955</b>	924	916		916	924	
<b>1956</b>	924	916		916	924	
<b>1957</b>	924	916		916	924	
<b>1958</b>	924	916		916	924	
<b>1959</b>	924	916		916	924	
<b>1960</b>	924	916		916	924	
<b>1961</b>	924	916	0	916	924	
<b>1962</b>	924	916		916	924	
<b>1963</b>	924	916		916	924	
<b>1964</b>	924	916		916	924	
<b>1965</b>	924	916		916	924	
<b>1966</b>	924	916		916	924	
<b>1967</b>	924	916		916	924	
<b>1968</b>	924	916		916	924	
<b>1969</b>	924	916		916	924	
<b>1970</b>	924	916		916	924	
<b>1971</b>	924	916		916	924	

<b>1972</b>	924	916		916	924	
<b>1973</b>	924	916		916	924	
<b>1974</b>	924	916		916	924	
<b>1975</b>	924	916		916	924	
<b>1976</b>	924	916		916	924	
<b>1977</b>	924	916		916	924	
<b>1978</b>	924	916	0	916	924	
<b>1979</b>	924	916	0	916	924	
<b>1980</b>	924	916	0	916	924	
<b>1981</b>	924	916	0	916	924	
<b>1982</b>	924	916	0	916	924	
<b>1983</b>	924	916	0	916	924	
<b>1984</b>	924	916	0	916	924	
<b>1985</b>	924	916	0	916	924	
<b>1986</b>	924	916	0	916	924	
<b>1987</b>	924	916	0	916	924	
<b>1988</b>	924	916	0	916	924	
<b>1989</b>	924	916	0	916	924	
<b>1990</b>	924	916	0	916	924	
<b>1991</b>	924	916	0	916	924	
<b>1992</b>	924	916	0.002642	916	924	0.5302172
<b>1993</b>	924	916	0.001905	916	924	0.2177345
<b>1994</b>	924	916	0.001169	916	924	0.0462322
<b>1995</b>	924	916	0.000517	916	924	0.0567389
<b>1996</b>	924	916	0.000642	916	924	0.0779443
<b>1997</b>	924	916	0.000527	916	924	0.0684499
<b>1998</b>	924	916	0.001139	916	924	0.0703899
<b>1999</b>	924	916	0.002589	916	924	0.090937
<b>2000</b>	924	916	0.002452	916	924	0.0867561
<b>2001</b>	924	916	0.001253	916	924	0.0805018
<b>2002</b>	924	916	0.001884	916	924	0.1076921
<b>2003</b>	924	916	0.003648	916	924	0.1343749
<b>2004</b>	924	916	0.003816	916	924	0.101823
<b>2005</b>	924	916	0.00523	916	924	0.0888375
<b>2006</b>	924	916	0.005014	916	924	0.0942003
<b>2007</b>	924	916	0.00624	916	924	0.1183412
<b>Years After Swap</b>	<b>China</b>	<b>Partner Kazakhstan</b>	<b>Average Share of China's Exports</b>	<b>Kazakhstan</b>	<b>Partner China</b>	<b>Average Share of Kazakhstan's Exports</b>
<b>2008</b>	924	916	0.007005	916	924	0.1081184
<b>2009</b>	924	916	0.006569	916	924	0.137271

<b>2010</b>	924	916	0.006007	916	924	0.1790393
<b>2011</b>	924	916	0.005143	916	924	0.2034315
<b>2012</b>	924	916	0.005475	916	924	0.1929648
<b>2013</b>	924	916	0.005788	916	924	0.2374301

**Table A22: Bilateral Exports Shares of China and Russia**

<b>Years Before Swap</b>	<b>China</b>	<b>Partner Russia</b>	<b>Average Share of China's Exports</b>	<b>Russia</b>	<b>Partner China</b>	<b>Average Share of Russia's Exports</b>
<b>1948</b>	924	922		922	924	
<b>1949</b>	924	922		922	924	
<b>1950</b>	924	922		922	924	
<b>1951</b>	924	922		922	924	
<b>1952</b>	924	922		922	924	
<b>1953</b>	924	922		922	924	
<b>1954</b>	924	922		922	924	
<b>1955</b>	924	922		922	924	
<b>1956</b>	924	922		922	924	
<b>1957</b>	924	922		922	924	
<b>1958</b>	924	922		922	924	
<b>1959</b>	924	922		922	924	
<b>1960</b>	924	922		922	924	
<b>1961</b>	924	922	0	922	924	
<b>1962</b>	924	922		922	924	
<b>1963</b>	924	922		922	924	
<b>1964</b>	924	922		922	924	
<b>1965</b>	924	922		922	924	
<b>1966</b>	924	922		922	924	
<b>1967</b>	924	922		922	924	
<b>1968</b>	924	922		922	924	
<b>1969</b>	924	922		922	924	
<b>1970</b>	924	922		922	924	
<b>1971</b>	924	922		922	924	
<b>1972</b>	924	922		922	924	
<b>1973</b>	924	922		922	924	
<b>1974</b>	924	922		922	924	
<b>1975</b>	924	922		922	924	
<b>1976</b>	924	922		922	924	
<b>1977</b>	924	922		922	924	
<b>1978</b>	924	922	0	922	924	
<b>1979</b>	924	922	0	922	924	
<b>1980</b>	924	922	0	922	924	

<b>1981</b>	924	922	0	922	924	
<b>1982</b>	924	922	0	922	924	
<b>1983</b>	924	922	0	922	924	
<b>1984</b>	924	922	0	922	924	
<b>1985</b>	924	922	0	922	924	
<b>1986</b>	924	922	0	922	924	
<b>1987</b>	924	922	0	922	924	
<b>1988</b>	924	922	0	922	924	
<b>1989</b>	924	922	0	922	924	
<b>1990</b>	924	922	0	922	924	
<b>1991</b>	924	922	0	922	924	
<b>1992</b>	924	922	0.027757	922	924	0.0687732
<b>1993</b>	924	922	0.029859	922	924	0.070476
<b>1994</b>	924	922	0.013304	922	924	0.0453831
<b>1995</b>	924	922	0.01148	922	924	0.0445757
<b>1996</b>	924	922	0.011413	922	924	0.0564949
<b>1997</b>	924	922	0.011336	922	924	0.0476101
<b>1998</b>	924	922	0.010191	922	924	0.0449802
<b>1999</b>	924	922	0.007842	922	924	0.0488459
<b>2000</b>	924	922	0.009147	922	924	0.0511012
<b>2001</b>	924	922	0.010374	922	924	0.0491548
<b>2002</b>	924	922	0.011038	922	924	0.0647277
<b>2003</b>	924	922	0.014061	922	924	0.0626396
<b>2004</b>	924	922	0.015644	922	924	0.0611663
<b>2005</b>	924	922	0.017722	922	924	0.0553345
<b>2006</b>	924	922	0.016703	922	924	0.0547325
<b>2007</b>	924	922	0.023865	922	924	0.0456508
<b>Years After Swap</b>	<b>China</b>	<b>Partner Russia</b>	<b>Average Share of China's Exports</b>	<b>Russia</b>	<b>Partner China</b>	<b>Average Share of Russia's Exports</b>
<b>2008</b>	924	922	0.023549	922	924	0.046069
<b>2009</b>	924	922	0.014849	922	924	0.0686448
<b>2010</b>	924	922	0.019158	922	924	0.0616222
<b>2011</b>	924	922	0.020916	922	924	0.0787873
<b>2012</b>	924	922	0.021934	922	924	0.068795
<b>2013</b>	924	922	0.022895	922	924	0.0682984

**Table A23: Bilateral Exports Shares of China and Ukraine**

<b>Years Before Swap</b>	<b>China</b>	<b>Partner Ukraine</b>	<b>Average Share of China's Exports</b>	<b>Ukraine</b>	<b>Partner China</b>	<b>Average Share of Ukraine's Exports</b>
<b>1948</b>	924	926		926	924	
<b>1949</b>	924	926		926	924	
<b>1950</b>	924	926		926	924	
<b>1951</b>	924	926		926	924	
<b>1952</b>	924	926		926	924	
<b>1953</b>	924	926		926	924	
<b>1954</b>	924	926		926	924	
<b>1955</b>	924	926		926	924	
<b>1956</b>	924	926		926	924	
<b>1957</b>	924	926		926	924	
<b>1958</b>	924	926		926	924	
<b>1959</b>	924	926		926	924	
<b>1960</b>	924	926		926	924	
<b>1961</b>	924	926	0	926	924	
<b>1962</b>	924	926		926	924	
<b>1963</b>	924	926		926	924	
<b>1964</b>	924	926		926	924	
<b>1965</b>	924	926		926	924	
<b>1966</b>	924	926		926	924	
<b>1967</b>	924	926		926	924	
<b>1968</b>	924	926		926	924	
<b>1969</b>	924	926		926	924	
<b>1970</b>	924	926		926	924	
<b>1971</b>	924	926		926	924	
<b>1972</b>	924	926		926	924	
<b>1973</b>	924	926		926	924	
<b>1974</b>	924	926		926	924	
<b>1975</b>	924	926		926	924	
<b>1976</b>	924	926		926	924	
<b>1977</b>	924	926		926	924	
<b>1978</b>	924	926	0	926	924	
<b>1979</b>	924	926	0	926	924	
<b>1980</b>	924	926	0	926	924	
<b>1981</b>	924	926	0	926	924	
<b>1982</b>	924	926	0	926	924	
<b>1983</b>	924	926	0	926	924	
<b>1984</b>	924	926	0	926	924	
<b>1985</b>	924	926	0	926	924	

<b>1986</b>	924	926	0	926	924	
<b>1987</b>	924	926	0	926	924	
<b>1988</b>	924	926	0	926	924	
<b>1989</b>	924	926	0	926	924	
<b>1990</b>	924	926	0	926	924	
<b>1991</b>	924	926	0	926	924	
<b>1992</b>	924	926	0.001061	926	924	0.0826498
<b>1993</b>	924	926	0.001047	926	924	0.1119867
<b>1994</b>	924	926	0.000797	926	924	0.0577188
<b>1995</b>	924	926	0.000506	926	924	0.0361313
<b>1996</b>	924	926	0.000395	926	924	0.0541014
<b>1997</b>	924	926	0.000563	926	924	0.0802014
<b>1998</b>	924	926	0.000501	926	924	0.0597579
<b>1999</b>	924	926	0.000424	926	924	0.0645281
<b>2000</b>	924	926	0.000559	926	924	0.0443446
<b>2001</b>	924	926	0.000947	926	924	0.034019
<b>2002</b>	924	926	0.001654	926	924	0.0398486
<b>2003</b>	924	926	0.002165	926	924	0.0441342
<b>2004</b>	924	926	0.002487	926	924	0.0257669
<b>2005</b>	924	926	0.003343	926	924	0.021175
<b>2006</b>	924	926	0.003929	926	924	0.0145106
<b>2007</b>	924	926	0.004915	926	924	0.0089606
<b>Years After Swap</b>	<b>China</b>	<b>Partner Ukraine</b>	<b>Average Share of China's Exports</b>	<b>Ukraine</b>	<b>Partner China</b>	<b>Average Share of Ukraine's Exports</b>
<b>2008</b>	924	926	0.005335	926	924	0.0083678
<b>2009</b>	924	926	0.003055	926	924	0.0367172
<b>2010</b>	924	926	0.003602	926	924	0.0260036
<b>2011</b>	924	926	0.003846	926	924	0.0322261
<b>2012</b>	924	926	0.003645	926	924	0.0260972
<b>2013</b>	924	926	0.003619	926	924	0.043552

**Table A24: Bilateral Exports Shares of China and Uzbekistan**

<b>Years Before Swap</b>	<b>China</b>	<b>Partner Uzbekistan</b>	<b>Average Share of China's Exports</b>	<b>Uzbekistan</b>	<b>Partner China</b>	<b>Average Share of Uzbekistan's Exports</b>
<b>1948</b>	924	927		927	924	
<b>1949</b>	924	927		927	924	
<b>1950</b>	924	927		927	924	
<b>1951</b>	924	927		927	924	
<b>1952</b>	924	927		927	924	
<b>1953</b>	924	927		927	924	

<b>1954</b>	924	927		927	924	
<b>1955</b>	924	927		927	924	
<b>1956</b>	924	927		927	924	
<b>1957</b>	924	927		927	924	
<b>1958</b>	924	927		927	924	
<b>1959</b>	924	927		927	924	
<b>1960</b>	924	927		927	924	
<b>1961</b>	924	927	0	927	924	
<b>1962</b>	924	927		927	924	
<b>1963</b>	924	927		927	924	
<b>1964</b>	924	927		927	924	
<b>1965</b>	924	927		927	924	
<b>1966</b>	924	927		927	924	
<b>1967</b>	924	927		927	924	
<b>1968</b>	924	927		927	924	
<b>1969</b>	924	927		927	924	
<b>1970</b>	924	927		927	924	
<b>1971</b>	924	927		927	924	
<b>1972</b>	924	927		927	924	
<b>1973</b>	924	927		927	924	
<b>1974</b>	924	927		927	924	
<b>1975</b>	924	927		927	924	
<b>1976</b>	924	927		927	924	
<b>1977</b>	924	927		927	924	
<b>1978</b>	924	927	0	927	924	
<b>1979</b>	924	927	0	927	924	
<b>1980</b>	924	927	0	927	924	
<b>1981</b>	924	927	0	927	924	
<b>1982</b>	924	927	0	927	924	
<b>1983</b>	924	927	0	927	924	
<b>1984</b>	924	927	0	927	924	
<b>1985</b>	924	927	0	927	924	
<b>1986</b>	924	927	0	927	924	
<b>1987</b>	924	927	0	927	924	
<b>1988</b>	924	927	0	927	924	
<b>1989</b>	924	927	0	927	924	
<b>1990</b>	924	927	0	927	924	
<b>1991</b>	924	927	0	927	924	
<b>1992</b>	924	927	0.000458	927	924	0.0817804
<b>1993</b>	924	927	0.000475	927	924	0.0154621
<b>1994</b>	924	927	0.000434	927	924	0.0382534
<b>1995</b>	924	927	0.000326	927	924	0.0237588
<b>1996</b>	924	927	0.000257	927	924	0.0528108

<b>1997</b>	924	927	0.000343	927	924	0.0443191
<b>1998</b>	924	927	0.000322	927	924	0.0129325
<b>1999</b>	924	927	0.000143	927	924	0.0060867
<b>2000</b>	924	927	0.000162	927	924	0.0050699
<b>2001</b>	924	927	0.000194	927	924	0.0033284
<b>2002</b>	924	927	0.000327	927	924	0.0161754
<b>2003</b>	924	927	0.000342	927	924	0.0908011
<b>2004</b>	924	927	0.000298	927	924	0.1346008
<b>2005</b>	924	927	0.000309	927	924	0.1135321
<b>2006</b>	924	927	0.000429	927	924	0.0978908
<b>2007</b>	924	927	0.000642	927	924	0.0523282

<b>Years After Swap</b>	<b>China</b>	<b>Partner Uzbekistan</b>	<b>Average Share of China's Exports</b>	<b>Uzbekistan</b>	<b>Partner</b>	<b>Average Share of Uzbekistan's Exports</b>
<b>2008</b>	924	927	0.000911	927	924	0.0399909
<b>2009</b>	924	927	0.001322	927	924	0.0663347
<b>2010</b>	924	927	0.000763	927	924	0.2123668
<b>2011</b>	924	927	0.000731	927	924	0.1305393
<b>2012</b>	924	927	0.000888	927	924	0.1887927
<b>2013</b>	924	927	0.001206	927	924	0.2815441

**Table A25: Bilateral Exports Shares of China and Hungary**

<b>Years Before Swap</b>	<b>China</b>	<b>Partner Hungary</b>	<b>Average Share of China's Exports</b>	<b>Hungary</b>	<b>Partner China</b>	<b>Average Share of Hungary's Exports</b>
<b>1948</b>	924	944		944	924	0
<b>1949</b>	924	944		944	924	
<b>1950</b>	924	944		944	924	
<b>1951</b>	924	944		944	924	
<b>1952</b>	924	944		944	924	
<b>1953</b>	924	944		944	924	
<b>1954</b>	924	944		944	924	
<b>1955</b>	924	944		944	924	0.0626287
<b>1956</b>	924	944		944	924	0.0659597
<b>1957</b>	924	944		944	924	0.0623674
<b>1958</b>	924	944		944	924	
<b>1959</b>	924	944		944	924	
<b>1960</b>	924	944		944	924	0
<b>1961</b>	924	944	0	944	924	0
<b>1962</b>	924	944		944	924	

<b>1963</b>	924	944		944	924	
<b>1964</b>	924	944		944	924	
<b>1965</b>	924	944		944	924	
<b>1966</b>	924	944		944	924	
<b>1967</b>	924	944		944	924	
<b>1968</b>	924	944		944	924	0.0077124
<b>1969</b>	924	944		944	924	0.0050083
<b>1970</b>	924	944		944	924	0.0079593
<b>1971</b>	924	944		944	924	0.0109663
<b>1972</b>	924	944		944	924	0.0101824
<b>1973</b>	924	944		944	924	0.0090304
<b>1974</b>	924	944		944	924	0.0048097
<b>1975</b>	924	944		944	924	0.0070006
<b>1976</b>	924	944		944	924	0.008401
<b>1977</b>	924	944		944	924	0.0056988
<b>1978</b>	924	944	0.006601	944	924	0.0092024
<b>1979</b>	924	944	0.004972	944	924	0.0089255
<b>1980</b>	924	944	0.002937	944	924	0.006609
<b>1981</b>	924	944	0.001898	944	924	0.0040081
<b>1982</b>	924	944	0.001194	944	924	0.0040811
<b>1983</b>	924	944	0.001277	944	924	0.0056191
<b>1984</b>	924	944	0.001516	944	924	0.0082315
<b>1985</b>	924	944	0.002998	944	924	0.0137981
<b>1986</b>	924	944	0.004423	944	924	0.0193755
<b>1987</b>	924	944	0.004898	944	924	0.0101411
<b>1988</b>	924	944	0.002868	944	924	0.0190682
<b>1989</b>	924	944	0.001619	944	924	0.0126499
<b>1990</b>	924	944	0.000382	944	924	0.0088546
<b>1991</b>	924	944	0.000283	944	924	0.0016502
<b>1992</b>	924	944	0.000535	944	924	0.0017261
<b>1993</b>	924	944	0.001831	944	924	0.0079761
<b>1994</b>	924	944	0.003285	944	924	0.0011432
<b>1995</b>	924	944	0.002232	944	924	0.0018119
<b>1996</b>	924	944	0.001475	944	924	0
<b>1997</b>	924	944	0.001651	944	924	0.00083
<b>1998</b>	924	944	0.002185	944	924	0.0008244
<b>1999</b>	924	944	0.002883	944	924	0.0028556
<b>2000</b>	924	944	0.003675	944	924	0.001453
<b>2001</b>	924	944	0.003942	944	924	0.0036422
<b>2002</b>	924	944	0.00454	944	924	0.0045056
<b>2003</b>	924	944	0.005328	944	924	0.0041804
<b>2004</b>	924	944	0.004575	944	924	0.0071341

<b>2005</b>	924	944	0.003347	944	924	0.0065583
<b>2006</b>	924	944	0.00347	944	924	0.0103866
<b>2007</b>	924	944	0.004203	944	924	0.0109288

<b>Years After Swap</b>	<b>China</b>	<b>Partner Hungary</b>	<b>Average Share of China's Exports</b>	<b>Hungary</b>	<b>Partner China</b>	<b>Average Share of Hungary's Exports</b>
<b>2008</b>	924	944	0.004348	944	924	0.0105044
<b>2009</b>	924	944	0.004532	944	924	0.0151394
<b>2010</b>	924	944	0.00422	944	924	0.012819
<b>2011</b>	924	944	0.00366	944	924	0.0121192
<b>2012</b>	924	944	0.002858	944	924	0.0116416
<b>2013</b>	924	944	0.002628	944	924	0.0121125

**Table A26: Bilateral Exports Shares of China and Mongolia**

<b>Years Before Swap</b>	<b>China</b>	<b>Partner Mongolia</b>	<b>Average Share of China's Exports</b>	<b>Mongolia</b>	<b>Partner China</b>	<b>Average Share of Mongolia's Exports</b>
<b>1948</b>	924	948		948	924	
<b>1949</b>	924	948		948	924	
<b>1950</b>	924	948		948	924	
<b>1951</b>	924	948		948	924	
<b>1952</b>	924	948		948	924	
<b>1953</b>	924	948		948	924	
<b>1954</b>	924	948		948	924	
<b>1955</b>	924	948		948	924	
<b>1956</b>	924	948		948	924	
<b>1957</b>	924	948		948	924	
<b>1958</b>	924	948		948	924	
<b>1959</b>	924	948		948	924	
<b>1960</b>	924	948		948	924	
<b>1961</b>	924	948	0	948	924	
<b>1962</b>	924	948		948	924	
<b>1963</b>	924	948		948	924	
<b>1964</b>	924	948		948	924	
<b>1965</b>	924	948		948	924	
<b>1966</b>	924	948		948	924	
<b>1967</b>	924	948		948	924	
<b>1968</b>	924	948		948	924	
<b>1969</b>	924	948		948	924	
<b>1970</b>	924	948		948	924	

<b>1971</b>	924	948		948	924	
<b>1972</b>	924	948		948	924	
<b>1973</b>	924	948		948	924	
<b>1974</b>	924	948		948	924	
<b>1975</b>	924	948		948	924	
<b>1976</b>	924	948		948	924	
<b>1977</b>	924	948		948	924	
<b>1978</b>	924	948	0	948	924	
<b>1979</b>	924	948	0	948	924	
<b>1980</b>	924	948	0.000207	948	924	
<b>1981</b>	924	948	0.000117	948	924	0.0424628
<b>1982</b>	924	948	0.000101	948	924	0.0409641
<b>1983</b>	924	948	9.97E-05	948	924	0.0591016
<b>1984</b>	924	948	8.07E-05	948	924	0.0389955
<b>1985</b>	924	948	0.000165	948	924	0.0250988
<b>1986</b>	924	948	0.0003	948	924	0.048836
<b>1987</b>	924	948	0.000513	948	924	0.0490661
<b>1988</b>	924	948	0.000354	948	924	0.0740417
<b>1989</b>	924	948	0.000382	948	924	0.0660239
<b>1990</b>	924	948	0.000457	948	924	0.1135418
<b>1991</b>	924	948	0.000364	948	924	0.2707197
<b>1992</b>	924	948	0.00161	948	924	0.1786818
<b>1993</b>	924	948	0.000905	948	924	0.314152
<b>1994</b>	924	948	0.000361	948	924	0.2055602
<b>1995</b>	924	948	0.000432	948	924	0.1643106
<b>1996</b>	924	948	0.000488	948	924	0.1910266
<b>1997</b>	924	948	0.000355	948	924	0.2272758
<b>1998</b>	924	948	0.000348	948	924	0.2990361
<b>1999</b>	924	948	0.00036	948	924	0.5709181
<b>2000</b>	924	948	0.000453	948	924	0.498423
<b>2001</b>	924	948	0.000469	948	924	0.3996546
<b>2002</b>	924	948	0.000439	948	924	0.4209348
<b>2003</b>	924	948	0.000363	948	924	0.4656371
<b>2004</b>	924	948	0.000403	948	924	0.4755801
<b>2005</b>	924	948	0.000428	948	924	0.4824912
<b>2006</b>	924	948	0.000458	948	924	0.6806551
<b>2007</b>	924	948	0.000573	948	924	0.7247239
<b>Years After Swap</b>	<b>China</b>	<b>Partner Mongolia</b>	<b>Average Share of China's Exports</b>	<b>Mongolia</b>	<b>Partner China</b>	<b>Average Share of Mongolia's Exports</b>
<b>2008</b>	924	948	0.000647	948	924	0.6454706
<b>2009</b>	924	948	0.000897	948	924	0.7387176
<b>2010</b>	924	948	0.000938	948	924	0.8164393

<b>2011</b>	924	948	0.00147	948	924	0.8585488
<b>2012</b>	924	948	0.00132	948	924	0.8895966
<b>2013</b>	924	948	0.00113	948	924	0.9041635

**Table A27: Bilateral Exports Shares of China and Brazil**

<b>Years Before Swap</b>	<b>China</b>	<b>Partner Brazil</b>	<b>Average Share of China's Exports</b>	<b>Brazil</b>	<b>Partner China</b>	<b>Average Share of Brazil's Exports</b>
<b>1948</b>	924	223		223	924	0.0025376
<b>1949</b>	924	223		223	924	0
<b>1950</b>	924	223		223	924	0.0018743
<b>1951</b>	924	223		223	924	0.0007488
<b>1952</b>	924	223		223	924	0
<b>1953</b>	924	223		223	924	0.0005894
<b>1954</b>	924	223		223	924	0.0016717
<b>1955</b>	924	223		223	924	0.0032376
<b>1956</b>	924	223		223	924	0.0004737
<b>1957</b>	924	223		223	924	0
<b>1958</b>	924	223		223	924	0.0060396
<b>1959</b>	924	223		223	924	0
<b>1960</b>	924	223		223	924	0.0003937
<b>1961</b>	924	223	0	223	924	0.0001428
<b>1962</b>	924	223		223	924	0
<b>1963</b>	924	223		223	924	0.0001422
<b>1964</b>	924	223		223	924	0.0001401
<b>1965</b>	924	223		223	924	0.000251
<b>1966</b>	924	223		223	924	0.0006325
<b>1967</b>	924	223		223	924	0
<b>1968</b>	924	223		223	924	0.0002128
<b>1969</b>	924	223		223	924	0
<b>1970</b>	924	223		223	924	0.0004904
<b>1971</b>	924	223		223	924	0
<b>1972</b>	924	223		223	924	0.0159054
<b>1973</b>	924	223		223	924	0.0106674
<b>1974</b>	924	223		223	924	0.002403
<b>1975</b>	924	223		223	924	0.0097331
<b>1976</b>	924	223		223	924	0.0008984
<b>1977</b>	924	223		223	924	0.013525
<b>1978</b>	924	223	0.000917	223	924	0.0103476
<b>1979</b>	924	223	0.007535	223	924	0.0078553
<b>1980</b>	924	223	0.014572	223	924	0.0036483

<b>1981</b>	924	223	0.015905	223	924	0.0045436
<b>1982</b>	924	223	0.017219	223	924	0.0043724
<b>1983</b>	924	223	0.016356	223	924	0.0127129
<b>1984</b>	924	223	0.015376	223	924	0.0170164
<b>1985</b>	924	223	0.015573	223	924	0.0325739
<b>1986</b>	924	223	0.008165	223	924	0.0235144
<b>1987</b>	924	223	0.006172	223	924	0.0140045
<b>1988</b>	924	223	0.001505	223	924	0.0223702
<b>1989</b>	924	223	0.001626	223	924	0.0195026
<b>1990</b>	924	223	0.001697	223	924	0.0124892
<b>1991</b>	924	223	0.000953	223	924	0.007383
<b>1992</b>	924	223	0.000769	223	924	0.0127453
<b>1993</b>	924	223	0.002132	223	924	0.0206738
<b>1994</b>	924	223	0.003056	223	924	0.019323
<b>1995</b>	924	223	0.005205	223	924	0.026306
<b>1996</b>	924	223	0.005177	223	924	0.0238159
<b>1997</b>	924	223	0.005886	223	924	0.0213209
<b>1998</b>	924	223	0.006036	223	924	0.0189225
<b>1999</b>	924	223	0.004588	223	924	0.0149326
<b>2000</b>	924	223	0.005012	223	924	0.020645
<b>2001</b>	924	223	0.00521	223	924	0.0346298
<b>2002</b>	924	223	0.004596	223	924	0.0443156
<b>2003</b>	924	223	0.004998	223	924	0.0653236
<b>2004</b>	924	223	0.006339	223	924	0.0589882
<b>2005</b>	924	223	0.006478	223	924	0.0603697
<b>2006</b>	924	223	0.007788	223	924	0.0625464
<b>2007</b>	924	223	0.009532	223	924	0.0687802

<b>Years After Swap</b>	<b>China</b>	<b>Partner Brazil</b>	<b>Average Share of China's Exports</b>	<b>Brazil</b>	<b>Partner China</b>	<b>Average Share of Brazil's Exports</b>
<b>2008</b>	924	223	0.013393	223	924	0.0857221
<b>2009</b>	924	223	0.011974	223	924	0.1279285
<b>2010</b>	924	223	0.015838	223	924	0.1570806
<b>2011</b>	924	223	0.017134	223	924	0.178426
<b>2012</b>	924	223	0.016635	223	924	0.1756277
<b>2013</b>	924	223	0.016702	223	924	0.1957912

**Table B****Table B1: Exports imports and trade Intensity and the Signing of Bilateral  
Currency Agreement**

Pooled OLS Gravity Estimates

	Column 1	Column 2	Column 3
Exporter Income	1.119*** (0.00639)	1.088*** (0.00614)	0.959*** (0.00500)
Importer Expenditure	0.835*** (0.00651)	0.893*** (0.00626)	0.959*** (0.00499)
Distance	-1.203*** (0.0185)	-1.166*** (0.0179)	-1.192*** (0.0150)
Border	0.766*** (0.0810)	0.634*** (0.0798)	0.723*** (0.0737)
Colony	1.656*** (0.0966)	1.668*** (0.0916)	1.547*** (0.0838)
Island	0.331*** (0.0303)	0.352*** (0.0291)	0.349*** (0.0239)
Landlocked	-0.691*** (0.0280)	-0.643*** (0.0274)	-0.707*** (0.0222)
Common language	0.716*** (0.0359)	0.763*** (0.0350)	0.775*** (0.0288)
Common nation	-0.0506 (0.177)	0.0737 (0.106)	0.272*** (0.0822)
Regional	0.490*** (0.0351)	0.469*** (0.0349)	0.433*** (0.0296)
Swap	0.247 (0.196)	0.440*** (0.152)	0.531*** (0.172)
Observations	635,137	657,835	853,918
R-squared	0.548	0.561	0.606

Robust standard errors in parentheses

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

**Table B2: Exports imports and trade Intensity and the Signing of Bilateral  
Currency Agreement**  
Poisson Pseudo Maximum Likelihood Gravity Estimates

	Column1	Column2	Column3
Exporter Income	0.834*** (0.0166)	0.845*** (0.0165)	0.845*** (0.0160)
Importer Expenditure	0.841*** (0.0210)	0.857*** (0.0218)	0.848*** (0.0159)
Distance	-0.740*** (0.0298)	-0.718*** (0.0286)	-0.731*** (0.0250)
Border	0.415*** (0.104)	0.386*** (0.107)	0.398*** (0.0990)
Colony	0.229** (0.102)	0.272** (0.109)	0.263*** (0.0967)
Island	0.548*** (0.0747)	0.525*** (0.0735)	0.539*** (0.0624)
Landlocked	-0.332*** (0.0611)	-0.300*** (0.0579)	-0.321*** (0.0515)
Common Language	0.592*** (0.0926)	0.522*** (0.0925)	0.558*** (0.0860)
Common nation	0.00337 (0.492)	0.0600 (0.336)	0.0939 (0.0905)
Regional	0.475*** (0.0488)	0.406*** (0.0519)	0.442*** (0.0448)
Swap	0.634** (0.270)	0.500** (0.228)	0.497*** (0.179)
Observations	635,137	657,835	853,918
R-squared	0.727	0.708	0.777

Robust standard errors in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.

**Table B3: Structural Gravity Estimates with Restricted sample 2000 – 2013**

	Time Fixed Effects	Bilateral Fixed Effects	Pair Fixed Effects	PPML Pair Fixed Effects	PPML Phase in Effects
Swap	0.664*** (0.193)	0.467** (0.193)	0.467** (0.193)	0.838*** (0.0365)	0.777*** (0.0491)
Swap_lag4					0.341*** (0.0537)
Observations	288,873	288,873	287,538	287,538	287,538
R-squared	0.573	0.575	0.500	0.633	0.633

**Table B4: Structural Gravity Estimates Restricted to 130 Countries from 1979 – 2013**

	Time Fixed effects	Bilateral Fixed effects	Pair Fixed Effects	PPML Pair Fixed effects	PPML Phase in effect
Swap	1.469*** (0.193)	1.067*** (0.194)	1.067*** (0.194)	1.571*** (0.0588)	1.514*** (0.0724)
Swap_lag4					0.313*** (0.0695)
Observations	343,090	343,090	342,586	342,586	342,586
R-squared	0.633	0.635	0.5600	0.533	0.653

**Table B5: Structural Gravity Estimates Restricted to 130 Countries from 1990 – 2013**

	Time Fixed Effects	Bilateral Fixed Effects	Pair Fixed Effects	PPML Pair Fixed Effects	PPML Phase in Effects
Swap	1.090*** (0.188)	0.746*** (0.188)	0.746*** (0.188)	1.281*** (0.0735)	1.218*** (0.0862)
Swap_lag4					0.337*** (0.0451)
Observations	276,574	276,574	276,027	276,027	276,027
R-squared	0.673	0.645	0.660	0.632	0.681

**Table B6: Structural Gravity Estimates Restricted to 130 Countries from 2000 – 2013**

	Time Fixed Effects	Bilateral Fixed effects	Pair Fixed Effects	PPML Pair fixed Effects	PPML Phase in Effects
Swap	0.537*** (0.184)	0.308* (0.184)	0.308* (0.184)	0.833*** (0.0350)	0.772*** (0.0476)
Swap_lag4					0.341*** (0.0543)
Observations	180,361	180,361	179,856	179,856	179,856
R-squared	0.663	0.633	0.671	0.688	0.632

**Table B7: Heckman Sample Selection and Poisson Estimator**

	Heckman (1)		PPML
	Regression	Selection	
Distance	-0.735*** (0.0247)	-0.217*** (0.00157)	-0.440*** (0.118)
Border	1.181*** (0.0308)	-0.0174** (0.00863)	1.749*** (0.360)
Colony	3.598*** (0.0913)	0.911*** (0.0120)	0.741*** (0.260)
Island	-1.435*** (0.0466)	-0.408*** (0.00210)	-0.483*** (0.127)
Landl	-1.522*** (0.0539)	-0.482*** (0.00225)	-1.227*** (0.134)
Comlang	-0.395*** (0.0213)	0.156*** (0.00307)	-0.135 (0.211)
RTA	0.0474*** (0.00432)	0.0498*** (0.000370)	0.00661 (0.00743)
Swap	5.972*** (0.679)	6.832 (5,113)	3.413*** (0.512)
TD_Swap	5.149*** (0.310)	1.247*** (0.122)	1.636*** (0.478)
Lambda	0.341** (0.153)		
Comctry			-0.751** (0.315)
Observations	1,526,756	1,526,756	415,446
R-squared	0.522	0.573	0.621

**Table B8: Trade Diversion Effect of Chinas' Bilateral Currency Swap**

	PPML [1]	PPML [2]	PPML [3]	PPML [4]
Exporter Income	0.806*** (0.0241)	0.857*** (0.0198)	0.854*** (0.0174)	0.829*** (0.0163)
ImporterExpen	0.813*** (0.0273)	0.859*** (0.0234)	0.857*** (0.0217)	0.840*** (0.0208)
Distance		-0.834*** (0.0443)	-0.873*** (0.0345)	-0.740*** (0.0300)
Border		0.590*** (0.173)	0.428*** (0.118)	0.411*** (0.105)
Colony		0.590*** (0.0782)	0.182 (0.117)	0.231** (0.102)
Island		0.537*** (0.0776)	0.516*** (0.0779)	0.549*** (0.0748)
Landlocked			-0.348*** (0.0609)	-0.334*** (0.0611)
Common language			0.623*** (0.106)	0.596*** (0.0926)
Common nation			0.0629 (0.483)	-0.0100 (0.500)
Regional				0.484*** (0.0487)
Currency swap				0.649** (0.271)
TD_Swap				0.216 (0.201)
Common Colony		0.595*** (0.203)	0.328 (0.236)	
Constant	-36.43*** (0.988)	-32.72*** (0.873)	-32.31*** (0.830)	-32.35*** (0.778)
Observations	635,137	635,137	635,137	635,137
R-squared	0.522	0.593	0.671	0.726

**Table B9: Structural Gravity Estimate (Sample 1990 – 2017)**

	Pair Fixed Effects	Bilateral Fixed Effects	Pair Fixed Effects	PPML	PPML
Currency swap	0.740*** (0.0969)	1.229** (0.612)	3.078*** (0.269)	0.740** (0.0969)	0.676*** (0.116)
Observations	22,980	22,984	22,984	22,980	22,980
R-squared	0.671	0.619	0.643	0.611	0.622

Standard errors in parentheses

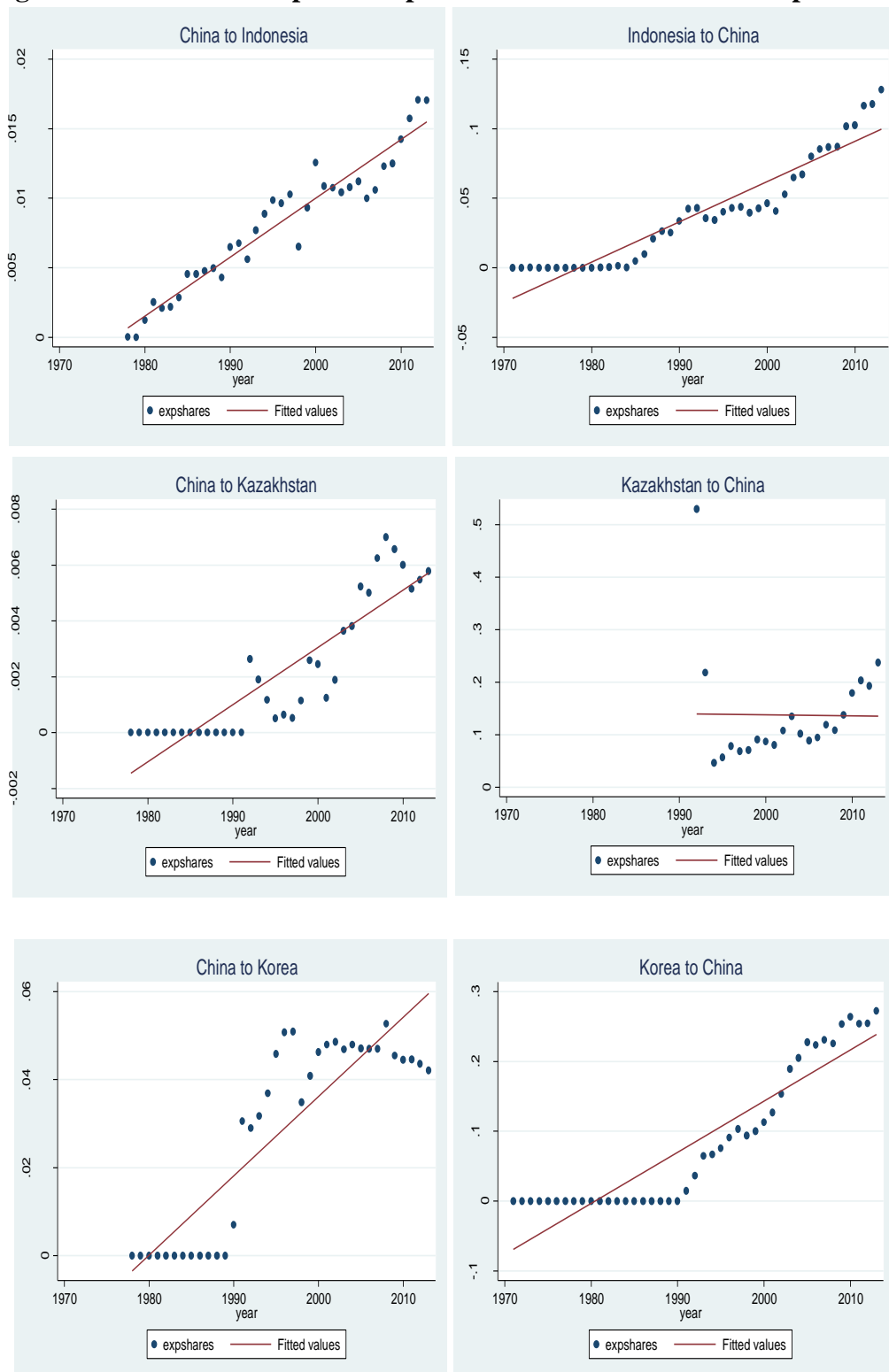
\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

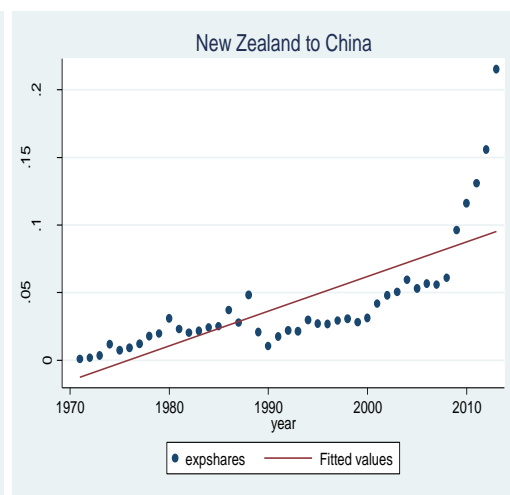
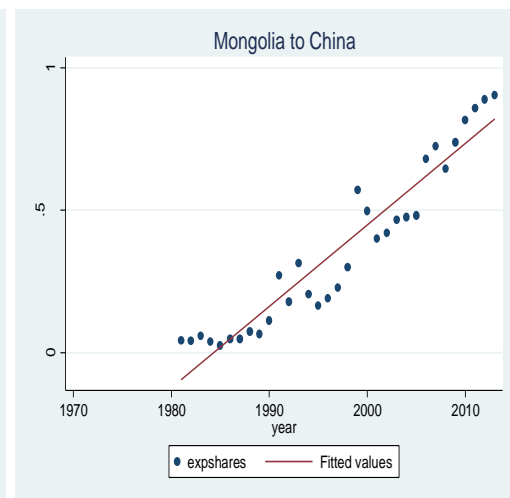
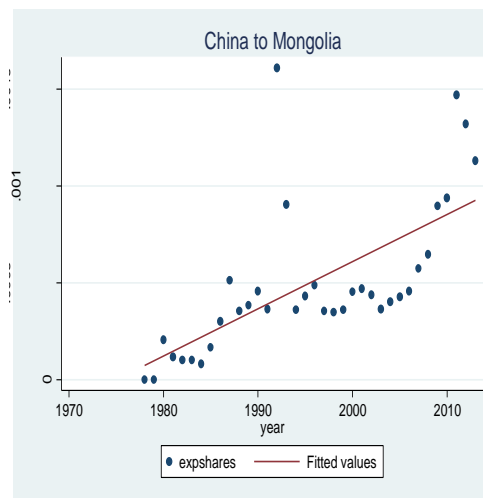
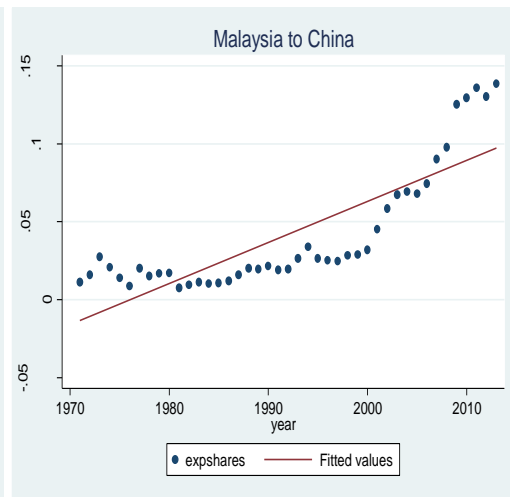
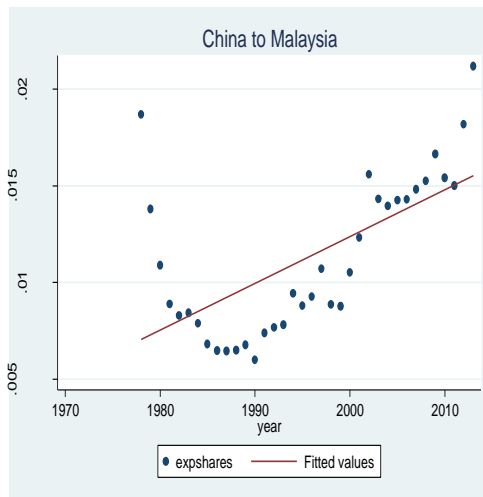
**Table 5: Robustness Check: Structural Gravity Estimates**

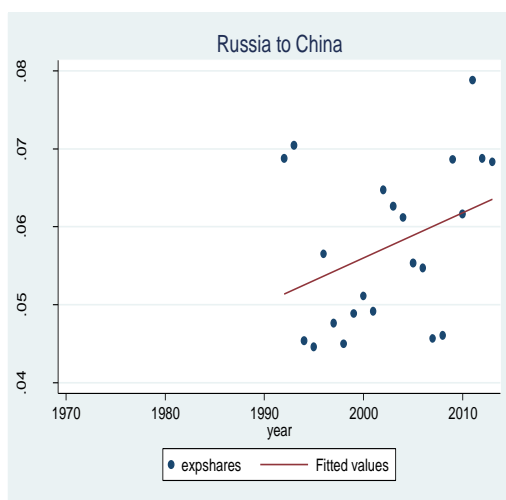
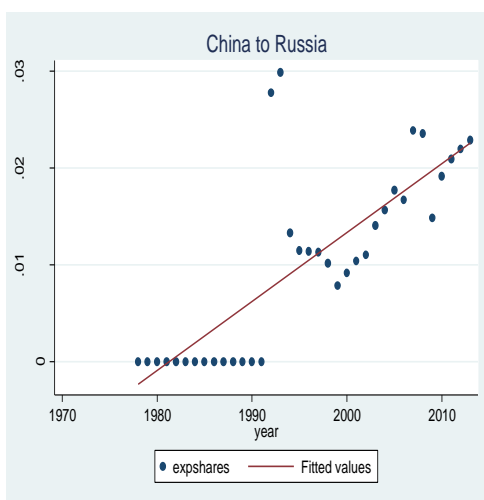
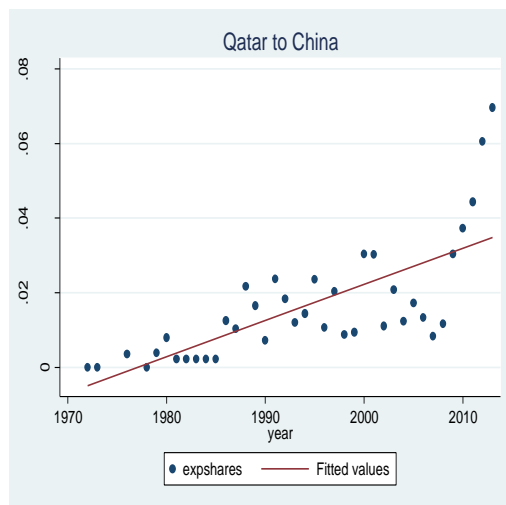
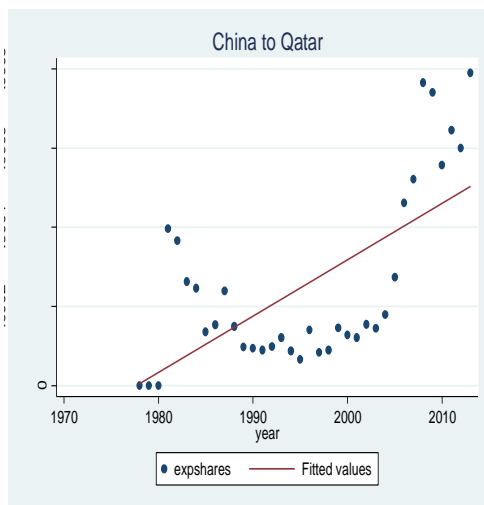
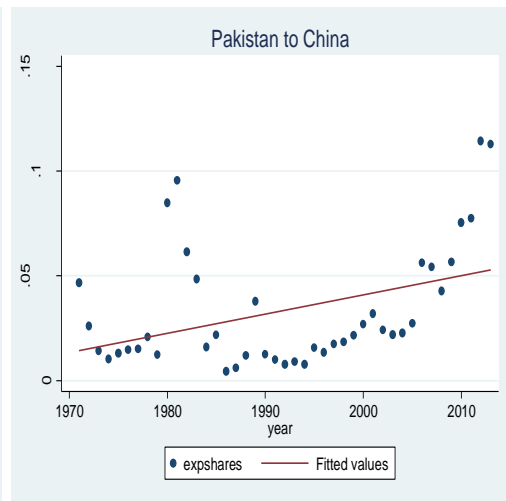
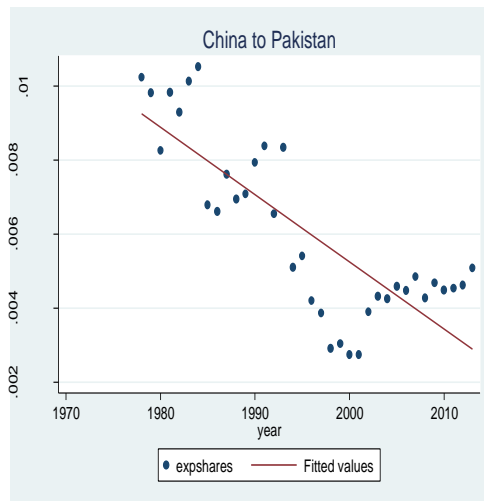
	Time Fixed Effects	Bilateral Fixed Effects	Pair Fixed Effects	PPML Pair Fixed Effects	PPML Pair Fixed Effects
Currency Swap	1.258*** (0.196)	0.986*** (0.196)	0.986*** (0.196)	1.286*** (0.0751)	1.223*** (0.0876)
Currency Swap <sub>t-4</sub>					0.337***
Observations	444,290	444,290	442,584	442,584	442,584
R-squared	0.587	0.653	0.653	0.676	0.664

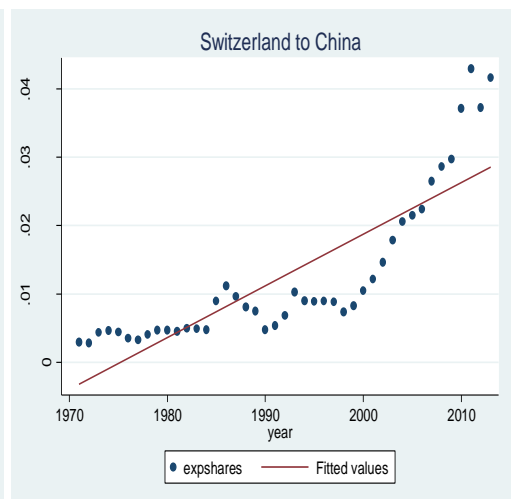
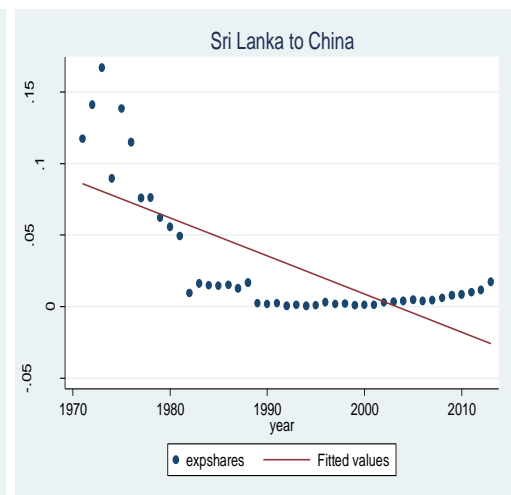
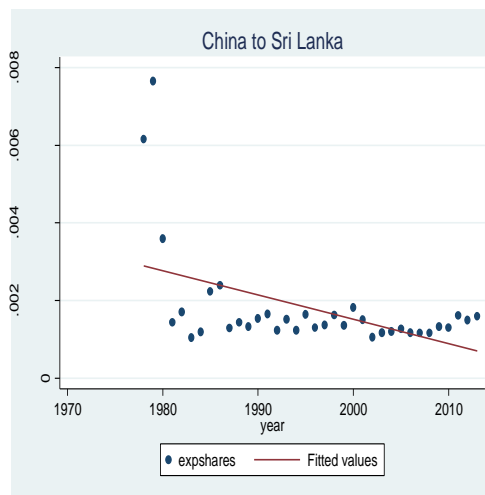
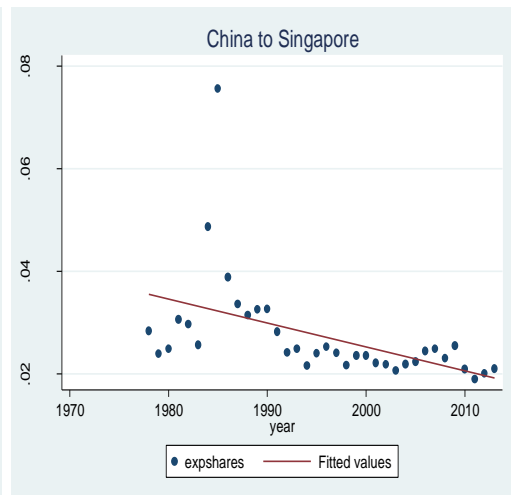
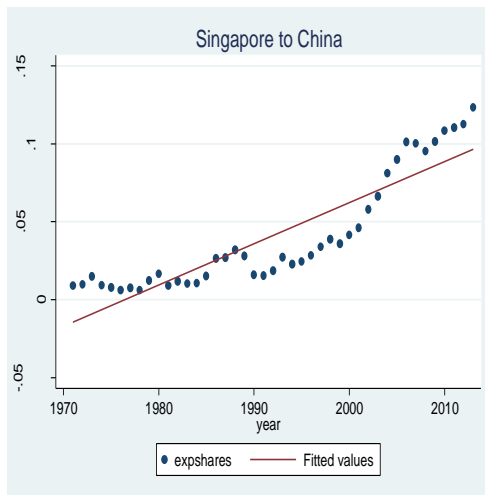
**Figure A**

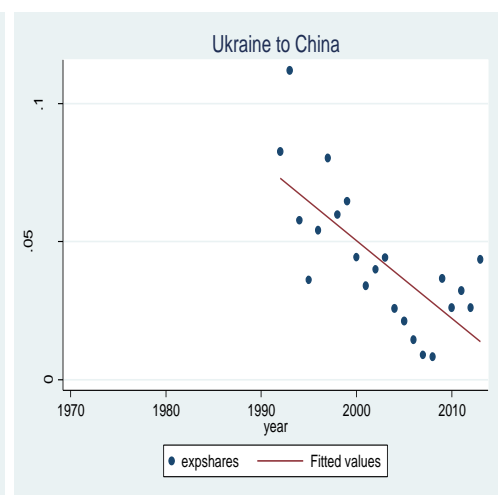
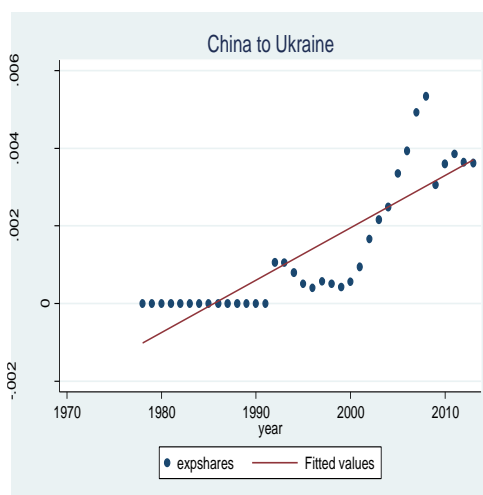
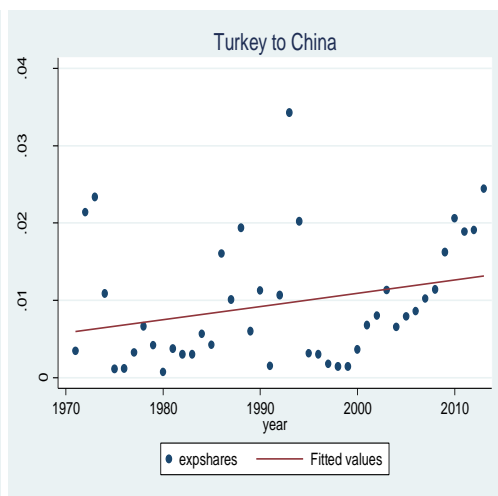
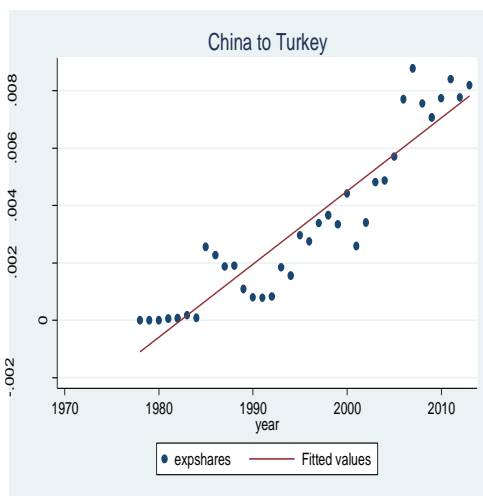
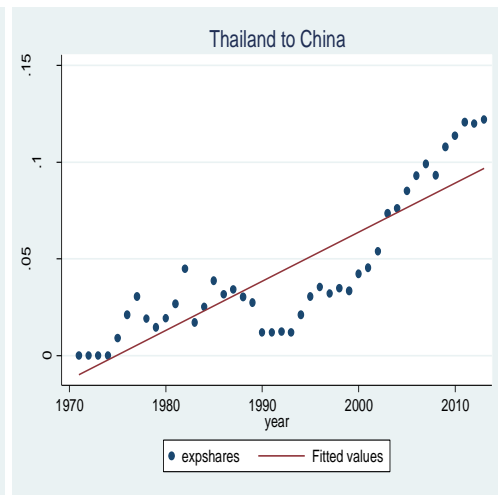
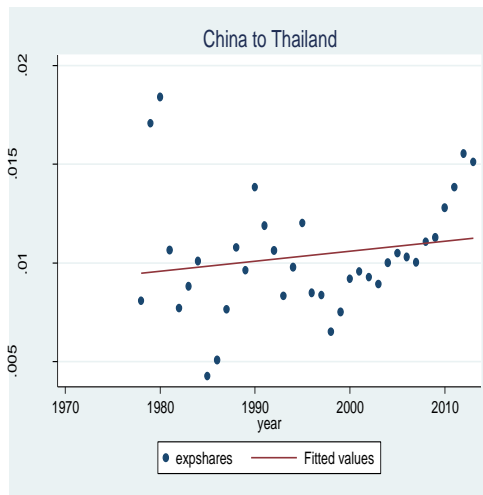
**Figure A1: Mirrow Graphs of Exports Shares for China and Swap Partners**

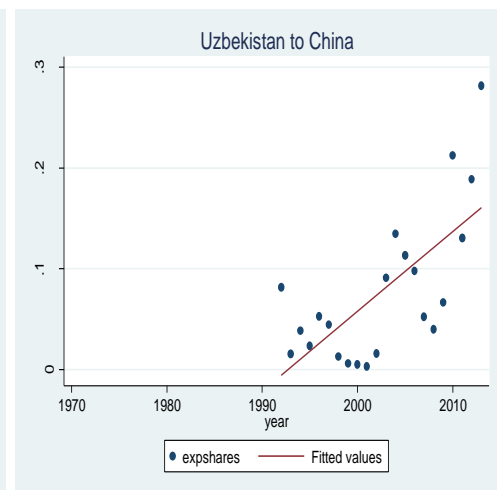
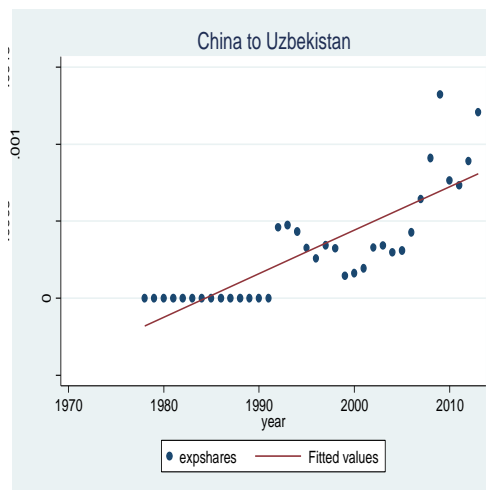
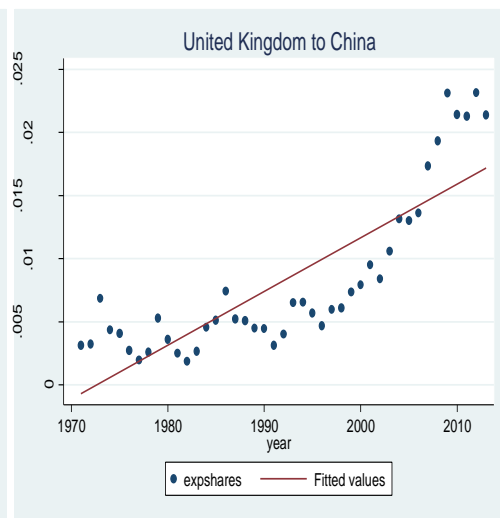
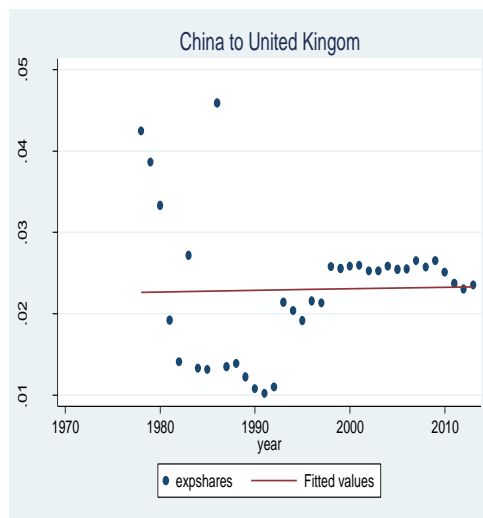
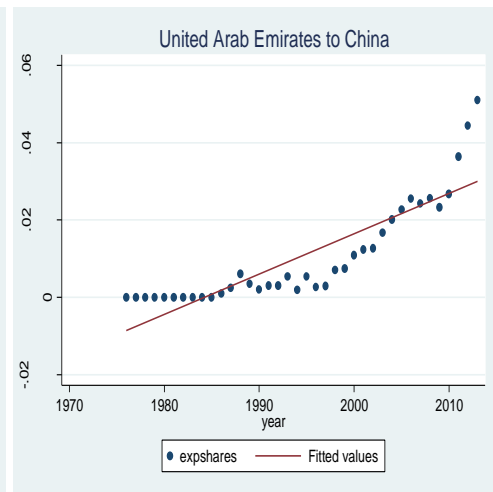
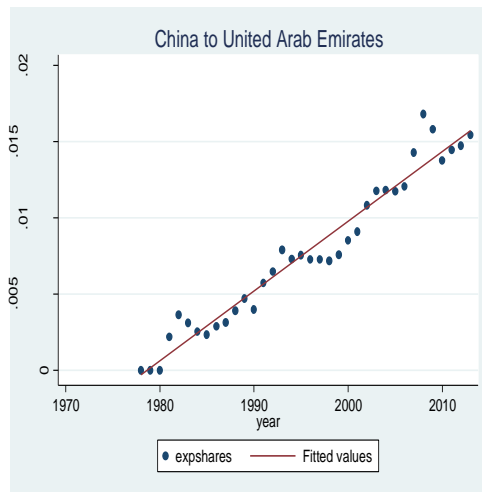




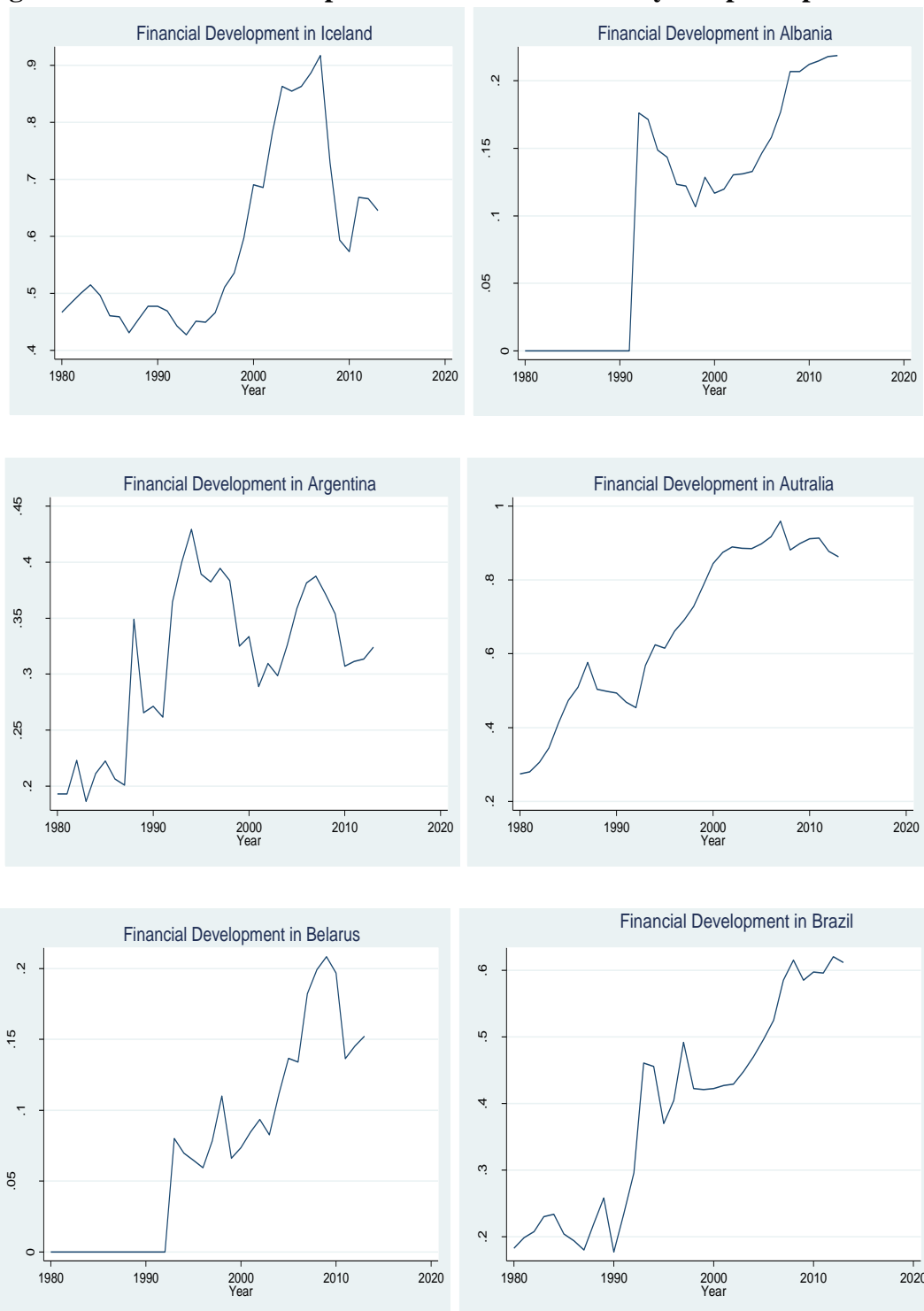


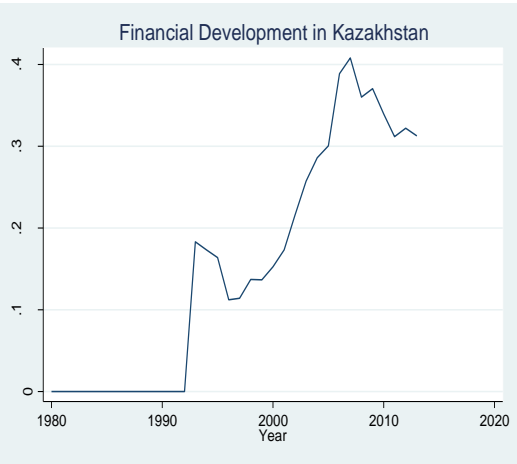
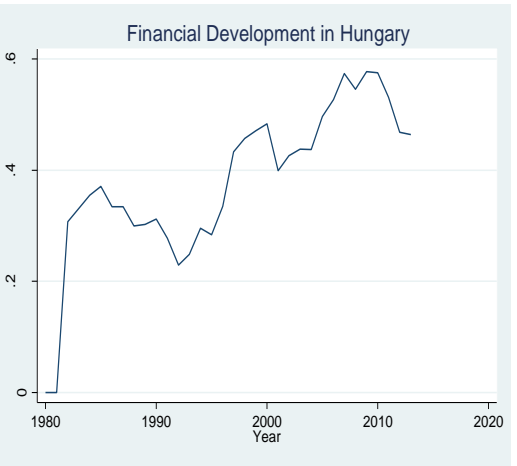
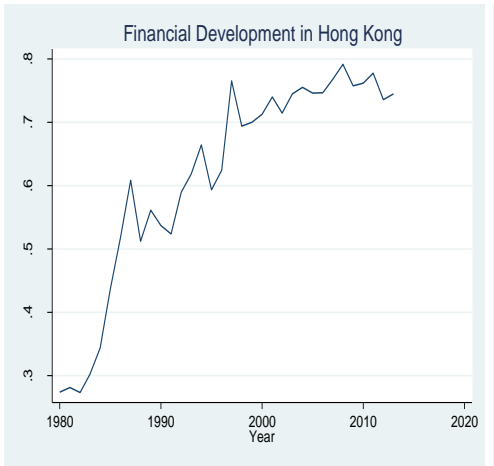
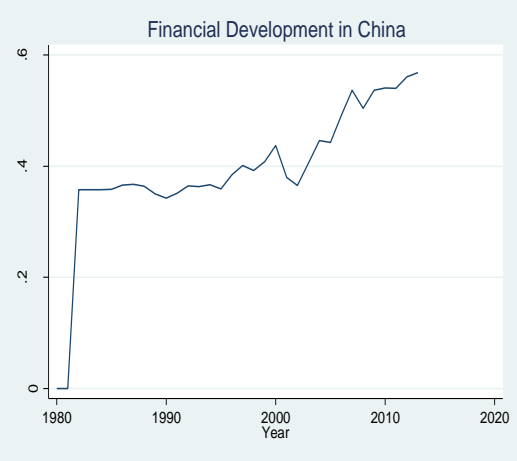
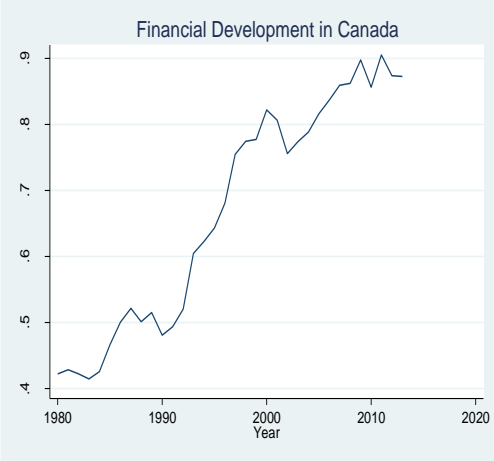


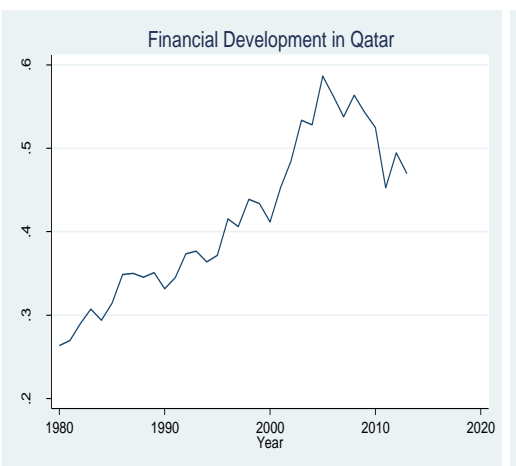
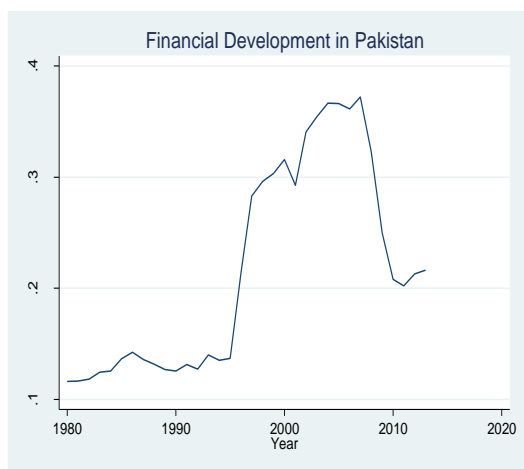
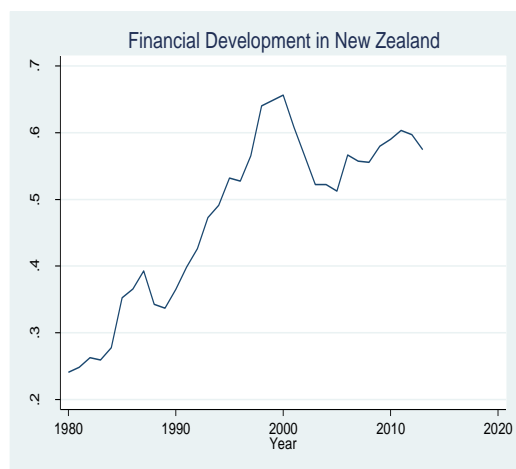
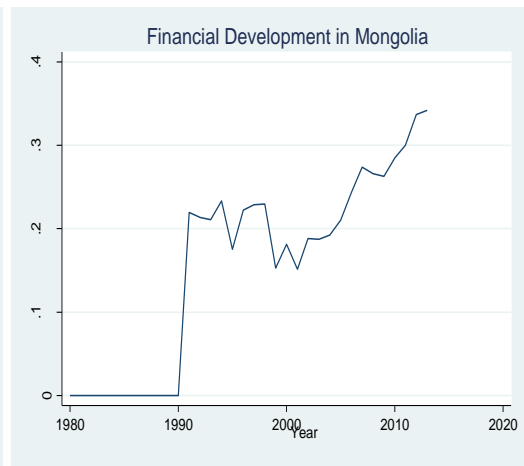
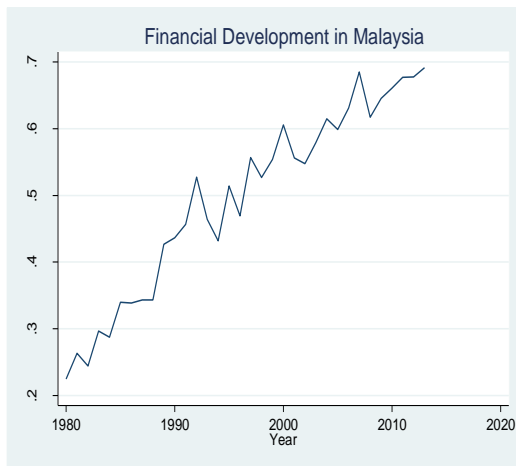


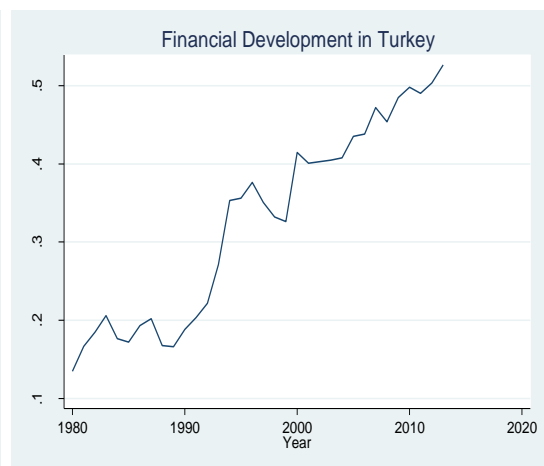
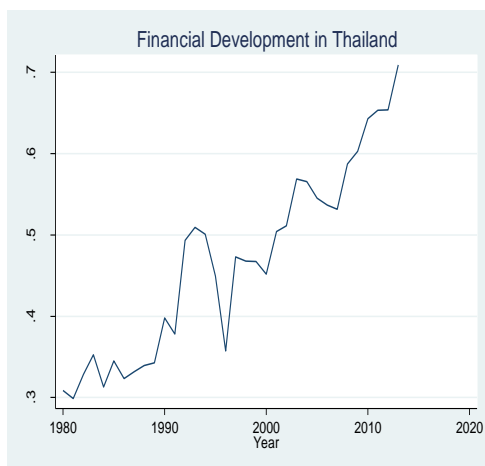
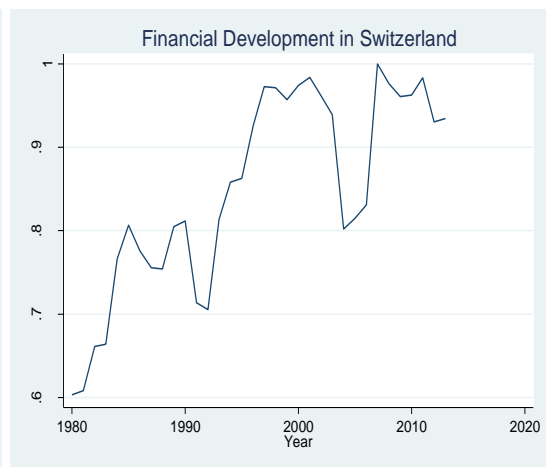
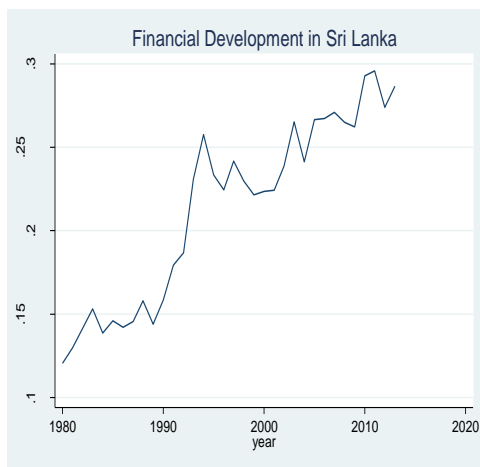
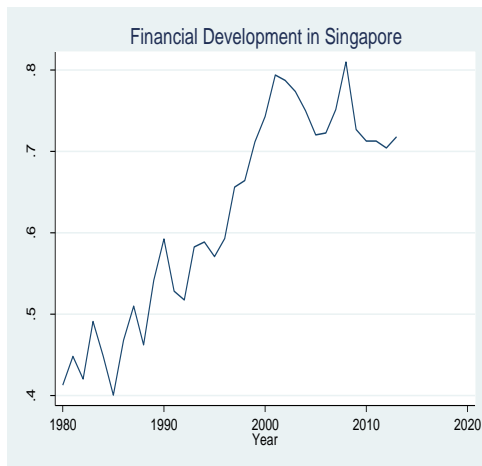


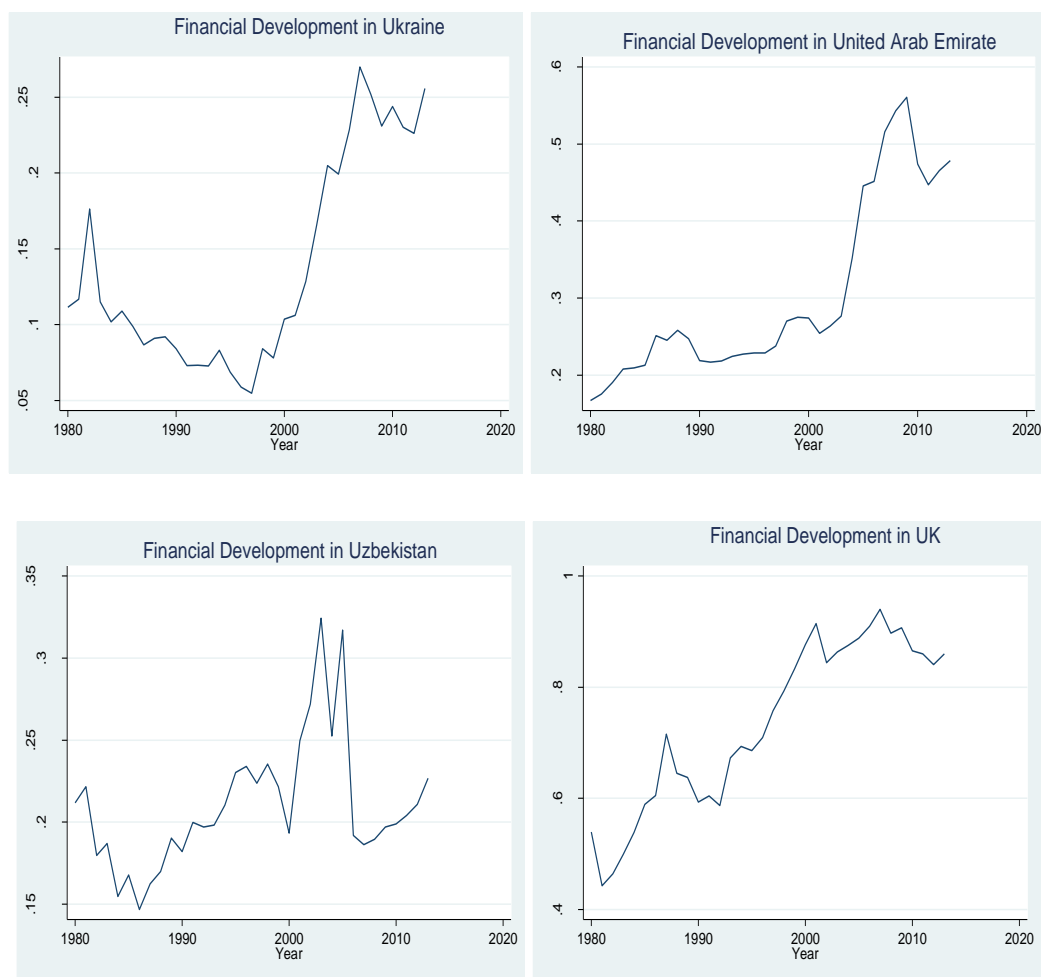
**Figure A2: Financial Development of Bilateral Currency Swap Recipients**





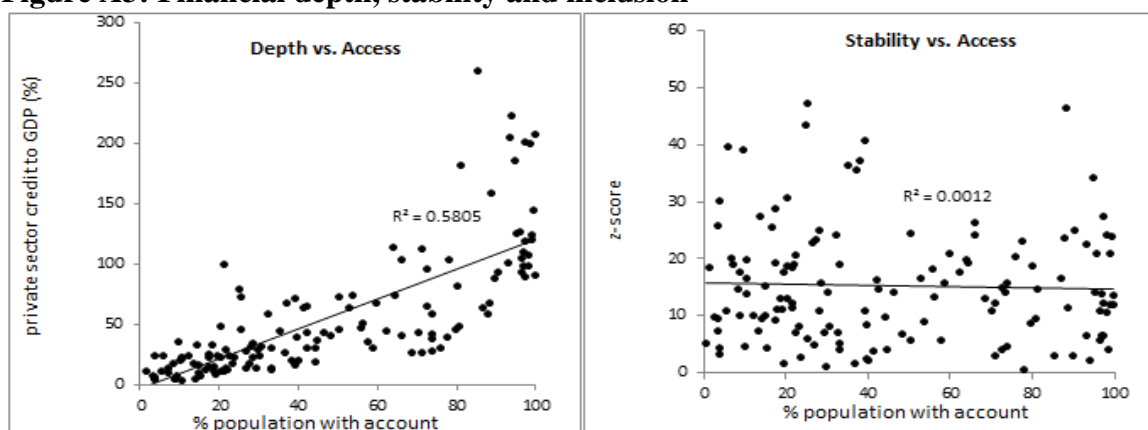






Source: Authors' Computation

**Figure A3: Financial depth, stability and inclusion**



Source: Data from and calculations based on the Global Financial Development Database (<http://www.worldbank.org/financialdevelopment>)

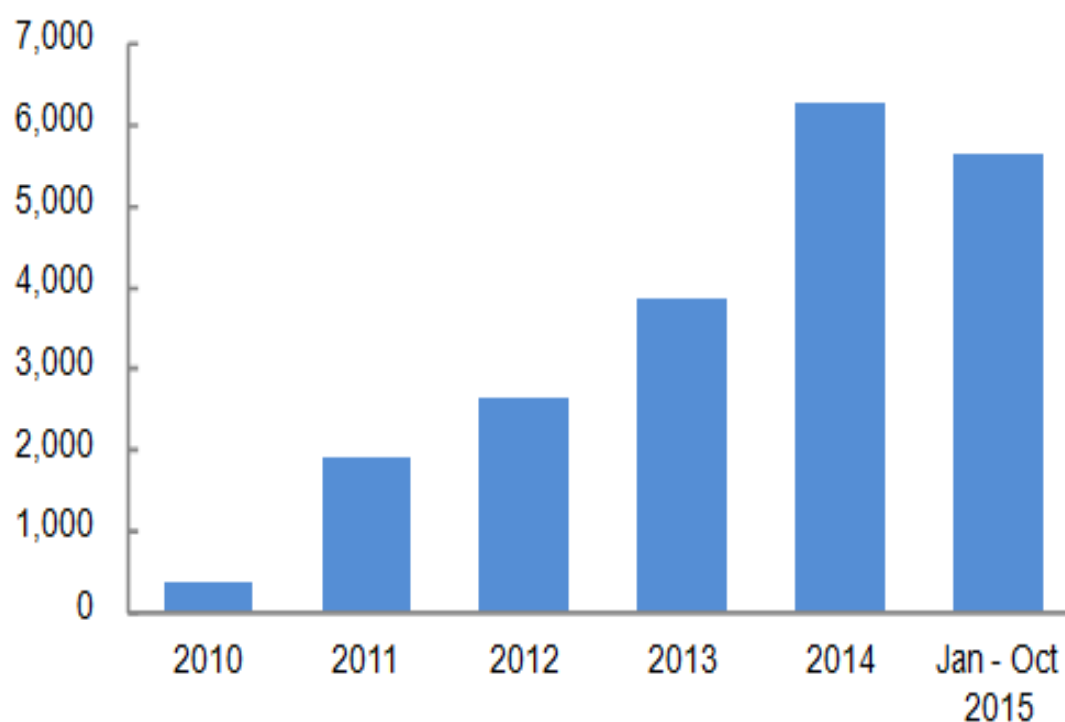
## **Hong Kong the global Offshore Renminbi Business Hub**

### **Renminbi Trade Settlement**

Hong Kong is the global hub for trade settlement in renminbi, serving both local and overseas banks and companies. In the first ten months of 2015, Renminbi trade settlement handled by banks in Hong Kong grew over 10% year on year to RMB 5.7 trillion Yuan. Over the same period some RMB 5.9 trillion yuan of Mainland China's trade was settled in renminbi.

### **Renminbi trade settlement in Hong Kong**

*RMB billion*



## How the renminbi trade settlement scheme works

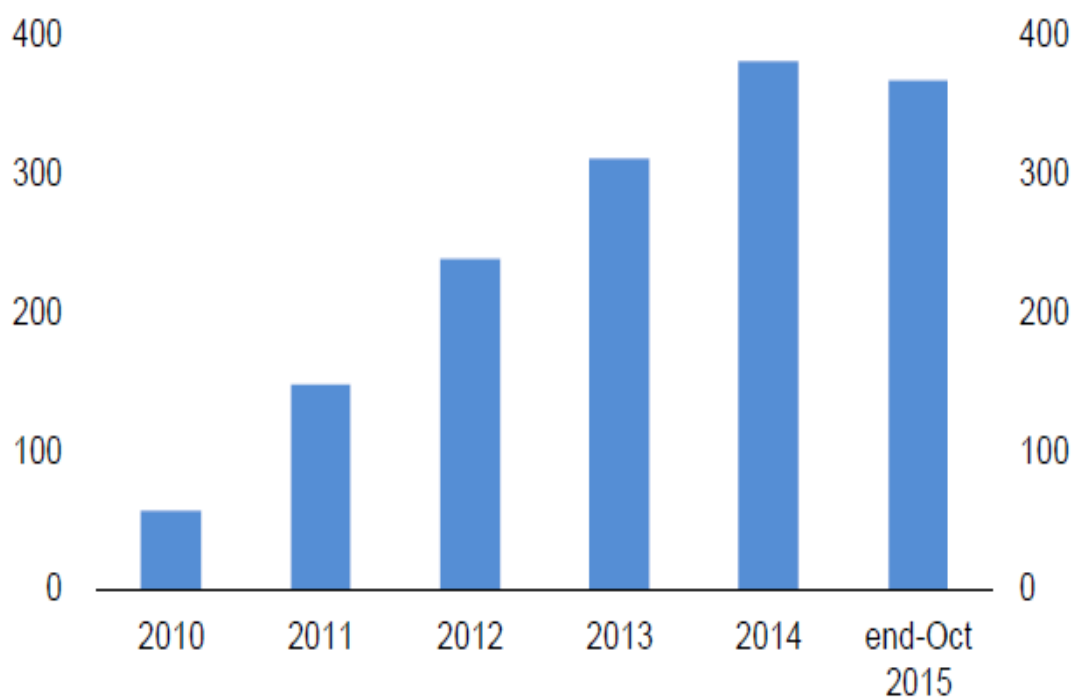
- All trade and other current account transactions between Mainland China and other parts of the world can be settled in Renminbi.
- For purchases of goods from mainland China:
  - An Offshore company can make renminbi payments through a bank in Hong Kong to its trade counterpart in Mainland China.
  - Renminbi can be purchased or Renminbi credit can be obtained from any bank in Hong Kong if needed.
- For sales of goods to Mainland China:
  - An Offshore company can receive renminbi payments through a bank in Hong Kong from its trade counterpart in Mainland China.
  - The Renminbi proceeds can be deposited with a bank in Hong Kong, invested in a wide range of renminbi financial products or converted into other currencies
- At the wholesale level, an offshore bank can convert renminbi with or borrow renminbi from another bank in Hong Kong, the clearing bank in Hong Kong, or a correspondent bank in Mainland China.

## **Global Hub for Renminbi Financing**

The First Offshore Renminbi bond was issued in Hong Kong in 2007. The Renminbi bond market in Hong Kong, or the dim-sum bond market, has since developed steadily and is now the largest outside Mainland China. The Outstanding bonds amounted to RMB367 Billion yuan at end-October 2015.

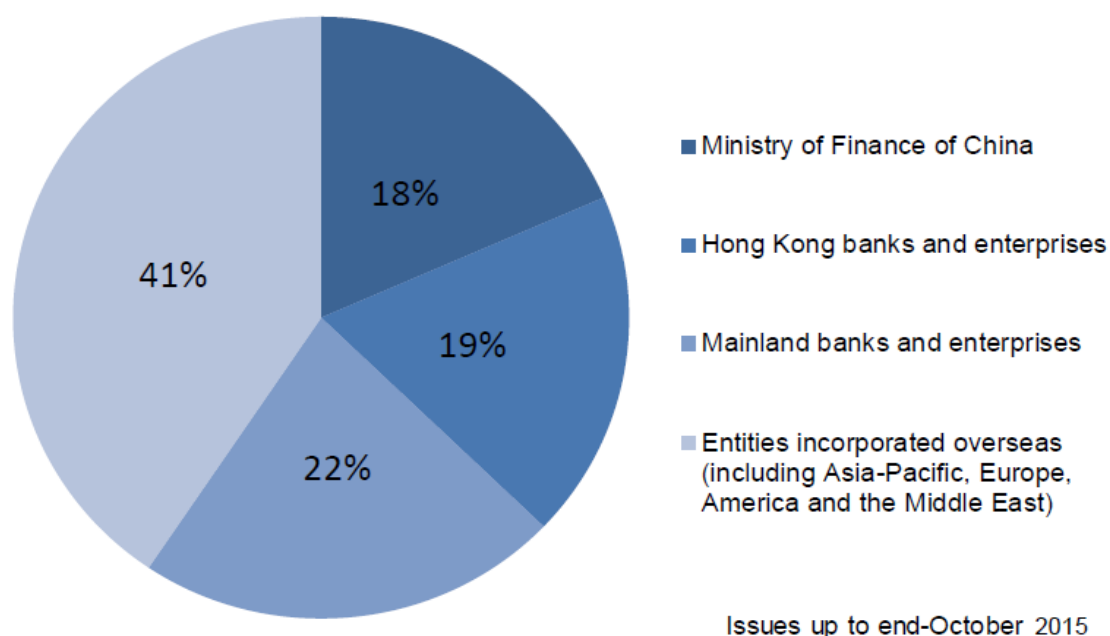
## Renminbi bond Outstanding in Hong Kong

*RMB billion*



Over the years, the range of issuers in the renminbi bond market in Hong Kong has broadened from the sovereign (Ministry of Finance of China) and Bank in Mainland China, to financial institutions and corporates from different parts of the world, as well as corporates from Mainland China starting from 2011. At the same time, the range of investors has widened from institutional and private wealth investors to sovereigns, as well as banks, corporates, and retail investors

## Renminbi bonds in Hong Kong by type of issuer



## How banks and companies benefit of the Renminbi bond market in Hong Kong

Companies	<ul style="list-style-type: none"> <li>• Benefits of raising renminbi funds through a cost-effective platform based on international practices.</li> <li>• Great flexibility in managing renminbi funds raised in the offshore market.</li> <li>• Ideal platform for financing investments in Mainland China (Remittance of proceeds to Mainland China subject to relevant rules and regulations in Mainland China)</li> </ul>
Banks and Financial institutions	<ul style="list-style-type: none"> <li>• New market with a growing base of investors and issuers globally.</li> <li>• New business for origination, distribution, investment and trading services.</li> </ul>

Source: Hong Kong Monetary Authority.

## **Abbreviations**

Financial Institutions Access Index (FIAI)

Financial Institutions Depth Index (FIDI)

Financial Institutions Efficiency Index (FIEI)

Financial Markets Access Index (FMAI)

Financial Markets Depth Index (FMDI)

Financial Markets Efficiency Index (FMEI)

Renminbi (RMB)

Financial Development (FD)

## BIBLIOGRAPHY

- Adam-Muller, A. (2000). Exports and Hedging Exchange Rate Risks: The Multi Country Case. (International Trade). *Journal of Futures Markets*, 20(9), 843.
- Aghion, P., Howitt, P., Mayer-Foulkes, D. (2005). The Effect of Financial Development on Convergence: Theory and Evidence. *Quarterly Journal Economics*, 120 (1), 173–222.
- Agnosteva, Delina E., James E. Anderson, and Yoto V. Yotov. (2014). Intra-National Trade Costs: Measurement and Aggregation. NBER Working Paper No. 19872.
- Aitken, Norman D., (1973). The effect of the EEC and EFTA on European Trade: A Temporal Cross-Section Analysis. *American Economic Review* 5, 881–892.
- Aizenman J., Yothin Jinjarak, & Donghyun P. (2011). International Reserves and Swap Lines: Substitutes or Compliments? *International Review of Economics and Finance*, 20(5), 5-18.
- Aizenman, J., & Lee, J. (2008). Financial versus monetary mercantilism: Long-run View of Large International Reserves Hoarding. *The World Economy*, 31(5), 593.
- Aizenman, J., Yothin Jinjarak, & Huanhuan Zheng (2017). Chinese Outwards Mercantilism – The Art and Practice of Bundling, NBER, WP, 21089.
- Aizenman, Joshua and Gurnain Kaur Pasricha. (2010). Selective Swap Arrangements and the Global Financial Crisis: Analysis and Interpretation. *International Review of Economics & Finance*, 19(3), 353-65.
- Allayannis G, Ihrig J, Weston JP. (2001). Exchange-Rate Hedging: Financial Versus Operational Strategies. *American Economic Review Papers Proc* 91:391–395
- Anderson, J. E., & Van Wincoop, E. (2003). Gravity with Gravitas: A Solution to the Border Puzzle. *American Economic Review*, 93(1), 170–192.
- Anderson, J.E., and Yotov. Yotov. (2011). Terms of Trade and Global Efficiency Effects of Free Trade Agreements, 1990-2002. NBER Working Paper No. 17003.
- Anderson, James E., (1979). A Theoretical Foundation for the Gravity Equation. *American Economic Review* 69 (1), 106–116.
- Antras, P. & Caballero, R. J. (2009). Trade and Capital Flows: A Financial Frictions Perspective. *Journal of Political Economy*, 117(4):701-744.
- Anwar, Y. (2014). Pakistan's Currency Swap Agreement with China. *Enterprise*, 20(10), 11.
- Arcand, Jean-Louis, Enrico Berkes, and Ugo Panizza. (2011). Too Much Finance?, VoxEU.org, 7 April.

- Arize, A. C., Osang, T., & Slottje, D. J. (2008). Exchange-rate volatility in Latin America and Its Impact on Foreign Trade. *International Review of Economics and Finance*, 17(1), 33-44.
- Armington, P. S. (1969) "A Theory of Demand for Products Distinguished by Place of Production", IMF Staff Papers, 16(1)159-177.
- Auboin, M., & Ruta, M. (2013). The Relationship between Exchange Rates and International Trade: A literature review. Cambridge: Cambridge University Press.
- Baier, S. L., & Bergstrand, J. H. (2004). Economic Determinants of Free Trade Agreements. *Journal of International Economics*, 64(1), 29–64.
- Baier, S. L., & Bergstrand, J. H. (2007). Do Free Trade Agreements Actually Increase Members' International Trade? *Journal of International Economics*, 71(1), 72–95.
- Baier, S. L., Bergstrand, J. H., & Vidal, E. (2007). Free Trade Agreements in The Americas: Are the Trade Effects Larger Than Anticipated? *World Economy*, 30(9), 1347-1377.
- Baier, Scott L., Bergstrand, Jeffrey H. (2001). The Growth of World Trade: Tariffs, Transport Costs, and Income Similarity. *Journal of International Economics* 53 (1), 1–27.
- Baldwin, R. (2006). The euro's trade effects. IDEAS Working Paper Series from RePEc,
- Baldwin, R., & Taglioni, D. (2006). Gravity for Dummies and Dummies for Gravity Equations. NBER Working Paper 12516, Cambridge, MA.
- Baltagi, B.H., Demetriades, P.O., Law, S.K., (2009). Financial Development and Openness: Evidence from Panel Data. *Journal of Development Economics*. 89 (2), 285–296.
- Bank for International Settlements. September (2013). Triennial Central Bank Survey of Foreign Exchange Turnover in April 2013: Preliminary Global Results. Monetary and Economic Department.
- Bank of Korea. (2012). Introduction of Korea-China Currency Swap-Financed Trade Settlement Facility. Ministry of Strategy and Finance, the Bank of Korea.
- Barkoulas, J.T., Baum, C.F., Caglayan, M. (2002). Exchange rate effects on the volume and variability of trade flows. *Journal International Money. Finance* 21 (4), 481–496.
- Barro, R., and S. Tenreyro. (2007). Economic Effects of Currency Unions. *Economic Inquiry* 45 (1): 1–23.
- Beck, T. (2002). Financial Development and International Trade: Is There a Link? *Journal. International. Economics*. 57 (1), 107–131.

- Beck, T. and Levine, R. (2004). Stock Markets, Banks, and Growth: Panel Evidence, *Journal of Banking and Finance*, 28, 423–42.
- Beck, T., Demirgüç-Kunt, A., & Levine, R. (2010). Financial Institutions and Markets Across Countries and Over Time: The Updated Financial Development and Structure database. *The World Bank Economic Review*, 24(1), 77–92
- Beck, T., Levine, R., Loayza, N. (2000). Finance and the Sources of Growth. *Journal Financial Economics* 58 (1), 261–300.
- Becker, B. & Greenberg, D. (2007). Financial Development, Fixed Costs and International Trade. *Working Paper*, Harvard Business School.
- Bencivenga, Valerie R., Bruce, D. Smith. (1991). Financial Intermediation and Endogenous Growth, *Review Economic Studies* 58 (2), 195–209.
- Blackburn, K., Bose, N., Capasso, S. (2005). Financial Development, Financing Choice and Economic Growth. *Review of Development Economics*, 9 (2), 135–149.
- Blackburn, K., Hung, V.T.Y. (1998). A Theory of Growth, Financial Development and Trade, *Economica*, 65 (257), 107–124.
- Bowles, P., & Wang, B. (2013). Renminbi Internationalization: A Journey to Where? *Development and Change*, 44(6), 1363–1385.
- Braun, M., Raddatz, C.E. (2005). Trade Liberalization and the Politics of Financial Development. *World Bank Working Paper* 3517.
- Broll U, Wahl JE, Wessel C. (2011). Export, Exchange Rate Risk and Hedging: The Duopoly Case. *German Economic Review* 12:490–502
- Broll, U., & Eckwert, B. (1999). Exchange Rate Volatility and International Trade. *Southern Economic Journal*, 66(1), 178–185.
- Broll, U., Welzel, P., & Wong, K. (2015). Futures Hedging with Basis Risk and Expectation Dependence. *International Review of Economics*, 62(3), 213–221.
- Bun, M. J., and F. J. Klaassen. (2007). The Euro Effect on Trade is Not as Large as Commonly Thought. *Oxford Bulletin of Economics and Statistics* 69 (4): 473–496.31
- Caglayan, M., & Di, J. (2010). Does Real Exchange Rate Volatility Affect Sectoral Trade Flows? *Southern Economic Journal*, 77(2), 313–335.
- Caglayan, M., Dahi, O., & Demir, F. (2013). Trade Flows, Exchange Rate Uncertainty, and Financial Depth: Evidence from 28 Emerging Countries. *Southern Economic Journal*.
- Campanella, Miriam. (2014). The Internationalization of the Renminbi and the rise of a Multipolar Currency System, ECIPE Working paper, No.01/2014

- Campbell, D. L. (2013). Estimating the Impact of Currency Unions on Trade: Solving the Glick and Rose Puzzle. *The World Economy*.
- Cavallo, Eduardo, and Carlos Scartascini (2012). Interest Groups and Government Capabilities Matter for Financial Development, VoxEU.org.
- Chen, H., W. Peng and C. Shu. (2009). Renminbi as an International Currency: Potential and Policy Considerations, Working Paper, 18/2009 (Hong Kong: Hong Kong Institute for Monetary Research).
- Chen, Xiaoli and Yin-Wong Cheung. (2011). Renminbi Going Global. *China & World Economy*, 19(2), 1-18.
- Cheung, Y.- W., Chow, K K and Qin. F. (2017). The RMB Exchange Rate: The Past Present and the Future, World Scientific Publishing Co. Pte Ltd., ISBN 9789814675499.
- Cheung, Y.-W., G. Ma and R. N. McCauley. (2011). ‘Renminbising China’s Foreign Assets.’ *Pacific Economic Review* no. 16: 1–17.
- Chey, H. (2012). Theories of International Currencies and the Future of the World Monetary Order1. *International Studies Review*, 14(1), 51-77.
- Cihák M., Demirgüç-Kunt A., Feyen E. and Levine R. (2012). (Eds.), Benchmarking Financial Systems Around the World. *Washington, D.C., the World Bank*.
- Cihák M., Demirgüç-Kunt A., Feyen E. and Levine R. (2013). Benchmarking Financial Systems around the World, *NBER Working Paper* 18946, National Bureau of Economic Research.
- Clark, P.B. (1973). Uncertainty, Exchange Risk, and the Level of International Trade. *Western Economic Journal* 6, 302–313.
- Cohen, Benjamin J. (2012). The Yuan Tomorrow? Evaluating China’s Currency Internationalization Strategy. *New Political Economy* 17(3):361–371.
- Cui, Y. (2013a). The Internationalization of the RMB: Where does the RMB Currently Stand in the Process of Internationalization. *Asian - Pacific Economic Literature*, 27(2), 68-85.
- Cui, Y. (2013b). How is the RMB Exchange Rate Misaligned? A Recent Application of Behavioral Equilibrium Exchange Rate (BEER) to China. *Journal of East Asian Economic Integration*, 17(3), 281-310.
- Dai, M., Yotov, Y. V., & Zylkin, T. (2014). On the Trade-Diversion Effects of Free Trade Agreements. *Economics Letters*, 122(2), 321-325.
- Darrat, A.F., Elkhail, K., McCallum, B. (2006). Finance and macroeconomic Performance. Some Evidence for Emerging Markets. *Emerging Market Finance and Trade* 42 (3), 5–28.

- David M. (2016). Renminbi SDR Inclusion Boost to Liquidity, focus: Renminbi Swap Network, OMFIF Bulletin.
- Demetriades, P., Andrianova, S. (2004). Finance and Growth: What We Know and What We Need to Know. In: Goodhart, C. (Ed.), *Financial Development and Economic Growth: Explaining the Links*. *Palgrave Macmillan, Basingstoke*, pp. 38–65.
- Demirgüç-Kunt, A., Levine, R. (2009). Finance and inequality: Theory and Evidence. *Policy Research Working Paper Series No. 4967*. The World Bank, Washington DC.
- Destais, C. (2016). Central Bank Currency Swaps and the International Monetary system. *Emerging Markets Finance & Trade*, 52(10), 2253-2266.
- Do, Q.-T., Levchenko, A.A. (2004). Trade and Financial Development. *World Bank Working Paper* 3347.
- Doganlar, M. (2002). Estimating the Impact of Exchange Rate Volatility on Exports: Evidence from Asian Countries. *Applied Economics Letters*, 9(13), 859-863.
- Ductor, L., Grechyna, D. (2015). Financial Development, Real Sector, and Economic Growth. *International Review Economics of Finance*. 37 (3), 393–405.
- Eaton, Jonathan, Kortum, Samuel (2002). Technology, Geography, and Trade. *Econometrica* 70 (5), 1741–1779.
- Egger, Peter, and Sergey Nigai. (2015). Structural Gravity with Dummies Only. CEPR Discussion Paper No. DP10427.
- Eichengreen, B. (2011b). ‘The Renminbi as an International Currency’, *Journal of Policy Modeling*, 33, 5, 723–30.
- Eichengreen, Barry. (2011a). *Exorbitant Privilege: The Rise and fall of the Dollar and the Future of the International Monetary System*. Oxford: Oxford University Press.
- Eichengreen, Barry. (2014). *International Currencies Past, Present and Future: Two Views from Economic History*.
- Eicher, T. S., Henn, C., & Papageorgiou, C. (2012). Trade Creation and Diversion Revisited: Accounting for Model Uncertainty and Natural Trading Partner Effects. *Journal of Applied Econometrics*, 27(2), 296-321.
- Esposito, P. (2017). Trade Creation, Trade Diversion, and Imbalances in the EMU DOI:
- Ethier, W. (1973). International Trade and the Forward Exchange Market. *American Economics Review*. 63,494-503.

- Feenstra, R. C. (2004). *Advanced International Trade: Theory and evidence*. Princeton: Princeton University Press.
- Frankel, J. A. (1997). *Regional Trading Blocs*. Washington: Institute for International Economics.
- Fung, M.K. (2009). Financial Development and Economic Growth: Convergence or Divergence? *Journal International Money Finance*, 28 (1), 56–67.
- Gao, H. and Yu, Y. (2009). Internationalization of the Renminbi, Paper Presented at the Bank for International Settlements/Bank of Korea seminar, Currency Internationalization: Lessons from the Global Financial Crisis and Prospects for the Future in Asia and the Pacific, Seoul, Korea, 19–20 March.
- Germain, R., & Schwartz, H. (2017). The Political Economy of Currency Internationalization: The Case of the RMB. *Review of International Studies*, 43(4), 765-787.
- Ghosh, S., & Yamarik, S. (2004). Are Regional Trading Arrangements Trade Creating? An Application of Extreme Bounds Analysis. *Journal of International Economics*, 63(2), 369–395.
- Glick, R., & Rose, A. K. (2016). Currency Unions and Trade: A Post-EMU Reassessment. *European Economic Review*, 87, 78-91.
- Glick, R., and A. Rose. (2002). Does a Currency Union Affect Trade? The Time-series evidence. *European Economic Review* 6 (6): 1125–1151.
- Goldberg L. S., Kennedy C. & Miu J. (2010.) “Central Bank Dollar Swap Lines and Overseas Dollar Funding Costs”, NBER Working Paper, No 15763, February.
- Goldberg, L. and C. Tille (2008). Vehicle Currency Use in International Trade, *Journal of International Economics*, 76, 2, 177–92.
- Goswami, G., Nam, J., & Shrikhande, M. M. (2004). Why do Global Firms Use Currency Swaps? Theory and Evidence. *Journal of Multinational Financial Management*, 14(4), 315-334.
- Greenwood, J., Jovanovic, B. (1990). Financial Development, Growth, and the Distribution of Income. *Journal Political Economy*, 98 (5), 1076–1107.
- Grier, K. B., & Smallwood, A. D. (2013). Exchange Rate Shocks and Trade: A Multivariate GARCH-M Approach. *Journal of International Money and Finance*, 37, 282-305.
- Guariglia, A., Poncet, S. (2008). Could Financial Distortions be no Impediment to Economic Growth After All? Evidence from China. *Journal Comparative Economics*. 36 (4), 633–657.
- Havránek, T. (2010). Rose Effect and the Euro: Is the Magic Gone? *Review of World Economics* 146 (2): 241–261.

- He, D. (2012). Renminbi Internationalization: A Primer, Hong Kong Institute for Monetary Research, Hong Kong.
- Head, Keith, & Thierry Mayer. (2014). Gravity Equations: Workhorse, Toolkit, and Cookbook. Chapter 3 in the Handbook of International Economics Vol. 4, eds. Gita Gopinath, Elhanan Helpman, and Kenneth S. Rogoff, Elsevier Ltd., Oxford.
- Hondroyannis, G., Lolos, S. and Papapetrou, E. (2005). Financial Markets and Economic Growth in Greece, 1986–1999, *Journal of International Financial Markets, Institutions and Money*, 15, 173–88.
- Huang, Y. & Temple, J. (2005). Does External Trade Promote Financial Development? *Working Paper* 5150, CEPR Discussion Paper.
- Ito, T. (2011). The Internationalization of the RMB: Opportunities and Pitfalls, Maurice R. Greenberg Center for Geo-economic Studies and International Institutions and Global Governance Program, Council on Foreign Relations.
- Ju, J. & Wei, S. (2011). When is Quality of Financial System a Source of Comparative Advantage? *Journal of International Economics*, 84(2):178-187.
- Kamps, A. (2006). The Euro as Invoicing Currency in International Trade, Working Paper 0665 (Frankfurt: European Central Bank).
- Kawai M, Zilcha I. (1986) International Trade with Forward-Futures Markets under Exchange Rate and Price Uncertainty. *Journal International Economics* 20:83–98
- Kenen, P. (2009). Currency Internationalization: An Overview, BIS Papers No. 61.
- Klein, M. W. (2005). Dollarization and Trade. *Journal of International Money and Finance* 24 (6): 935–943.
- Kiendrebeogo, Y. (2012). The Effects of Financial Development on Trade Performance and the Role of Institutions. *IDEAS Working Paper Series from RePEc*,
- Kim, D., Lin, S. C., & Suen, Y. (2010). Are Financial Development and Trade Openness Complements or Substitutes? *Southern Economic Journal*, 76(3), 827-845.
- King, R. G. and Levine, R. (1993). Finance and Growth: Schumpeter Might be Right, *Quarterly Journal of Economics*, 108,717–37.
- Klein, M. W. (2005). Capital Account Liberalization, Institutional Quality and Economic Growth: Theory and Evidence. *Working Paper* 11112, NBER.
- Klein, M. W., and J. C. Shambaugh. (2006). Fixed Exchange Rates and Trade. *Journal of international Economics* 70 (2): 359–383.

- Krugman, P. (1984). The International Role of the Dollar: Theory and Prospect, in J. Bilson and R. Marston (eds.), *Exchange Rate Theory and Practice* (Chicago, IL: University of Chicago Press), 261–78.
- Kwon, E. (2015). China's Monetary Power: Internationalization of the Renminbi. *Pacific Focus*, 30(1), 78-102.
- Lai, E. L., & Yu, X. (2015). Invoicing Currency in International Trade: An Empirical Investigation and Some Implications for the Renminbi. *The World Economy*, 38(1), 193-229.
- Lai, E. L.-C. and J. Zhou. (2012). The Emergence of a Major Invoicing Currency, Working Paper (Hong Kong: Hong Kong University of Science and Technology).
- Lane, P. R., & Shambaugh, J. C. (2010). Financial Exchange Rates and International Currency Exposures. *The American Economic Review*, 100(1), 518-540.
- Levine, R. (1997). Financial Development and Economic Growth: Views and Agenda. *Journal Economic Literature*. 35 (2), 688–726.
- Levine, R. (2003). More on Finance and Growth: More Finance More Growth? *Federal Reserve Bank of St. Louis Review*. 85 (4), 31–46.
- Levine, R. (2004). Finance and Growth: Theory and Evidence. *NBER Working Paper*No: 10766
- Levine, R. and Zervos, S. (1998). Stock Markets, Banks and Economic Growth, *American Economic Review*, 88,537–58.
- Li, B. (2013), The Prospect of Renminbi Pricing in Cross-Border Trade, *China Finance*, 2013, 23, 47–48.
- Liao, S., & McDowell, D. (2015). Redback Rising: China's Bilateral Swap Agreements and Renminbi Internationalization. *International Studies Quarterly*, 59(3), 401-422.
- Lin, Z., Zhan, W., & Cheung, Y. (2016). China's Bilateral Currency Swap Lines. *China & World Economy*, 24(6), 19-42.
- Linnemann, Hans, (1966). *An Econometric Study of International Trade Flows*. North-Holland, Amsterdam.
- Loayza, Norman V., and Romain Ranciere. (2006). Financial Development, Financial Fragility, and Growth. *Journal of Money, Credit and Banking*, 38:1051-76.
- Love H and Chen C. (2015). Chinese Renminbi Internationalization: Guide to Present Developments, international services, Pnc.com/Go China.
- Lucia O. (2016). Internationalization of the Chinese Currency: Towards a Multipolar International Monetary System? *Rocnik*.

- Magee, C. S. (2003). Endogenous Preferential Trade Agreements: An Empirical Analysis. *Contributions to Economic Analysis & Policy*, 2(1).
- Magee, C. S. P. (2008). New Measures of Trade Creation and Trade Diversion. *Journal of International Economics*, 75(2), 349-362.
- Manova, K. (2006). Credit Constraints, Heterogeneous Firms, and International Trade. *Working Paper*, Harvard University.
- Matsuyama, K. (2005). Credit Market Imperfection and Patterns of International Trade and Capital Flows. *Journal of the European Economic Association*, 3(2-3):714-723.
- Matsuyama, K., N. Kiyotaki and A. Matsui (1993). Toward a Theory of International Currency', *Review of Economic Studies*, 60, 2, 283–307.
- McCauley Robert. (2011). Renminbi Internationalization and China's Financial Development. Bank for International Settlements.
- Mcguire, P., & Von Peter, G. (2012). The dollar shortage in global banking and the international policy response. *International Finance*, 15(2), 155-178.
- McKenzie, M.D. (1999). The Impact of Exchange Rate Volatility on International Trade Flows. *Journal. Economic. Survey*. 13/1, 71–106.
- Menyah, K., Nazlioglu, S., & Wolde-Rufael, Y. (2014). Financial Development, Trade Openness and Economic Growth in African Countries: New insights from a Panel Causality Approach. *Economic Modelling*, 37, 386-394.
- Mishkin, F.S. (2009). Globalization and Financial Development. *Journal of Development. Economics*. 89 (2), 164–169.
- Niroomand, F., Hajilee, M., & Al Nasser, O. (2014). Financial Market Development and Trade Openness: Evidence from Emerging Economies. *Applied Economics*, 46(13), 1490.
- Nitsch, V. (2005). Currency union entries and trade. 2005/9. Diskussionsbeiträge Des Fachbereichs Wirtschaftswissenschaft Der FreienUniversität Berlin.
- Obstfeld, M., Shambaugh, J. C., & Taylor, A. M. (2009). Financial Instability, Reserves, and Central Bank Swap Lines in the Panic of 2008. *The American Economic Review*, 99(2), 480-486.
- Olivero, MaríaPía, and Yoto Yotov. (2012). Dynamic Gravity: Endogenous Country Size and Asset Accumulation. *Canadian Journal of Economics*, 45(1): 64–92.
- Park, Y. (2010). RMB Internationalization and its Implications for Financial and Monetary Cooperation in East Asia, *China & World Economy*, 18(2):1–21.

- Rajan, R.G., Zingales, L. (2003). The Great Reversals: The Politics of Financial Development in the Twentieth Century. *Journal. Financial Economics* 69 (1), 5–50.
- Rey, H. (2001). International Trade and Currency Exchange, *Review of Economic Studies*, 68, 2,443–64.
- Rose, A. (2001). Currency Unions and Trade: The Effect is large. *Economic Policy*, (33), 449-461.
- Rose, A. K., & Spiegel, M. M. (2012). Dollar Illiquidity and Central Bank Swap Arrangements during the Global Financial Crisis. *Journal of International Economics*, 88(2), 326-340.
- Roubini, Nouriel. (2009). The Almighty Renminbi? The New York Times, May 13. Available at [http://www.nytimes.com/2009/05/14/opinion/14Roubini.html?\\_r=0](http://www.nytimes.com/2009/05/14/opinion/14Roubini.html?_r=0)
- Rousseau, P. and Wachtel, P. (2000). Equity Markets and Growth: Cross Country Evidence on Timing and Outcomes, *Journal of Banking and Finance*, 24, 1933–57.
- Ruan V. (2013). “People’s Bank of China in Swap Deal with European Central Bank”, *South China Morning Post*, Friday, 11 October.
- Sapir, Andre. (1981). Trade Benefits Under the EEC Generalized System of Preferences. *European Economic Review* 15,339–355.
- Silva, J., & Tenreyro, S. (2006). The Log of Gravity. *Review of Economics and Statistics*, 88(4), 641-658.
- Song, Z., Stores Letten, K., & Zilibotti, F. (2009). Growing Like China. IDEAS Working Paper Series from RePEc.
- Subramanian, A. and Kessler, M. (2012). The Renminbi Bloc is Here: Asia Down, rest of the World to go? Peterson Institute for International Economics (PIIE) Working Papers No. 12–19.
- Svaleryd, H. & Vlachos, J. (2005). Financial Markets, the Pattern of Industrial Specialization and Comparative Advantage: Evidence from OECD Countries. *European Economic Review*, 49(1):113-144.
- Svirydenka, K. (2016). Introducing A New Broad-based Index of Financial Development, *IMF Working paper*, WP/16/5
- Tenreyro, S. (2007). On the Trade Impact of Nominal Exchange Rate Volatility, *Journal of Development Economics*, 82(2), 485-508.
- Thom, R., and B. Walsh. (2002). The Effect of a Currency Union on Trade: Lessons from the Irish Experience. *European Economic Review* 46 (6): 1111–1123.

- Tinbergen, Jan. (1962). *Shaping the World Economy*. The Twentieth Century Fund, New York.
- Trefler, Daniel. (1993). Trade liberalization and the theory of Endogenous Protection: An Econometric Study of U.S. import policy. *Journal of Political Economy* 101 (1), 138–160.
- Vallee, S. (2012). *The Internationalization Path of the Renminbi*, Bruegel Working Paper No. 2012/05.
- Viaene, J., & de Vries, C. G. (1992). International Trade and Exchange Rate Volatility. *European Economic Review*, 36(6), 1311-1321.
- Viner, J., (1950). *The Customs Union Issue*. Carnegie Endowment for International Peace, New York.
- Wei, S. (1999). Currency Hedging and Goods Trade. *European Economic Review*, 43(7), 1371-1394.
- Wilson, W. T. (2015). *Washington, China, and the Rise of the Renminbi: Are the Dollar's Days as the Global Reserve Currency Numbered?* The Heritage Foundation, Special Report, No. 171.
- Wong, K. P. (2003). Export Flexibility and Currency Hedging. *International Economic Review*, 44(4), 1295-1312.
- Wooldridge, J. M. (2003). *Introductory Econometrics: A Modern Approach* (2nd Ed.). Cincinnati, OH: Southwestern College Publishing.
- Wooldridge, Jeffrey M. (2002). *Econometric Analysis of Cross-Section and Panel Data*. MIT Press, Cambridge, MA.
- World Bank (2012). *Global Financial Development Report 2013: Rethinking the Role of the State in Finance*, *World Bank, Washington DC*.
- Yang, J., & Han, L. (2013). Optimal Size of Currency Swap between Central Banks: Evidence from China. *Applied Economics Letters*, 20(3), 203-207.
- Yotov, V. Yoto, & Roberto, P, Jose-Antonio M, & Mario Larch. (2016). *An Advanced Guide to Trade Policy Analysis: The Structural Gravity Model*, World Trade Organization.
- Yu, Y. (2012). *Revisiting the Internationalization of the Yuan*, ADBI Working Paper Series No. 366.

