

Essays on China's Exchange Rate Regime and RMB Internationalization

中国の為替制度と人民元の国際化に関する研究

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Exchange rate policy has played a crucial role in the process of China's rapid economic development over the past several decades. Chinese authorities launched the reform of RMB exchange rate regime since July 2005 when the new exchange rate policy was announced. More recently, especially after the Global Financial Crisis of 2007-2008, China's accelerated the exchange rate regime reform and the process of the renminbi (RMB) internationalization. Considering China's rapid economic growth and increasing weight in the world trading system as well as the ongoing global financial system reform triggered by the recent financial crisis, a deeply understanding of China's exchange rate regime and RMB internationalization is increasingly important not only for China, but also for the rest of the world.

This thesis aims to do comprehensive studies on China's exchange rate regime as well as the internationalization of the RMB by conducting empirical studies and policy analysis. There are several research questions about the RMB exchange rate regime and RMB internationalization we attempt to explore: Firstly, we need to understand China's current exchange rate policy and the level of RMB exchange rate. Since the new exchange rate policy which is a managed floating exchange rate regime based on market supply and demand with reference to a basket of currencies was announced by the People's Bank of China (PBoC) in July 2005, the scepticism about if China truly pegged the RMB to a currency basket attracted extensively debates. In addition, it is widely believed that the RMB was significantly undervalued. But recent drastic RMB revaluation implies that we need to find the latest evidence on how much the RMB is misaligned. Secondly, RMB revaluation is likely to impact negatively on China's export industry which is still relatively vulnerable to fluctuations of the RMB exchange rate. We need to find how China's international competitiveness changed compared with ASEAN countries which are regarded as China's competitors in manufacturing sector, when the RMB is being revaluated. Thirdly, in addition to above empirical studies, we believe that policy implication of exchange rate reform of other East Asian countries is valuable for China's ongoing exchange rate regime reform. Their experiences and lessons are important to study. Lastly, China is committed to internationalizing the RMB as a part of its financial system reform. How to promote RMB internationalization under the background of East Asian regional integration will be studied in this research. Also, we will forecast the share of the RMB as a reserve currency in the global monetary system to measure the potential of the RMB as an international currency in the coming decades.

We employ the currency basket inference model developed by Frankel and Wei (1994) to examine the RMB's currency basket:

$$\log RMB(t+s) - \log RMB(t) = c + \sum w(j) [\log X(j,t+s) - \log X(j,t)] \quad (1)$$

where w is weight of each component currency. We employ the latest data to find the new evidence that how the RMB is pegging to its currency basket and what China's current real exchange rate regime.

There are five major models which could be used to measure a currency's "equilibrium" real exchange rate: the relative purchasing power parity (PPP) approach, the absolute PPP approach, the unit labour costs (ULCs) deflated exchange rate approach, the fundamental equilibrium exchange rate (FEER) approach and the behavioural equilibrium exchange rate (BEER) approach. Based on the China's economic features, we employ the BEER approach (Clark and Macdonald, 1998) and the latest monthly data to examine RMB equilibrium real exchange rate in order to assess RMB misalignment.

$$BEER = F(BSE, ToT, OPENNESS, FR, FDI) \quad (2)$$

where **BSE** is Balassa-Samuelson effect, **ToT** is terms of trade, **OPENNESS** is foreign trade ratio to GDP, **FR** is foreign reserve ratio to GDP, **FDI** is foreign directive investment ratio to GDP.

Under the background of RMB revaluation and rising wages, China's international competitiveness seems to weaken compared with ASEAN countries. The unit labour costs (ULCs) is becoming a more important indicator to measure country's international competitiveness. In this part, we compare the competitiveness between China and ASEAN countries in term of ULCs so as to find if China lost its competitive advantage when the RMB is being revaluated:

$$ULCs = W/y = wL/y \quad (3)$$

where w is average wages, L is the number of employees and y is real GDP.

Apart from empirical studies, policy comparison analysis is also an important part in this research. We review Japan, Korea and Taiwan's experiences on exchange rate reform and draw lessons for China. As an important part of China's financial reform, RMB internationalization has attracted extensively discussion after China accelerated to internationalize the RMB. To differ with previous studies, we analyse RMB internationalization from the perspective of East Asian regional integration. A new determinant of international currency will be tested.

The main findings can be summarized as follows: Firstly, the RMB is in a transitional period shifting from a single currency peg to a currency basket peg regime except for the period of financial crisis. Weight of the US dollar is still the largest in RMB basket, but its importance decreased steadily. Secondly, the RMB has approached its equilibrium level. The RMB was even slightly overvalued in 2012. Thirdly, China lost its international competitiveness compared with ASEAN countries because of RMB appreciation and wages rising. However, some regions of China are still more competitive than ASEAN countries because the ULCs in northeast and northwest China are lower than these in ASEAN countries. Fourthly, based on Japan, Korea and Taiwan's experience on exchange rate regime reform, gradualism approach is better than one-off approach. Follow-up easing monetary and expanding fiscal policies are needed, but timing and scale of policy are equally crucial. Exchange rate regime reform should be seen as an integral component of broad financial system reform. Policies for the long-term economic structure adjustments and industry upgrading need to be prepared. Lastly, China has achieved significant progress in promoting RMB internationalization since 2009, although numerous challenges need to be overcome. East Asia's regional integration lays a broad foundation for China to internationalize the RMB. In turn, an internationalized RMB will play more important role in the process of East Asian regionalization in economic and financial aspects. Therefore, China's authority should promote RMB internationalization not only under framework of China's financial system reform, but also integrate it with the process of East Asian economic and financial integration. The RMB could become an international currency comparable to the US dollar and the euro by 2025, if China removes controls on its capital account and the RMB becomes a fully convertible currency. The chapters of the thesis are organized as follows:

1. Introduction
2. RMB EX Regime: Currency Basket Peg VS. US Dollar Peg
3. RMB "Equilibrium" Real Exchange Rate
4. RMB Revaluation and China's International Competitiveness
5. Lessons Learnt From Japan, Korea and Taiwan's EX regime reform
6. RMB Internationalization
7. Concluding Remarks

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Chapter 1: Introduction

1.1 General Background

Since the Reform and Opening-up policy was introduced at the end of the 1970s, China has achieved remarkable economic growth. China's exchange rate policy, in particular, has played a crucial role in the process of its economic development. Since July 2005, when a new exchange rate policy was announced by the People's Bank of China (henceforth, the PBoC), Chinese authorities began the renminbi (also called yuan, henceforth, the RMB) exchange rate regime reform by shifting from a single currency peg (the US dollar) to a basket of currencies peg. More recently, in June 2010, in the aftermath of the Global Financial Crisis in 2007-2008, China reaffirmed that it will continue the exchange rate regime reform and improve the flexibility of RMB exchange rate. In the meantime, China has accelerated the internationalization of the RMB by introducing a number of bold and concrete measures to promote its status on the world stage. Considering China's rapid economic growth and increasing weight in the world trading system as well as the ongoing global financial system reform triggered by the recent financial crisis, an in-depth understanding of China's exchange rate regime and RMB internationalization is becoming increasingly important, not only for China but also for the rest of the world.

The recent global financial crisis caused deep concerns about a "Currency War"¹ in which countries would competitively devalue their currencies in order to maintain export competitiveness. Among the intensive discussions surrounding exchange rate policies in the economic and political circles of the world, China's RMB and its exchange rate policy are at the centre. After the managed floating exchange rate regime was introduced by the PBoC in July 2005, the RMB exchange rate still demonstrated a notable trend of co-moving with the US dollar, although this trend has seemed to taper over the last several years. Also, the composition of RMB's currency basket remains unclear. The international community still doubts if China has actually adopted a currency basket peg regime and to what extent that China is implementing this exchange rate policy.

The level of the RMB exchange rate is a further issue. The majority of literature on the RMB exchange rate has concluded that the RMB is undervalued by a broad range of misalignment. But there is no consensus on how much the RMB is misaligned mainly because of various problems in statistics and economic methodologies. More importantly, the latest statistics illustrate that the RMB has substantially appreciated in both nominal and real terms since July 2005; although this revaluation process was disrupted by the global financial crisis when the RMB was re-pegged to the US dollar for two years from mid-2008 to mid-2010. Since the second half of 2010, the RMB proceeded to appreciate, implying that the RMB misalignment needs to be carefully re-assessed. Recently, some argue that the RMB is approaching its equilibrium exchange rate and is no longer undervalued². On the other hand,

¹ The Brazilian Finance Minister initially warned of a "Currency War" in September 2010 when the global financial crisis was spreading across the world by saying that "we are in the midst of an international currency war" and "this threatens us because it takes away our competitiveness".

² The Deputy Governor of the People's Bank of China, Gang Yi, said: "the RMB exchange rate is close to

however, others believe that the RMB is still undervalued based on their empirical results.

It appears that Chinese authorities are willing to revalue the RMB and reform the current RMB exchange rate regime. The question is how should China revalue its currency? There are two options suggested by economists: the one-off approach and the gradualism approach. It seems that the latter is now being applied by the PBoC. Each of these approaches has its own advantages and disadvantages. Reducing the RMB misalignment through smoothly approaching its equilibrium exchange rate is crucial for China to reform its exchange rate regime so that China can avoid adverse impacts on its exports and economic growth. Therefore, it is very important for China to adopt an appropriate approach to reform its exchange rate regime.

The RMB's appreciation, along with drastic changes in China's labour market in recent years, evoked deep concerns as to whether China could continue to grow by relying heavily on traditional manufacturing goods exports which are sensitive to volatility in the RMB exchange rate. It seems that China lost its international competitiveness relative to East Asian countries, in particular ASEAN countries, when the RMB was being revaluated rapidly and the wages of Chinese workers rose substantially. It is reported that foreign-invested firms based in China and Chinese firms themselves have begun to move out of China and have relocated in other Southeast Asian countries with cheaper labor and lower costs. As evidence for this, China's overseas direct investment (ODI) increased considerably from US\$ 2.7 billion in 2002 to US\$ 74.65 billion in 2011.³ However, China's notable regional disparity needs to be considered when we assess China's international competitiveness relative to other countries. Over the past several decades, all regions of China have developed significantly, but with different growth rates. The level of economic development in some regions is similar to levels in developed ASEAN countries, such as Malaysia and Thailand, while some regions of China are comparable to Vietnam and Indonesia in terms of their level of economic development. Such notable regional disparity could lead to regional competitiveness disparity. Thus, the decline of China's international competitiveness at a national level caused by RMB appreciation does not necessarily mean that every region of China is not competitive. China's regional disparity should not be neglected when we assess the effect of RMB revaluation on China's international competitiveness.

One attractive development in the financial system of China is the internationalization of the RMB. With China's increasing weight in the world economy and in the global trading system, Chinese authorities have taken a number of concrete steps to promote the status of the RMB since 2009. As the currency of the second largest economy and the largest exporting country in the world, the RMB is expected to become another international currency comparable to the US dollar and the euro. It should take some roles in the global financial system such as being a settlement and denomination currency, an anchor currency for East Asian currencies and an international reserve currency in decades. Over the last four years, the world has witnessed that striking progress has been made in the process of RMB internationalization. Since 2009, numerous measures were introduced by Chinese authorities to raise the status of the RMB in the world. These include the Pilot Program of RMB Settlement of Cross-Border Trade Transactions, the RMB-denominated bonds (Dim Sum

its equilibrium level. There is no obvious undervaluation in the RMB" in a media interview in May 2012. A former member of the Monetary Policy Committee of the People's Bank of China, Daokui Li, expressed a similar opinion on the RMB exchange rate that the RMB is approaching its equilibrium exchange rate.

³ See the 2011 Statistical Bulletin of China's Outward Foreign Direct Investment from the Ministry of Commerce of the People's Republic of China.

bonds) issuance in Hong Kong, the RMB Qualified Foreign Institutional Investor (RQFII) scheme, the RMB-denominated Outward Direct Investment (ODI) scheme, the RMB-Denominated Foreign Direct Investment (FDI) scheme, and so forth. In addition, by September 2013, China had signed 23 bilateral currency swap agreements with other economies and an increasing amount of RMB assets are being held by other central banks as a part of their foreign reserves. Although significant progress has been made over the past four years, Chinese authorities still face many challenges in transforming the RMB into an international currency as it is still in the very early stages of the process of internationalization. Judging by international criteria, the RMB is still far from being an international currency, or even an Asian regional currency. Historical experience and reality tell us that the process of RMB internationalization will not be a smooth journey.

In contrast with the experience of existing international currencies like the US dollar and the euro, the internationalization of the RMB is being pushed forward under the background of deepening regional integration in East Asia. East Asian countries have achieved outstanding progress in regional economic and financial integration since the Asian financial crisis of 1997. The recent global financial crisis highlighted the importance of coordination in economic and financial policies for East Asian countries. In the next decade, the RMB is expected to become another regional currency, if not an international currency, that will help promote further East Asian regional integration. Therefore, RMB internationalization needs to be analyzed from the perspective of deepening East Asian regional integration. In addition, the recent global financial crisis exposed structural and systematic faults in the current global financial system. The reform of the global financial system that is being discussed at G20 meetings may provide China with a golden chance to push forward RMB internationalization.

China's exchange rate regime reform and RMB internationalization are challenging tasks which need to be considered systematically and comprehensively. This is not only because they are correlated with other parts of China's financial system reform such as interest rate regime reform and capital account liberalization, but also because the current global economy is still under uncertainty caused by the recent global financial crisis. In addition, as mentioned above, the RMB exchange rate regime and the level of the RMB are experiencing drastic adjustments. The RMB's use as a settlement and denomination currency is also increasing rapidly. Such drastic changes in RMB exchange rate regime reform and the process of RMB internationalization are an opportunity and challenge for China. Therefore, it is meaningful to study China's exchange rate regime and RMB internationalization in a systematic and comprehensive way under the current circumstances.

1.2 Research Objectives

This thesis aims to do a comprehensive study on China's exchange rate regime as well as the internationalization of the RMB by conducting empirical studies and policy comparison analysis. To do so, there are several research objectives we attempt to fulfil in this study. Firstly, we would like to update our understanding on the recent development in the RMB exchange rate regime and the level of the RMB exchange rate. Secondly, we attempt to come up with an appropriate strategy of RMB exchange rate regime reform to avoid the disruptive impact on China's economy. Thirdly, under the background of rapid RMB appreciation, we expect to draw policy implications to the adjustment of economic development model of China. Fourthly, we attempt to provide a new perspective: East Asian regional integration, to analyse the RMB regionalization and internationalization. Lastly, a new determinant of

international currency will be examined. Also, we would like to forecast the status of the RMB as an international currency in the global monetary system in the coming decades. In addition, the relationship between the volatility of RMB exchange rate and RMB internationalization is expected to be identified.

1.3 Research Questions and Expected Outputs

To achieve above objectives, several questions about China's exchange rate regime and the level of the RMB exchange rate as well as RMB internationalization need to be addressed in this thesis. These issues tightly interact with each other and need to be studied one by one so that we could understand China's exchange rate regime and RMB internationalization more deeply.

The first question is what China's current exchange rate regime is. It is still controversial that if the PBoC truly pegged the RMB to a basket of currencies since July 2005. In addition, the reference currencies involved and their weights in the RMB's currency basket remained unclear. However, we should note that this is a dynamic process in which the PBoC could adjust the extent that the RMB pegged to its currency basket. According to previous studies, the weight of each component currency in RMB basket might have been changed. We attempt to find the latest evidence that if the RMB is pegged to a single currency (used to be the US dollar) or a basket of currencies. If the RMB pegged to a basket of currencies, we would like to know how much weight is allocated to each of reference currencies. We pay more attention on recent years, especially after June 2010 when the PBoC reaffirmed to proceed to reform the RMB exchange rate regime and the RMB continued to be revaluated. This period has not been covered by previous studies.

The following question is about the level of the RMB exchange rate. By employing various methodologies, the majority of the empirical literature concluded that the RMB was undervalued by a broad range from 3 to 67 per cent (Zhang 2000, Couder and Couharde 2005, Cline and William 2005, 2007, 2008, 2010 and Cheung *et al.* 2010), although a few papers argued that RMB was overvalued. It is worthwhile to investigate how the RMB misaligned from its equilibrium exchange rate by employing the up-to-date data. It is notable that the RMB continued to appreciate in both nominal term and real terms since mid-2010. Is the RMB approaching its equilibrium level after being revaluated considerably? What degree is the RMB exchange rate deviation if it is still misaligned? We attempt to find the latest evidence to answer these questions.

The evidence has shown that the RMB has appreciated considerably since 2005, although it is gradually. Intuitively, currency appreciation could hurt country's international competitiveness, thereby impairing its exports and economic growth, in particular for the export-oriented economies. Recently, it appeared that China's long-lasting international competitiveness which has significantly contributed to its economic miracle over the past several decades is vanishing mainly because of RMB appreciation. Thus, the next questions are how RMB revaluation has impacted on China's international competitiveness and what Chinese authorities could do to counter the disruptive impact on its economy? In particular, is China still competitive compared with Southeast Asian countries that compete with China in traditional manufacturing sectors? How could China prolong the period of economic growth against the background of RMB revaluation and wage rising? These questions are significant for reforming the RMB exchange rate regime and avoiding the dramatic impact on China's

economy.

However, the empirical studies on the RMB exchange rate regime could only unveil a part of the myth of the RMB exchange rate. Apart from that, to answer the question whether it is the *one-off* revaluation approach or the *gradualism* revaluation approach China should adopt, we need to study other countries' experiences of exchange rate regime reform and draw lessons for China. It could provide us with another perspective to make valuable policy implications for China's ongoing exchange rate regime reform. Thus, the question we would like to address is what lessons China could learn from other countries' experiences of exchange rate reform, particularly the East Asian countries which share the similar economic development model to China.

How to internationalize the RMB is another research question in this thesis. Chinn and Frankel (2005) and Li and Liu (2008) argue that currency appreciation and the volatility of exchange rate significantly affect the use of international currency as an international reserve currency. Also, RMB internationalization tightly interacts with China's exchange rate regime reform. An internationalized RMB requires that the RMB becomes a full convertible currency with a more flexible exchange rate regime. In turn, a flexible and market-driven RMB exchange rate regime would provide foreign investors with transparency and confidence in holding and using the RMB, thereby raising the RMB's status in the global financial system. In addition, a fully convertible RMB would expand the RMB's use in the cross-border trade and financial transactions, thereby promoting RMB internationalization. Therefore, after studying the RMB exchange rate regime, we expect to establish an appropriate roadmap for RMB internationalization. To differ from previous studies, we analyse the strategy of RMB internationalization from the perspective of deepening East Asian regional integration. Also, we are interested in the RMB's potential as an international currency in the coming decades. So we will forecast the share of the RMB as an international reserve currency in the global monetary system in the future. Last but not least, we will examine a new determinant of international currency—the Global Competitiveness Index to find out how the country's international competitiveness influences the currency internationalization.

1.4 Theoretical Frameworks

- (1) Frankel (1993) and Frankel and Wei (1994, 1995 and 2007) developed an economic model to examine the basket of currencies to which one currency could peg. This currency weight inference model, which regresses the change in the log value of target currency's exchange rate against the changes in the log value of component currencies' exchange rates in currency basket, was applied by Shah *et al.* (2005), Eichengreen (2006), Yamazaki (2006), and Frankel and Wei (2006, 2007) to assess the RMB's currency basket. Frankel and Wei (2008) and Frankel (2009) re-examined the dynamics of currency basket of the RMB by applying this model. We will employ Frankel and Wei (2007)'s model to examine the currency basket of the RMB with particular focus on the period of after June 2010 when the RMB continued to appreciate.
- (2) There are five main methodologies which could be used to measure one currency's equilibrium exchange rate: the relative purchasing power parity (PPP) approach, the absolute PPP approach, the unit labour costs (ULCs) deflated exchange rate approach, the fundamental equilibrium exchange rate (FEER) approach and the behavioural equilibrium exchange rate (BEER) approach. The FEER and BEER are widely accepted and have

been used to examine various currencies (Cheung *et al.*, 2010). Based on the China's economic characteristics, we will employ the BEER approach (Clark and Macdonald, 1997) and the up-to-date monthly data to examine the RMB's equilibrium exchange rate so that we could assess how much RMB is misaligned from its equilibrium level over the period. Also, to obtain more accurate results, we add a new explanatory variable as an economic fundamental into the BEER model based on the characteristics of the Chinese economy. The findings in previous studies using other methodologies will be compared with our results. It is important to make a comparison between the findings derived from different methodologies in order to obtain a robust estimation of RMB misalignment.

- (3) Comparison of international competitiveness needs a comprehensive measure because the international competitiveness is a complicated concept which covers many aspects of competitiveness of a country. There are some indicators which shed lights on some aspects of international competitiveness, such as the GDP deflator, the real effective exchange rate (REER), the average costs, the productivity and so forth. In this thesis, we pay more attention on the comparison of the unit labour costs (ULCs) between China and ASEAN countries to assess China's competitiveness. The ULCs is becoming an increasingly important indicator to measure one country's international competitiveness because the ULC assesses whether the wage evolves in line with the productivity. The ULCs is defined as the average costs of labour per unit of output. In other words, the ULCs is the ratio of total labour compensation to real GDP. The real ULCs, which is nominal ULCs deflated by CPI or GDP deflator, is the wage share in the total output. However, we should note that the ULCs is not a comprehensive measure of international competitiveness, but an assessment of cost competitiveness. By comparison of ULCs, we could assess China's international competitiveness compared to other countries. In addition, we will make a policy implication for China's adjustment of economic development model under the background of RMB revaluation.
- (4) Comparison analysis of exchange rate policies is also an important part of this thesis. Undoubtedly, other countries' experiences of exchange rate regime reform are important and valuable for China to learn. The experience of the Japanese yen after signing the Plaza Accord in 1985 is a good example to study. It is still an open question whether Japan's economic recession in the 1990s was mainly caused by a balance sheet recession which was induced by excessive fluctuations of the yen exchange rate. The experiences of exchange rate reform in Korea and Taiwan in the 1990s, regarded as relatively smooth exchange rate regime reforms, also deserve studying carefully. Compared with Japan's exchange rate regime reform in the 1980s, Korea and Taiwan seemed to be more successful in reforming their exchange rate regimes by shifting from the US dollar peg regime to a free floating exchange rate regime without generating excessive economic fluctuation. We pay particular attentions on the economic background, the exchange rate and monetary policies applied and the corresponding consequence in these three economies over the period. In addition, policy implications and suggestions for China reforming its exchange rate regime will be provided.
- (5) Chinn and Frankel (2005) empirically examined the euro's potential as the next leading international currency. Based on previous literature, they summarize that determinants of international currency include the patterns of output and trade, financial markets, confidence in the value of the currency and network externalities. Since 2009 when Chinese authorities accelerated the process of RMB internationalization, the RMB as a potential international currency has received increasing discussions. Some studied the

potential of the RMB as an international currency (Chen and Peng 2007, Chong and Hui 2011 and Lee 2013). To extend previous studies, based on Chinn and Frankel (2005)'s model, we will examine a new determining factor of international currency and forecast the share of the RMB as an international reserve currency in the global reserve holdings in the coming decades.

1.5 Possible Contributions

In this thesis, we attempt to extend previous studies on China's exchange rate regime and RMB internationalization in several dimensions as follows:

- (1) More deeply and thoroughly understanding China's exchange rate regime and RMB internationalization: by conducting empirical studies and policy comparison analysis, we cover the several issues surrounding China's exchange rate regime and RMB internationalization including the currency basket of the RMB, the RMB equilibrium exchange rate and RMB misalignment, China's international competitiveness under the background of RMB revaluation, the experiences and lessons on exchange rate regime reform from Japan, Korea and Taiwan, the strategy of RMB internationalization and the potential of the RMB as an international reserve currency in the coming decades.
- (2) Applying upgraded the BEER model by using monthly data and referring to a larger country basis to find more detailed information on the degree of RMB misalignment: the more accurate and detailed results could be obtained by using monthly data than yearly or quarterly data used in previous studies. In addition, a new explanatory variable which is FDI inflows could help improve the accuracy of results.
- (3) The first attempt of studying China's international competitiveness in term of ULCs at both national and regional levels: to our knowledge, the comparison of international competitiveness between China's regions and ASEAN countries has not been done in the previous studies. We find that some regions of China are still more competitive than some ASEAN countries, although China as a whole lost the competitiveness advantage relative to these countries at a national level. The widely accepted argument that traditional manufacturing sector should move from China to South East Asian countries because of RMB appreciation and increasing labour costs in China may be wrong. China could still develop the manufacturing sector by transferring labour-intensive sectors from the coastal regions to the inland of China. A domestic Flying Geese formation could be formed due to regional competitiveness disparity. These findings could contribute to making a proper policy about how to prolong the period of China's economic growth under the background of RMB revaluation and wage rising.
- (4) RMB internationalization: in contrast with previous studies on RMB internationalization which mainly focus on China's domestic demands and preconditions, in this thesis, we analyse RMB internationalization from a regional perspective, in particular, how to promote RMB internationalization under the background of deepening regional economic and financial integration in East Asia. It could provide us with a new perspective to establish an appropriate strategy of RMB internationalization in order to create a win-win situation between China and East Asian countries.
- (5) Forecasting the share of the RMB as an international reserve currency: to extend previous studies on RMB internationalization, we consider country's international competitiveness

as a determining factor which plays an important role in determining if a national currency could be used internationally. We argue that the currency from the more economically and politically competitive country, the more likely this currency is to become an international currency. However, the competitiveness is a complex concept which includes many factors from economic to political factors. In this thesis, we apply the Global Competitiveness Index (GCI) from the World Economic Forum (WEF) as an explanatory variable in Chinn and Frankel (2005)'s model. To our knowledge, this is the first attempt to include the international competitiveness into empirical study on currency internationalization.

1.6 Structure of Thesis

The remainder of this thesis is organized as follows. In Chapter 2, the evolutionary history of the RMB exchange rate regime from 1949 to 2013 is briefly reviewed. We then empirically examine the currency basket of the RMB. It is followed by the assessment of RMB's equilibrium exchange rate and the degree of RMB misalignment in Chapter 3. We assess China's international competitiveness relative to ASEAN countries in term of ULCs in Chapter 4. Also, a policy implication for China's adjustment of economic growth model is provided. Chapter 5 reviews the experiences of exchange rate regime reform of Japan, Korea and Taiwan. We drew some policy implications for China's ongoing exchange rate regime reform. In Chapter 6, we analyse RMB internationalization from the perspective of regional economic and financial integration in East Asia. In addition, we assess the potential of the RMB as an international currency by forecasting the share of the RMB as a reserve currency in the coming decades. Chapter 7 concludes the thesis and proposes the future research.

Chapter 2: RMB Exchange Rate Regime: US Dollar Peg VS. A Basket of Currencies Peg⁴

2.1 Background

Exchange rate policy has become one of the key global economic issues when cooperation on protesting trade protectionism and stabilizing the global economy among countries seriously weakened since the Global Financial Crisis in 2007-2008. During the period of financial crisis and in the aftermath, the US's monetary authority pumped liquidity to stimulate its economic growth which is known as QE1, 2 and 3. The US dollar depreciated considerably against the currencies of major emerging economies during the period of crisis. Some East Asian emerging countries struggled to avoid currency appreciation in order to keep export competitiveness advantage. International community deeply concerned the "Currency War" when some governments attempted to use exchange rate policy as a tool to keep export competitiveness and economic growth. More recently, Japan's easing monetary policy adopted by Abe administration evoked extensively debate on the impact of one country's exchange rate policy on other countries.⁵

Among many arguments on exchange rate policy in the world, Chinese currency, the RMB and China's exchange rate policy are on the central stage. The RMB suffered increasing pressure economically and politically from the international community, especially from the United States. Since China announced to adopt a new exchange rate regime which is shifting from pegging to the US dollar toward pegging to a basket of currencies in July 2005, and reaffirmed to reform the RMB exchange rate regime and enhance flexibility of the RMB exchange rate in June 2010, it seemed that the rest of the world still doubted if Chinese authorities have truly adopted this currency basket peg regime and to what extent that China implemented it. In this chapter, given the drastic adjustment in the RMB exchange rate regime since 2005, particularly in the aftermath of recent global financial crisis, we are interested in answering the following questions about RMB exchange rate regime: What is the exchange rate regime are being adopted now by Chinese authorities? Is it a real managed floating exchange rate regime with reference to a basket of currencies? If so, to what extent the RMB is pegging to its currency basket?

There is a large body of literature on the RMB currency basket (Frankel 1993, Frankel and Wei 1994, 2007 and 2008, Shah *et al.* 2005, Eichengreen 2006, Yamazaki 2006). Their results show that there are signs indicating that the RMB exchange rate regime is moving away from pegging to the US dollar, but not significantly. It is interesting to know what the recent RMB exchange rate regime is, in particular, after June 2010 when the new policy was announced by the PBoC. In this chapter, we will revisit China's exchange rate policy and the currency basket of the RMB. To do that, firstly, we briefly review the evolutionary history of the RMB exchange rate regime from 1949 to 2013. We then move forward to analyze how the RMB pegs to its currency basket and estimate the weight of each component currency in

⁴ Revised version of this chapter: "Revisiting China's Exchange Rate Regime and RMB Basket: A Recent Empirical Study", was published in *International Journal of Economics and Finance*, Vol. 6, Issue 2, pp. 150-160.

⁵ Japan's the new government (Abe administration) adopted easing monetary policy and loose fiscal policy aimed at curbing decades-long deflation. Since November 2012, Japanese yen has depreciated considerably by more than 20 per cent until June 2013.

the RMB currency basket by applying Frankel and Wei (1994)'s model. To avoid repeating the works have been done by previous studies, we examine the RMB currency basket during the period which has never been covered in previous studies. Also, we could compare our results with the findings in previous studies in order to find the changes of the RMB currency basket.

The rest of this chapter is organized as follows. Section 2 is the literature review. We briefly review the evolutionary history of RMB exchange rate regime from 1949 to 2013 and introduce the background on the RMB currency basket in section 3. Section 4 introduces the data and economic model we apply in the chapter. Empirical results and analysis are presented in section 5. Section 6 concludes this chapter.

2.2 Literature Review

There are numerous papers which assess the currency basket of the RMB since the new exchange rate policy was announced by the PBoC in July 2005. Shah *et al.* (2005) study the RMB currency basket covering a short period from July 2005 to October 2005 which is four months after the new exchange rate policy was announced. They find that the RMB remained pegging to the US dollar. TAC's research team (2005) finds that China's monetary authorities took one day to adjust the RMB exchange rate to respond the fluctuations of the currencies in its currency basket. Moreover, they find that the main four currencies, which are the US dollar, the euro, the Japanese yen and the Korean won, explained more than 90 per cent of the daily variation of the RMB exchange rate, while the rest of currencies explained about 10 per cent of the daily variation. Jen (2005)'s estimation indicates that the weight of the US dollar was about 85 per cent in 2005. While by employing the daily data covering the period from July 2005 to March 2006, Eichengreen (2006) finds that the weight of the US dollar was around 90 per cent. Yamazaki (2006) finds the evidence that the euro, the Japanese yen and the Korean won's weights in the RMB currency basket increased gradually. Frankel and Wei (2006) find that the heavy weight was still signed to the US dollar, although the higher flexibility was seen in the RMB exchange rate regime. In addition, Frankel and Wei (2007) conclude that the RMB could be characterized by the higher flexibility, and its behavior has changed from heavily weighting on the US dollar (close to one) to weighting on some non-US dollar currencies since 2006, but not significantly.

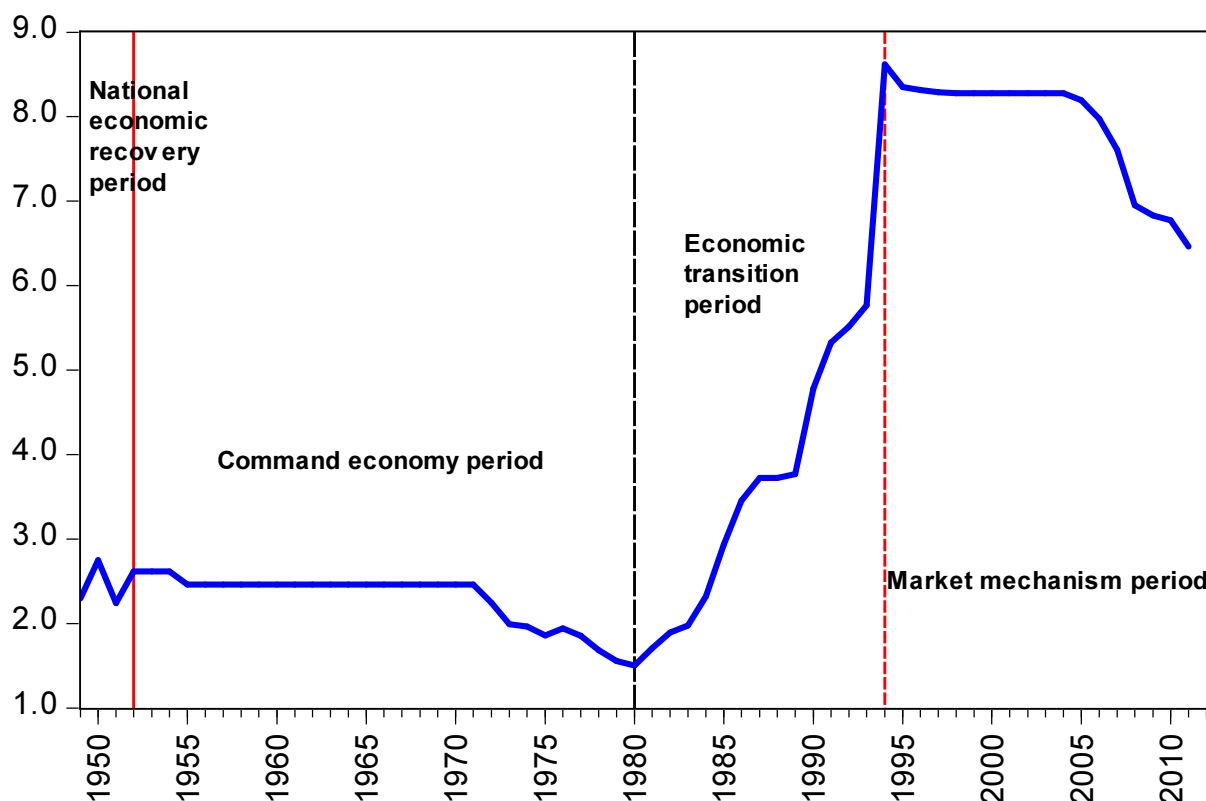
More recently, Ito (2008) finds that the US dollar's weight remained very high during the period from July 2005 to July 2007. Also, he argues that the RMB exchange rate regime became a crawling peg rather than a single currency peg regime because the RMB gradually appreciated against the US dollar over time. Moosa (2008) argues that the RMB actually crawlingly pegged to the US dollar rather than a currency basket as the PBoC announced during the period from August 2005 to May 2008. In contrast, Frankel (2009) concludes that the RMB currency basket switched a substantial weight on the US dollar into the euro. Additionally, according to the empirical results by using TV-AR-GARCH models from Funke and Cronwald (2008), evolution of the RMB exchange rate regime is the smooth nonlinearity rather than the linearity used in the most previous studies. By applying the modified Frankel and Wei (1994)'s model with time-varying coefficients and the Kalman filter covering the period from 2005 to 2009, Fidrmuc (2010) proves that the US dollar remained as the dominant currency in the RMB currency basket and the RMB exchange rate regime was far from the free floating regime.

2.3 RMB Exchange Rate Regime and RMB Currency Basket

2.3.1 Review of the RMB exchange rate regime

Compared to other major currencies, the RMB's 64 years history is relatively short. But it has experienced significant adjustments due to economic and political reasons (see Figure 2.1). It is widely accepted that the history of the RMB exchange rate regime can be divided into four periods according to RMB exchange rate policies announced by the PBoC (Sun *et al.*, 2008 and Qin, 2010). Table 2.1 shows the summary of various RMB exchange rate policies in four periods from 1949 to 2013. Since 2005, Chinese authorities moved into a managed floating exchange rate regime based on market supply and demand with reference to a basket of currencies, which was officially announced by the PBoC on July 21, 2005. In addition, the daily trading band of the RMB exchange rate in the inter-bank exchange market was set at ± 0.3 per cent in bilateral exchange rate between the RMB and the US dollar, which was widened to ± 0.5 per cent on May 21, 2007, ± 1.0 per cent on April 14, 2012 and ± 2.0 per cent on March 17, 2014. It was looked as a positive signal that China has realized the importance of the RMB exchange rate regime reform and would accelerate this process. Since then, the reform of the RMB exchange rate regime has been made significant progress and RMB exchange rate policy as a policy instrument started to play increasingly more important role in China's economic development, in particular, China's foreign trade growth.

Figure 2.1: The RMB nominal exchange rate, against the US dollar, yearly, 1949-2012



Source: China Statistics Yearbooks (1995-2012).

Table 2. 1: The summary of RMB exchange rate regime from 1949 - 2012

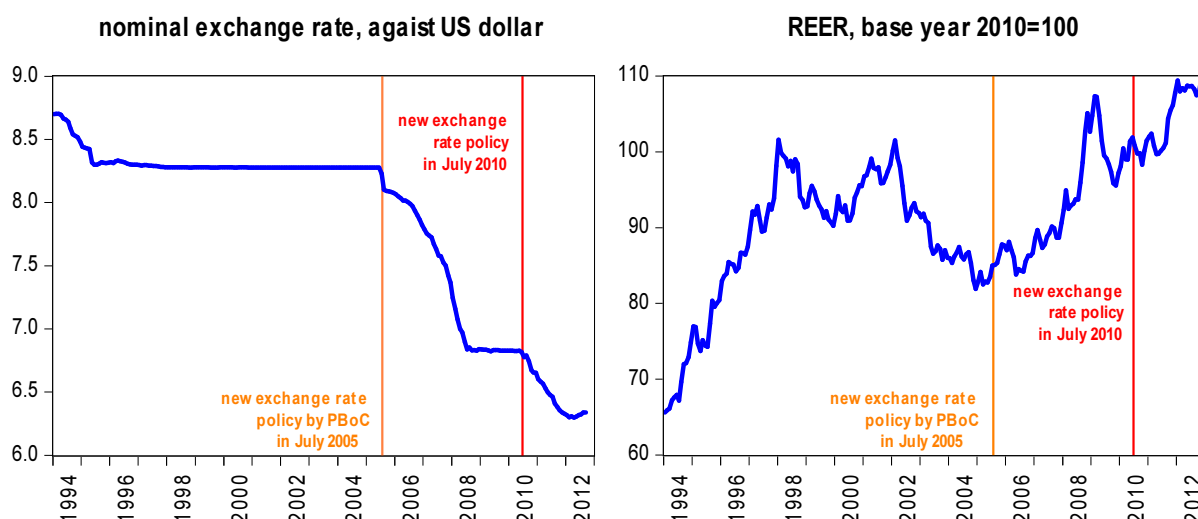
Stage	Period	Target of RMB exchange rate policy	Characteristics of the RMB exchange rate
National economy recovery period	1949-1950	encouraging exports and constraining imports	fluctuated dramatically and changed frequently; changed from multiple exchange rates into united exchange rate.
	1951-1952	balancing between imports and exports	rallied gradually; transferred from “encouraging exports and constraining imports” into “balancing between imports and exports”.
Command economy period	1953-1972	relatively fixed exchange rate regime	kept stable; ineffective as an economic tool to modulate China’s economic development.
	1973-1980	pegging to a currency basket	fluctuated frequently; seriously overvalued.
Economy transition period	1981-1984	dual RMB exchange rate regime	two exchange rates existed simultaneously: official exchange rate and RMB Internal Settlement rate (ISR).
	1985-1993	canceled ISR, but actually implemented dual exchange rate regime again	frequently adjusted; depreciated sharply; Foreign Exchange Swap Centers (FESC) was established.
Market mechanism period	1994-2005	managed floating exchange rate regime	foreign exchange surrender system was launched; RMB official exchange rate depreciated in one-step sharply; <i>de facto</i> pegged to the US dollar since 1997 Asia Financial Crisis until 2005.
	2006-2013	managed floating exchange rate regime based on market supply and demand with reference to a currency basket	appreciated gradually; widened daily movement band from $\pm 0.3\%$ to $\pm 0.5\%$, $\pm 1.0\%$; under pressure internally and externally to allow RMB appreciation further.

Source: Author’s summary according to the PBoC’s policies, Sun *et al.* (2008) and Qin (2010).

However, the global financial crisis in 2007-2008 disrupted China’s exchange rate regime reform. China returned to peg the RMB to the US dollar in the midst of financial crisis (see Figure 2.1). Such policy reversion led to critics from the rest of the world. On June 19, 2010, the PBoC announced that China would proceed to reform the RMB exchange rate regime and enhance the flexibility of the RMB exchange rate⁶, which implies that China would continue to reform the RMB exchange rate regime. From June 2010, the RMB re-started to be revaluated gradually. The RMB in nominal term appreciated at 3-4 per cent of annual rate since 2005. In the meantime, the real effective exchange rate (REER) of the RMB also increased considerably by 29 per cent by the end of 2012, although it dropped in 2009 (see Figure 2.2).

Figure 2.2: The RMB nominal exchange rate and the REER, 1994-2012

⁶ The PBoC stated: “in view of the recent economic situation and financial market developments at home and abroad, and the balance of payments (BOP) situation in China, the People’s Bank of China has decided to proceed further with reform of the RMB exchange rate regime and to enhance the RMB exchange rate flexibility”. (See the PBoC’s official website: <http://www.pbc.gov.cn/publish/english/955/2010/20100622144059351137121/20100622144059351137121.html>)



Source: The PBoC and BIS.

Generally speaking, Chinese authorities have successfully managed the RMB exchange rate policy which contributed to China's economic growth significantly. Especially, since 2005 when China changed the single currency peg regime into a currency basket peg regime, China's exports and economic growth continued to grow without damaging China's exports. As an integral component of China's ongoing financial system reform, the goal of RMB exchange rate regime reform is achieving a free floating exchange rate regime. Meanwhile, mounting external pressure on the RMB's value and deepening the global financial system reform under G20 framework push Chinese authorities to continue to reform the RMB exchange rate formation mechanism. How to smoothly push forward the RMB exchange rate regime reform is still a challenging task for Chinese authority. Now China's RMB exchange rate regime is at the crossroad (Obstfeld, 2007).

2.3.2 The RMB currency basket

Since the PBoC officially announced to adopt a managed floating exchange rate regime by pegging to a currency basket rather than pegging to the US dollar in July 2005, it has never officially revealed the information about composition of the RMB currency basket and the respective weight of each of component currencies. But Zhou Xiaochuan, the governor of the PBoC, released a little information about the RMB's basket of currencies in 2005⁷. According to Zhou, the principle of selecting the candidate currencies is referring to the weights of foreign exchanges which are frequently used in China's foreign trade settlement. Based on this principle, the main currencies in the RMB currency basket are the US dollar, the euro, Japanese yen, and Korean won. Furthermore, some currencies from China's important trading partners such as Singaporean dollar, British pound sterling, Malaysian ringgit, Australian dollar, Canadian dollar, Russian ruble and Thai baht are also could be included in the RMB currency basket. But the weight of each component currency in the RMB currency basket and frequency of weight adjustment remained unclear. Table 2.2 shows the component currencies which may be included in the RMB currency basket according to Zhou (2005).

⁷ Zhou Xiaochuan, the governor of the PBoC, informally elaborated the principle and the candidate currencies in the RMB's currency basket when he gave opening remark at the inauguration ceremony of the PBoC's Shanghai headquarter in Shanghai on August 9, 2005.

Table 2. 2: Component currencies in the currency basket of the RMB

Currencies	Name	Symbol
Main Currencies (first tier)	The US Dollar	USD
	The Euro	EUR
	Japanese Yen	JPY
	Korean Won	KRW
Other Currencies (second tier)	Singaporean Dollar	SGD
	British Pound	GBP
	Malaysian Ringgit	MYR
	Australian Dollar	AUD
	Canadian Dollar	CAD
	Russian Ruble	RUB
	Thai Baht	THB

Source: According to the PBoC governor's public speech on August 9, 2005.

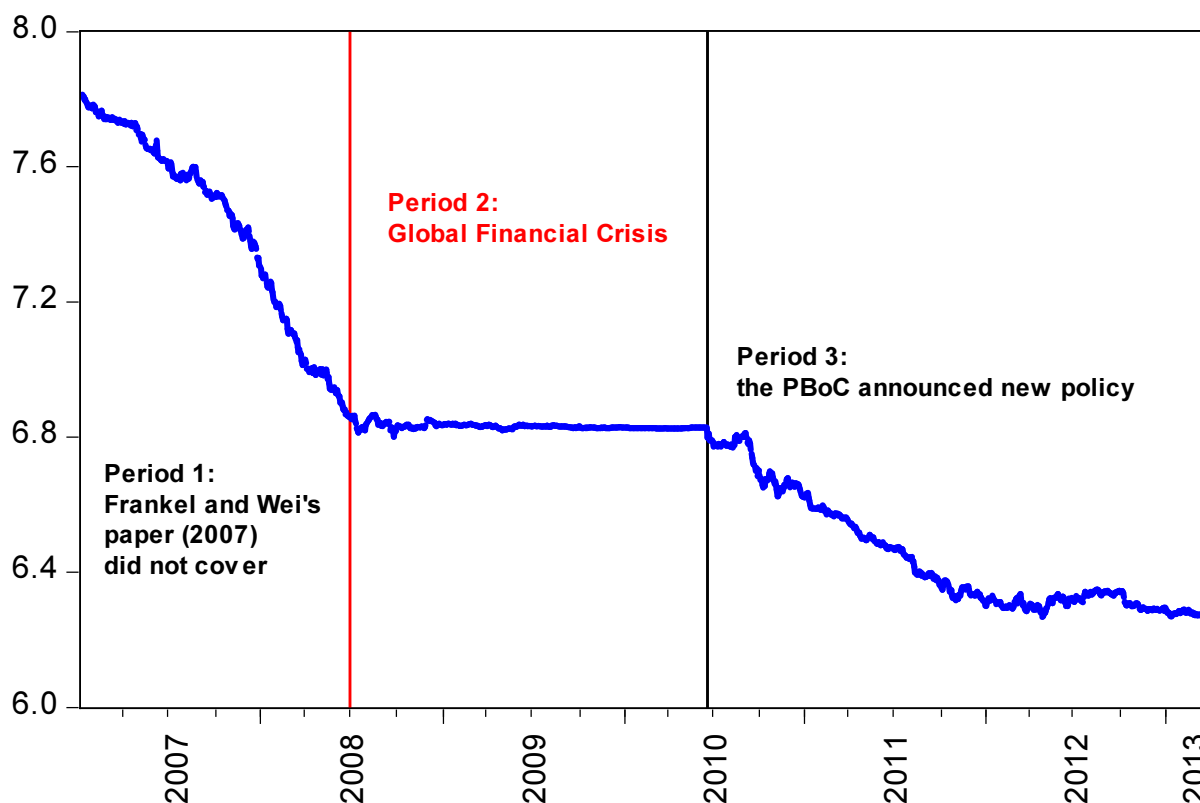
2.4 Data and Methodology

2.4.1 Data

Since the similar studies about the RMB currency basket have been done in previous studies (Frankel and Wei 1994 and 2007, Yamazaki 2006), in this research we will examine the RMB currency basket by covering the period which has not been tested in previous studies. The latest research on the RMB currency basket using the same model we use in this research is done by Frankel and Wei (2007). The period they covered is from July 2005 to August 2007.⁸ In this chapter, by using the same model, we will examine the RMB currency basket covering the period from January 2007 to March 2013 to find the latest evidence on who the RMB pegs to its currency basket. It is notable that during the period of recent financial crisis, the RMB appeared to be heavily pegged to the US dollar from mid-2008 to mid-2010. We can see from Figure 2.3 that the RMB nominal exchange rate against the US dollar kept relatively unchanged for about two years from July 2008 to June 2010. Therefore, we divide the whole sample into three periods: period 1 (pre-crisis): January 1, 2007-June 30, 2008; period 2 (period of crisis): July 1, 2008-June 30, 2010 and period 3 (post-crisis): July 1, 2010-March 30, 2013 (see Figure 2.3). By doing so, we could not only find the changes of the RMB currency basket before and after the financial crisis, but also test if the RMB pegged to the US dollar during the period of financial crisis. In addition, due to applying the same model, we can compare our results with Frankel and Wei (2007)'s findings to find the change in the RMB currency basket.

Figure 2.3: The RMB nominal exchange rate, against the US dollar, from January 1, 2007 to March 31, 2013

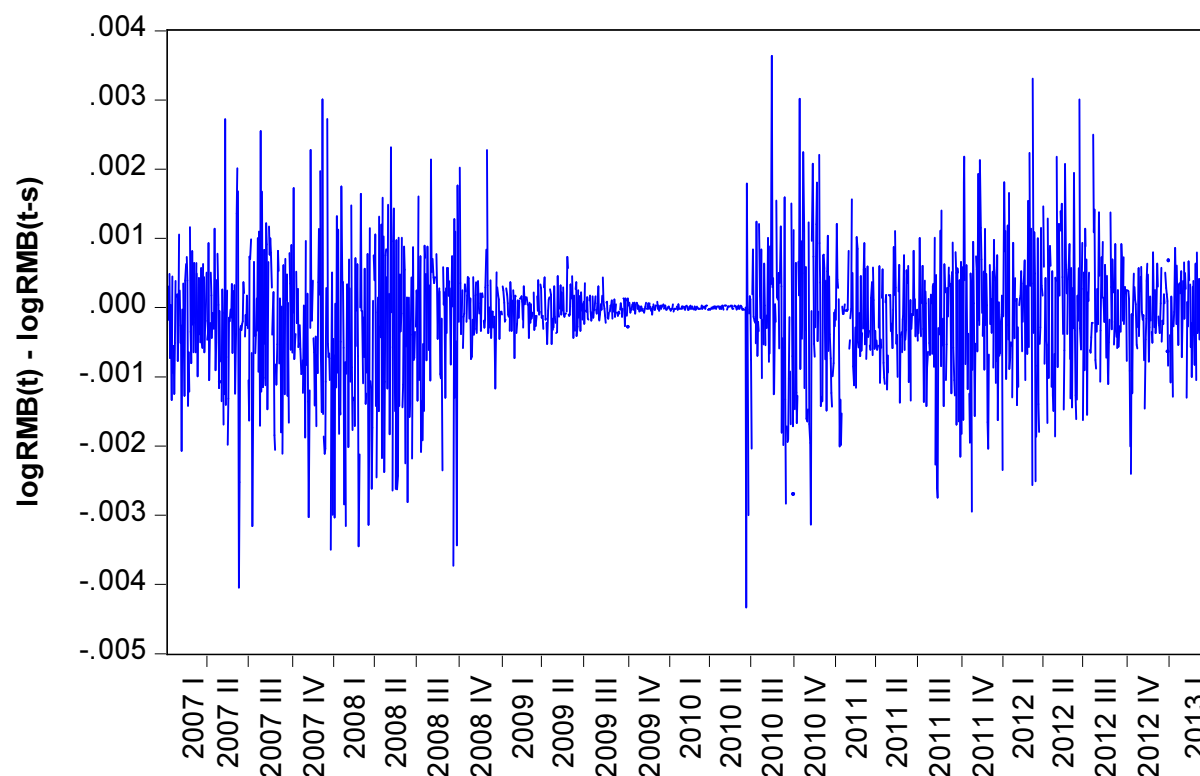
⁸ Frankel (2009) re-tests the RMB currency basket by using the upgraded Frankel and Wei (1994)'s model (adding a new variable). But only four major currencies are included into the RMB currency basket.



Source: State Administration of Foreign Exchange (SAFE), China.

What's more, since the PBoC reaffirmed that China would proceed to reform the RMB exchange rate regime and enhance the flexibility of the RMB exchange rate in June 2010, it seemed that RMB revaluation was accelerated. Since then, the RMB has appreciated considerably in both nominal and real terms. As Figure 2.4 shows, the daily change of the RMB exchange rate against the US dollar is about 0.1 per cent before the global financial crisis. During the period of financial crisis, the RMB exchange rate remained almost unchanged. Since the third quarter of 2010, fluctuation of the daily RMB exchange rate has intensified. Its daily movement frequently reached about 0.2 per cent after July 2010. The larger daily movement of the RMB exchange rate against the US dollar since July 2010 implies that the flexibility of the RMB exchange rate became much higher than before. It clearly shows us that the RMB is no longer purely peg to the US dollar.

Figure 2.4: Changes in the RMB exchange rate, against the US dollar, from January 1, 2007 to March 31, 2013



Source: Author's calculation.

To find more detailed information on the RMB currency basket, we further divide the period 3 (33 months) into 6 sub-periods: sub-period 1: July 1, 2010 to December 31, 2010; sub-period 2: January 1, 2011 to June 30, 2011; sub-period 3: July 1, 2011 to December 31, 2011; sub-period 4: January 1, 2012 to June 30, 2012; sub-period 5: July 1, 2012 to December 31, 2012; sub-period 6: January 1, 2013 to March 31, 2013. Each of sub-periods is six-month length except for the last sub-period (3 months). By doing so, we could find more detailed information on how the RMB pegged to its currency basket and the implicit weight of each of component currencies in each of sub-periods. For comparison, we use the SDR (Special Drawing Right)⁹ as the numeraire to define the “value” of each of component currencies in the RMB currency basket as Frankel and Wei (2007) did.¹⁰ Compared to other potential numeraire, like the gold and the Swiss franc, the SDR is more appropriate to the currency weight inference model such as Frankel and Wei (1994)'s model partly because the SDR is a weighted IMF unit based on a currency basket which consists of four major currencies in the world. The value change of each currency measured by the major currencies reflects the change of this currency compared to others. Therefore, the SDR is a good numeraire to catch the clues that to what extent that the RMB pegs to its currency basket. The IMF reports the daily exchange rate of all currencies against the SDR.

2.4.2 Methodology

⁹ Currency value of the SDR is based on a basket of major currencies: the US dollar, the Euro, Japanese yen, and pound sterling. Based on their roles in international trade and finance, on November 15, 2010, the IMF adjusted the weight of each currency: USD 41.9%, EUR 37.4%, GBP 11.3% and Yen 9.4%.

¹⁰ Frankel and Wei (2007) explained in details why they used the SDR as a numeraire rather than others like Swiss franc.

In this chapter, we employ the currency basket inference model developed by Frankel and Wei (1994) to examine the RMB currency basket. This is a well-known model which was applied by Shah *et al.* (2005), Eichengreen (2006), Yamazaki (2006), Frankel and Wei (2007) in analyzing the RMB currency basket. More recently, Frankel (2009) upgrades this model by adding a new variable, called Exchange Market Pressure variable which is defined as the percentage increase in the value of currency plus the increase in reserves, to re-estimate the RMB currency basket. This upgraded model helped to capture the extent of flexibility of the RMB exchange rate. The higher coefficient of this variable, the higher floating degree is because there is less external intervention in foreign exchange markets. The zero of coefficient means that the RMB exchange rate is purely fixed, while the one of coefficient indicates purely floating exchange rate regime. According to his results, there was an upward trend on this coefficient although it's not very significant. It increased from 0.123 in December 2008 to 0.249 in May 2009. It implies that the RMB pegged to a currency basket to an increasing extent rather than only the US dollar. Moreover, the euro and Japanese yen's weights grew during the period from July 2006 to May 2008.

Based on Frankel (2009)'s findings, in this study, we will not add this new variable (Exchange Market Pressure variable) into Frankel and Wei (1994)'s model. We assume that the RMB pegs to its currency basket which consists of eleven currencies more heavily than before, especially considering that the PBoC reaffirmed to continue the RMB exchange rate regime reform and enhance the flexibility of the RMB exchange rate in June 2010. Recent considerable appreciation of the RMB in both nominal and real terms suggests that the RMB is moving away from the single currency peg (the US dollar), although it remained unclear if it is actually pegging to a currency basket. Because we cannot ensure that the RMB is fully pegging to a currency basket, the constant c is included to allow the possibility of the RMB not perfectly pegging to its currency basket. Also c could measure the trend of the RMB exchange rate. Therefore, we have

$$\log RMB(t+s) - \log RMB(t) = c + \sum w(j) [\log X(j, t+s) - \log X(j, t)] \quad (2.1)$$

where X denotes the currencies which are eleven component currencies in the RMB currency basket declared by the PBoC, w represents the weight of each currency, j denotes each of currencies. If one currency purely pegs to another currency, the weight (w) of this reference currency should be one. If one currency perfectly pegs to a currency basket, the weights of these component currencies in its currency basket should be significant and positive. To estimate the RMB currency basket, we assume that all eleven component currencies are included in the RMB currency basket.

2.5 Result Analysis

The currency weight inference model which regress the change in the log value of RMB exchange rate against the changes in the log value of eleven component currencies in the RMB currency basket is simple and neat. The reason of choosing the change rather than the level is concern of non-stationary data (Frankel and Wei, 1994). The exchange rate data is very typical time series data. It was proved that some time series data is non-stationary. So we cannot simply make a regression on two or more time series data without testing if the unit root $[I(1)]$ exists (Engel and Granger, 1987). Table 2.3 shows that the first difference of each variable is stationary.

Table 2. 3: Unit root test

Variables (first differences in the log)	ADF test	Critical value		I (1) or I (0)
		1%	5%	
CNY	-39.380	-3.435	-2.863	I (0)
USD	-133.551	-3.434	-2.863	I (0)
EUR	-51.316	-3.434	-2.863	I (0)
JPY	-39.988	-3.435	-2.863	I (0)
KRW	-781.930	-3.435	-2.863	I (0)
SGD	-47.234	-3.435	-2.863	I (0)
GBP	-62.324	-3.434	-2.863	I (0)
MYR	-41.438	-3.435	-2.863	I (0)
AUD	-41.880	-3.435	-2.863	I (0)
CAD	-85.376	-3.435	-2.863	I (0)
RUB	-37.547	-3.435	-2.863	I (0)
THB	-40.178	-3.435	-2.864	I (0)

Source: Author's calculation.

The results are reported in Table 2.4. We can see that weights of the US dollar, Japanese yen, Singaporean dollar and Russian ruble are statistically significant and positive for the whole sample period. The US dollar received the largest weight which is 86.1 per cent in the RMB currency basket. Surprisingly, the weight of Japanese yen (1.5 %) is less than that of Singaporean dollar (5.7 %), although the yen was classified into the first tier in the RMB currency basket. We also noticed that the adjusted R-squared for the whole sample is relatively high (0.937) which implies that the RMB might tightly peg to its currency basket. In period 1 which is the period before the financial crisis, more currencies in the RMB currency basket received weights: the US dollar (83.3 %), the euro (6.3 %), Japanese yen (6.7 %), Korean won (5.1 %), Australian dollar (3.7 %) and Russian ruble (1.3 %). It suggests that the RMB pegged to its currency basket in a higher degree during this period. However, in period 2 which covers the period of financial crisis, the US dollar's weight increased sharply to 90 per cent from 83.3 per cent in previous period. Other three currencies (Japanese yen, Singaporean dollar and Thai baht) have positive and statistically significant weights, but very little. Adjusted R-squared in period 2 is 0.98 which is very high. It indicates that the RMB exchange rate regime in financial crisis period is the US dollar peg regime. It is consistent with the phenomenon that the RMB exchange rate against the US dollar remained unchanged during the period of crisis (see Figure 2.4). Since July 2010 (in the period 3) when the PBoC reaffirmed to reform the RMB exchange rate regime, the US dollar's weight dropped to 80.2 per cent. Weights of Singaporean dollar and Russian ruble are 5.2 and 1.9 per cent, respectively.

Table 2. 4: Estimation of eleven component currencies' weights in the RMB currency basket, from January 1, 2007 to March 31, 2013

(numeraire currency = SDR)

Sub-period	Whole sample	Period 1	Period 2	Period 3
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US dollar	0.861** (0.017)	0.833** (0.052)	0.901** (0.021)	0.802** (0.027)
the euro	-0.002 (0.011)	0.063* (0.037)	0.000 (0.011)	-0.027* (0.017)
Japanese yen	0.015** (0.005)	0.067** (0.014)	0.010* (0.005)	0.003 (0.008)
Korean won	0.005 (0.003)	0.051** (0.014)	-0.001 (0.003)	0.007 (0.009)
Singapore dollar	0.057** (0.016)	0.025 (0.045)	0.049** (0.018)	0.052** (0.025)
British pound	-0.008 (0.007)	-0.009 (0.021)	-0.007 (0.006)	0.008 (0.014)
Malaysian ringgit	0.007 (0.012)	0.043 (0.030)	-0.022 (0.012)	0.033 (0.021)
Canadian dollar	-0.006 (0.004)	-0.035** (0.012)	0.006 (0.004)	-0.066 (0.006)
Australian dollar	0.001 (0.005)	0.037** (0.014)	0.0001 (0.005)	-0.006 (0.009)
Russian ruble	0.015** (0.006)	0.131** (0.040)	0.004 (0.006)	0.019** (0.009)
Thai baht	0.021 (0.010)	-0.007 (0.017)	0.046** (0.016)	0.020 (0.019)
Constant	-4.89E-05** (1.22E-05)	-0.0001** (3.01E-05)	-1.07E05 (1.46E-05)	-4.22E-05** (1.78E-05)
Observations	780	165	266	349
Adj. R-squared	0.937	0.878	0.980	0.926

Source: Author's calculation.

Note:

1. Whole sample: January 1, 2007-March 30, 2013
2. Period 1: January 1, 2007-June 30, 2008
3. Period 2: July 1, 2008-June 30, 2010
4. Period 3: July 1, 2010-March 30, 2013

* Significant at 10%; ** Significant at 5%; Standard errors in parentheses.

We then compare our results with the findings of Frankel and Wei (2007) in which they covered the different period from ours (see Table 2.5). Not surprisingly, the US dollar's weight remained the largest in the RMB currency basket in all periods. But its importance is fading. Compared to 90.4 per cent during period from July 2005 to August 2007 in Frankel and Wei (2007), the weight was assigned to the US dollar was around 80 per cent in period 1 and 3. But it increased to 90.1 per cent during the period of financial crisis (period 2 in our research). Notably, in our results, more currencies received weights in the RMB currency basket in each of periods than the results in Frankel and Wei (2007), such as Singaporean dollar in period 2 and 3, Russian ruble in period 1 and 3 as well as the euro, Japanese yen and Korean won in period 1. It indicates that the extent of the RMB pegging to its currency basket is increasingly higher than before. Also, it seemed that the PBoC adjusted the weights of component currencies in the RMB currency basket with accordance to external economic environment and possible political pressure.

Table 2. 5: Comparison of our findings with previous study

(Numeraire currency = SDR)

Sub-period	Frankel and Wei (2007)'s results	Period 1	Period 2	Period 3
US dollar	0.904** (0.021)	0.833** (0.052)	0.901** (0.021)	0.802** (0.027)
the euro	-0.006 (0.014)	0.063* (0.037)	0.000 (0.011)	-0.027* (0.017)
Japanese yen	0.008 (0.009)	0.067** (0.014)	0.010* (0.005)	0.003 (0.008)
Korean won	0.002 (0.009)	0.051** (0.014)	-0.001 (0.003)	0.007 (0.009)
Singapore dollar	-0.018 (0.021)	0.025 (0.045)	0.049** (0.018)	0.052** (0.025)
British pound	-0.004 (0.011)	-0.009 (0.021)	-0.007 (0.006)	0.008 (0.014)
Malaysian ringgit	0.053** (0.015)	0.043 (0.030)	-0.022 (0.012)	0.033 (0.021)
Canadian dollar	0.003 (0.008)	-0.035** (0.012)	0.006 (0.004)	-0.066 (0.006)
Australian dollar	-0.003 (0.008)	0.037** (0.014)	0.0001 (0.005)	-0.006 (0.009)
Russian ruble	-0.018 (0.021)	0.131** (0.040)	0.004 (0.006)	0.019** (0.009)

Thai baht	0.006	(0.010)	-0.007	(0.017)	0.046**	(0.016)	0.020	(0.019)
Constant	9.00E-05**	(3.00E-05)	-0.0001**	(3.01E-05)	-1.07E05	(1.46E-05)	-4.22E-05**	(1.78E-05)
Observations	382		165		266		349	
Adj. R-squared	0.95		0.878		0.980		0.926	

Source: Author's calculation and Frankel and Wei (2007)'s findings.

Note:

1. Frankel and Wei (2007)'s period: July 22, 2005-August 1, 2007
2. Period 1: January 1, 2007-June 30, 2008
3. Period 2: July 1, 2008-June 30, 2010
4. Period 3: July 1, 2010-March 31, 2013

* Significant at 10%; ** Significant at 5%; Standard errors in parentheses.

Since the PBoC reaffirmed to continue the RMB exchange rate regime reform and enhance the flexibility of the RMB exchange rate on June 19, 2010, it is interesting to find out how the RMB pegged to its currency basket after this policy was announced. Therefore, we divide period 3 (from July 1, 2010 to March 31, 2013) into six sub-periods to find the latest information on the RMB currency basket. Table 2.6 reports that the US dollar accounted for the largest weight in the RMB currency basket in each of sub-periods. Singaporean dollar, Japanese yen, the euro and Russian ruble also received weights in some sub-periods, although their weights were much less than the US dollar's weight. We also observed that the weight of the US dollar clearly showed a downward trend since 2011. Its weight declined from 87.9 per cent in the first half year of 2011 (sub-period 2) to 73.2 per cent in the first three months of 2013 (sub-period 6). This finding confirms that the RMB is no longer tightly peg to the US dollar. It is shifting to a currency basket peg regime, although other component currencies' weights were adjusted frequently. More interestingly, we find that Singaporean dollar's weight in the RMB currency basket was 13.2 per cent in sub-period 5 and 21.2 per cent in sub-period 6. Singapore's exchange rate regime (Band-Basket-Crawl), which is a typical managed floating regime by referring to a currency basket, is similar to China's exchange rate regime. It may tell us that Singaporean dollar is playing more important role in the RMB currency basket. By referring to Singaporean dollar, the RMB could indirectly peg to other regional currencies in addition to the major international currencies. In addition, adjusted R-squared increased from 90.9 in sub-period 1 to 97.7 in sub-period 6, although it dropped slightly to 89.2 in sub-period 4. It means that our data is highly fit to this model. In other words, the RMB exchange rate regime is a currency basket peg regime.

Table 2. 6: Estimation of eleven component currencies' weights in the RMB currency basket, July 1, 2010-March 31, 2013
(numeraire currency = SDR)

Sub-period	Whole sample	(1)	(2)	(3)	(4)	(5)	(6)
US dollar	0.802** (0.027)	0.736** (0.086)	0.879** (0.055)	0.860** (0.068)	0.719** (0.080)	0.775** (0.071)	0.732** (0.098)
the euro	-0.027* (0.017)	-0.020 (0.053)	-0.042 (0.038)	-0.002 (0.045)	-0.057 (0.046)	-0.005 (0.034)	-0.084** (0.039)
Japanese yen	0.003 (0.008)	0.010 (0.028)	0.003 (0.015)	-0.016 (0.019)	0.053** (0.023)	-0.012 (0.024)	-0.048** (0.024)
Korean won	0.007 (0.009)	0.016 (0.024)	-0.006 (0.020)	-0.007 (0.017)	0.012 (0.030)	0.061* (0.033)	0.009 (0.030)
Singapore dollar	0.052** (0.025)	0.082 (0.087)	0.095 (0.060)	0.055 (0.053)	0.091 (0.083)	0.132** (0.064)	0.212** (0.096)
British pound	0.008 (0.014)	-0.004 (0.040)	0.031 (0.021)	0.015 (0.044)	0.025 (0.040)	0.054 (0.042)	0.007 (0.029)
Malaysian ringgit	0.033 (0.021)	-0.038 (0.065)	-0.080 (0.063)	0.062 (0.047)	0.007 (0.069)	0.041 (0.045)	-0.031 (0.060)
Canadian dollar	-0.066 (0.006)	-0.004 (0.023)	0.003 (0.006)	-0.035* (0.019)	-0.022 (0.025)	0.005 (0.024)	-0.029 (0.033)
Australian dollar	-0.006 (0.009)	0.024 (0.030)	0.009 (0.016)	-0.050** (0.021)	-0.003 (0.027)	-0.036 (0.026)	0.012 (0.023)
Russian ruble	0.019** (0.009)	0.074** (0.034)	0.025 (0.024)	0.042* (0.026)	0.004 (0.018)	0.020 (0.021)	-0.057 (0.042)
Thai baht	0.020 (0.019)	0.063 (0.069)	-0.001 (0.030)	0.051 (0.054)	0.069 (0.044)	-0.014 (0.064)	-0.039 (0.047)
Constant	-4.22E-05** (1.78E-05)	-1.56E-05 (5.95E-05)	-7.11E-05 (3.67E-05)	-8.13E-05 (5.01E-05)	-2.47E-05 (4.34E-05)	8.20E-06 (3.38E-05)	-4.26E-05 (4.24E-05)
Observations	349	61	56	65	64	69	34
Adj. R-squared	0.926	0.909	0.977	0.946	0.892	0.921	0.971

Source: Author's calculation.

Note:

(1): July 1, 2010-December 31, 2010

(2): January 1, 2011-June 30, 2011

(3): July 1, 2011-December 31, 2011

(4): January 1, 2012-June 30, 2012

(5): July 1, 2012-December 31, 2012

(6): January 1, 2013-March 31, 2013

* Significant at 10 %; ** Significant at 5 %; Standard errors in parentheses.

2.6 Chapter Conclusions

Since Chinese authorities initiated the RMB exchange rate regime reform in 1994, the RMB had been tightly pegged to the US dollar at the rate of 8.28 yuan per unit of the US dollar for about ten years. This US dollar peg exchange rate regime played an important and positive role in China's economic growth. But such purely US dollar peg regime also seriously distorted the RMB nominal exchange rate from its equilibrium exchange rate and accumulated huge trade surplus in China's current account. Therefore, as an integral component of China's financial system reform, a managed floating exchange rate regime with reference to a basket of currencies was adopted by the PBoC since July 2005.

However, *de facto* exchange rate policy is often different from *de jure* exchange rate policy announced by monetary authorities. Previous studies found very limited evidence on if the RMB is perfectly pegging to its currency basket. Our findings confirm that the RMB is shifting from the US dollar peg regime to a currency basket peg regime except for the period of financial crisis. The weight of the US dollar is still the largest in the RMB currency basket, but its importance decreased steadily. The weights of some currencies in the RMB currency basket have been increasing gradually, but not very significantly. Surprisingly, two of major currencies--the euro and Japanese yen were not allocated relatively large weights in the RMB currency basket. In contrast, Singaporean dollar received increasing weight in some periods.

China's RMB exchange rate regime is in a transitional period from the single currency pegging to the currency basket pegging. In the long run, Chinese authorities should adopt more flexible exchange rate regime in order to establish a stable and resilient financial system. Compared to the single currency peg regime and the free floating exchange rate regime, the currency basket peg regime probably is the optimal exchange rate regime for China as a transitional measure. It seems that the PBoC doesn't have an explicit and long-term approach on how to allocate the weight to each of component currencies and adjust the composition of the RMB currency basket until now. Therefore we could not label the current RMB exchange rate regime as a currency basket peg regime. But our results showed that the RMB is moving toward this direction.

Chapter 3: RMB “Equilibrium” Real Exchange Rate¹¹

3.1 Background

Over the last several decades, we have witnessed that exchange rate policy has played an increasingly important role in the development of global economy. Diverse exchange rate regimes were applied by countries. However, recent global financial crisis triggered extensively discussions on the “Currency War” which means that countries competitively devalue their currencies so as to maintain their export competitiveness during the period of crisis. The latest example is Japan. Japanese yen has depreciated by more than 20 per cent since September 2012. It sparked concerns that other countries would follow Japan to devalue their currencies to maintain their international competitiveness¹². But the Japanese authorities argued that the sharp depreciation of yen is a market correction of overvalued yen over the past few years. The question arising from this debate is what the “appropriate” exchange rate of yen should be.

China is another example. Along with China’s impressive performance in economic growth, China’s exchange rate policy and the level of RMB exchange rate attracted intensive debates. China adopted a managed floating exchange rate regime which indeed is to peg the RMB to a single currency (the US dollar) or a currency basket¹³. Such exchange rate peg regime implies that the RMB’s exchange rate needs to be “manipulated” so as to control the excessive fluctuation of RMB exchange rate. Not only China, but many economies do the similar thing to different extents. More recently, it is widely believed that China’s exchange rate policy significantly contributed to the global imbalance which may have led to recent global financial crisis. Since July 2005, the RMB has appreciated by about 24 per cent in nominal term and 29 per cent in real term by the end of 2012. In addition, China’s ratio of currency account surplus to GDP dropped considerably to 2.6 per cent in 2012 from 10.1 per cent in 2007. Chinese authorities argued that the RMB is approaching its equilibrium level and the RMB is no longer significantly undervalued. Naturally, we want to know if the exchange rate of RMB is approaching an appropriate level and how the RMB is misaligned.

There are many discussions on the issues of RMB exchange rate. Among them, estimation of the RMB’s “equilibrium” real exchange rate is the fundamental question which needs to be carefully assessed. Given China’s economic size and trade share in

¹¹ Revised version of this chapter: “How Is the RMB Exchange Rate Misaligned: A Recent Application of Behavioral Equilibrium Exchange Rate (BEER) to China”, was published in *Journal of East Asian Economic Integration*, Vol. 17, No. 3, pp. 281-310.

¹² Some policymakers like the Governors of the Deutsche Bundesbank and Central Bank of Russian Federation expressed concerns on Bank of Japan’s intervention in the yen exchange rate.

¹³ Recent studies illustrate that the RMB is still heavily pegging to the US dollar. But the dollar’s weight in RMB basket steadily declined. Some currencies received increasing weight in some periods such as Malaysian ringgit, but not significantly (see Frankel and Wei 2007). We also find the similar results in Chapter 2.

the global economy, RMB exchange rate and the degree of its misalignment needs to be studied carefully. In this chapter, we attempt to find out if the RMB is undervalued or overvalued. If so, how much is the RMB misaligned from its equilibrium exchange rate. We will employ the Clark and Macdonald (1994)'s the Behavioral Equilibrium Exchange Rate (BEER) approach to assess the degree of RMB misalignment from its equilibrium exchange rate which is determined by China's economic fundamentals. In contrast with the previous studies which used yearly or quarterly data, this study will apply the monthly data to find more detailed information about the dynamics of RMB misalignment over the period. In addition, we add more economic fundamentals which could explain the behaviors of RMB exchange rate as explanatory variables into the BEER model.

The remainder of this chapter is organized as follows. Section 2 is literature review. We briefly review the recent development of RMB exchange rate and explain what the equilibrium exchange rate means in section 3. This is followed by section 4 in which the data and analytical framework are explained. In section 5, the findings are presented and analyzed. Section 6 concludes the chapter.

3.2 Literature Review

How the RMB exchange rate is misaligned from its equilibrium exchange rate has been extensively studied by applying various methodologies. Empirical results by using the BEER approach from Zhang (2000) indicate that there was a dramatic fluctuation of RMB misalignment from 1955 to 2000. He also finds that the RMB was substantially overvalued before the 1980s. Bosworth (2004) estimates the RMB's equilibrium level by applying the PPP-based method, the macroeconomic balance approach and the accumulation of reserves in a fixed exchange rate regime approach. He finds the evidence of RMB undervaluation in PPP-based approach, while little or no RMB undervaluation by using other approaches. What's more, he argues that it is the large foreign capital inflows, rather than the current account surplus, that caused the problem of RMB misalignment. Shi and Yu (2005) examine the RMB's equilibrium exchange rate covering the period 1991-2004 by employing the BEER approach. They find that the RMB deviated from its equilibrium level since the 1990s. To be more detailed, the RMB was undervalued from the second quarter of 1992 to the fourth quarter of 1994, while overvalued from the first quarter of 1995 to the second quarter of 1999. Based on the BEER model, Funke and Rahn (2005) find that since the mid-1996, the RMB had been undervalued by 11-15 per cent during the period of 1997-2002. Chen (2007) applies the BEER model to estimate the RMB's equilibrium exchange rate during the period of 1994 to 2006 by using quarterly data. He finds that the RMB was undervalued during the majority of sample periods, but has been approaching its equilibrium exchange rate. Coudert and Couharde (2007)'s findings from the FEER approach illustrate that the RMB was undervalued from 23 to 46 per cent during the period of 2002-2005. Wang *et al.* (2007), by applying the BEER approach, argue that the RMB was not continuously undervalued but fluctuated around its equilibrium level within a narrow band from 3 per cent of overvaluation to 5 per cent of undervaluation during the period of 1980 to 2005.

More recently, Li (2009) finds that the RMB misaligned from its equilibrium exchange rate from -13.98 per cent (undervalued) to 16.66 per cent (overvalued) during the most period of 1980 to 2007 by using the equilibrium real exchange rate (ERER) approach. By applying the ERER approach, Lin and Wang (2009) find the evidence of RMB overvaluation by 3-7 per cent from 2003 to 2007. The paper of Subramanian (2010) finds that the RMB was undervalued by about 30 per cent in 2010 by applying the new PPP-based approach. Takagi (2010), by employing the Markov switching approach, finds that the quarterly RMB exchange rate fluctuated between overvaluation and undervaluation relative to its equilibrium level during the period of 1992 to 2009. But the period of RMB overvaluation outweighed the period of RMB undervaluation. By using the FEER model, Cline (2008) and Cline and Williamson (2009, 2010, 2011, 2012) estimate the currency misalignment for about thirty countries. They find that the equilibrium exchange rate of the RMB against the US dollar should be 5.50 yuan per dollar in 2010, meaning that the RMB was undervalued by 21.55 per cent in this year, while the magnitudes of RMB undervaluation were 23.73 per cent in 2008 and 33.92 per cent in 2009. However, their latest report shows that the RMB was undervalued by 16 per cent in 2011 and 3 per cent in the first half of 2012 in the real term, respectively. Their results imply that the misalignment of RMB shrank considerably from 2009 to 2012.

Strikingly different findings on RMB equilibrium exchange rate and RMB misalignment in the previous studies, however, also attract extensively discussions. Dunaway and Li (2005) find that the estimations on RMB misalignment by using various methods in previous studies spanned from zero to nearly 50 per cent. It is because of the difficulties in modeling the equilibrium exchange rate based on current economics skills, especially for China which is a rapidly changing economy. Isard (2007) also finds the vast difference in estimating the equilibrium exchange rate by applying different methodologies. Therefore he points out that the comparison of results from the different methodologies could provide a more accurate assessment about currency misalignment. The judgment about the results from different methodologies should be based on whether the methodology is based on the ability to interpret the equilibrium trend of exchange rate of out-of-sample, allowing for unexpected changes of exogenous variables. Cheung, Chinn and Fujii (2007) use the conventional methodologies such the BEER and the FEER models to assess the degree of RMB misalignment. They argue that RMB undervaluation is likely to be overvalued because of sampling uncertainty and difficulties in estimating RMB equilibrium exchange rate.

Cline and Williamson (2007) argue that there is no consensus on what the equilibrium exchange rate of RMB should be. The average degree of RMB undervaluation in term of REER in eighteen previous studies is about 20 per cent. The RMB needs appreciate by 40 per cent in term of bilateral exchange rate against the dollar. In their research, they employ three approaches which are enhanced-PPP approach, the BEER and the FEER approach to estimate the RMB's equilibrium exchange rate. They find that the largest RMB undervaluation which is 67 per cent is from the enhanced-PPP method. While corresponding results estimated by using the BEER and the FEER in term of the bilateral dollar exchange rate are 25 and 36 per cent respectively. In term of multilateral exchange rate, the real RMB appreciation needed is 18 and 21 per cent respectively.

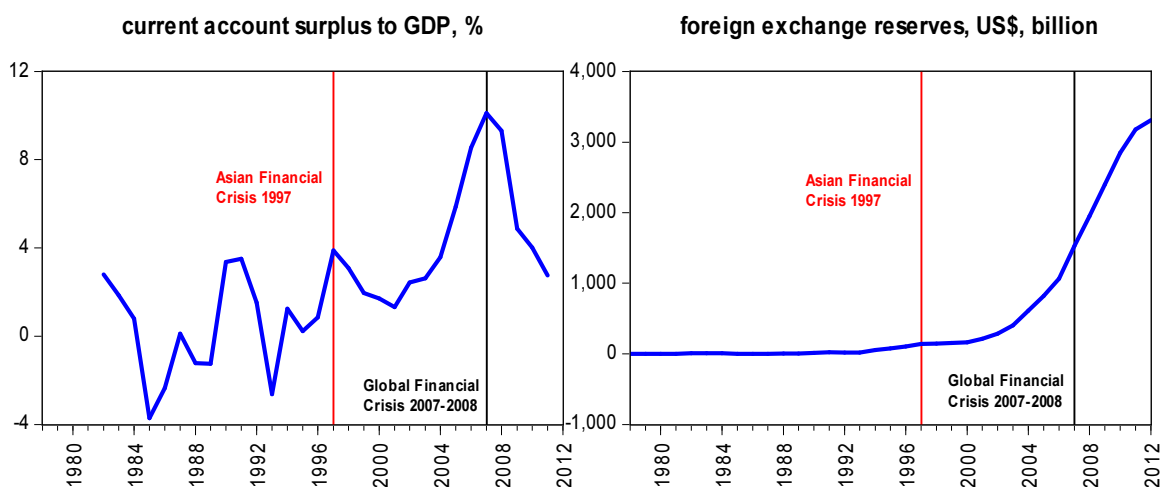
Cheung, Chinn and Fujii (2010) also point out that it is unlikely to have agreement on the RMB equilibrium exchange rate and RMB misalignment due to the theoretical and empirical difficulties. Argument on RMB undervaluation or overvaluation should be very cautious.

3.3 Background of RMB Exchange Rate and Equilibrium Exchange Rate

3.3.1 Recent development of RMB exchange rate

Two economic indicators were frequently cited by economists and politicians to assess the level of RMB exchange rate: current account surplus and foreign exchange reserves. China's ratio of current account surplus to GDP sharply surged since 2002 (see Figure 3.1) up to 10 per cent by the end of 2007. But it dropped dramatically since 2008 when the global financial crisis struck. At the same time, from Figure 3.1, we can see that China's foreign exchange reserves grew considerably in the last two decades. China's long-lasting current account surplus and persistently increasing foreign exchange reserves may imply that the RMB is misaligned.

Figure 3.1: China's ratio of current account surplus to GDP and foreign exchange reserves, 1978-2012

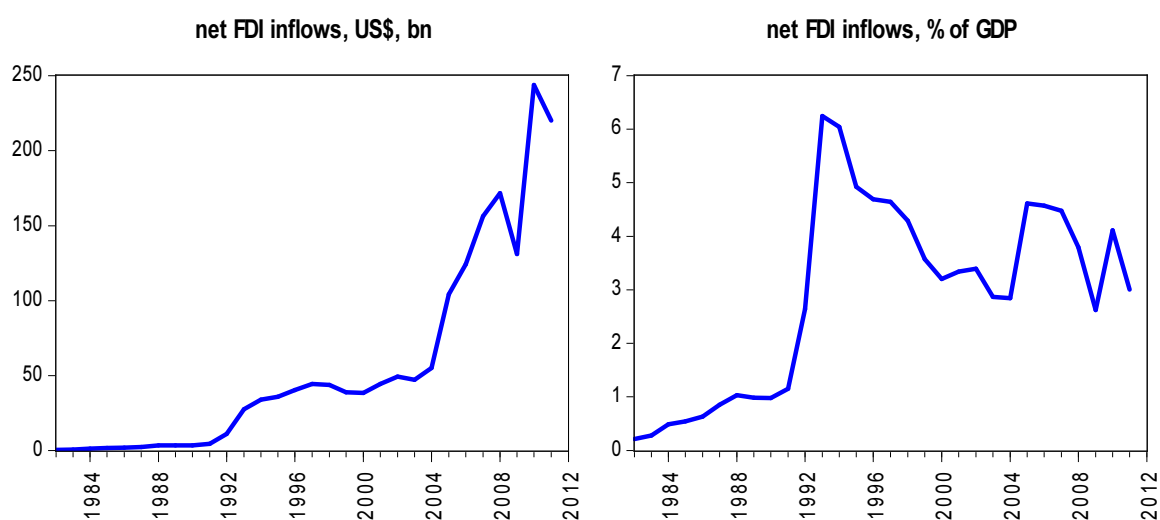


Source: WDI of World Bank and National Bureau of Statistics of China.

Another phenomenon which may imply that the RMB deviated from its equilibrium level is China's increasing capital inflows which partly are in the formation of foreign direct investment (FDI) in the last few years. China has been the largest FDI recipient country for decades (see Figure 3.2). The FDI has taken an important role in China's economic development by promoting the technology progress and improving the productivity. More recently, due to the expectation of RMB appreciation, some speculative capital flowed into China in the formation of FDI because China's capital

account has not been fully liberalized. Most of capital inflows in foreign exchanges are converted into the RMB under the rules from China's State Administration of Foreign Exchange (SAFE). The RMB liquidity injected into China's economic system by the PBoC is called the funds outstanding for foreign exchange. The amount of funds outstanding in the PBoC's balance sheet has increased considerably since 1994. To avoid the high inflation, the PBoC issued the central bank bills to sterilize such RMB liquidity caused by converting foreign capital inflows into the RMB. Although the PBoC applied various policy tools such as issuing the central bank bills to avoid high inflation, recent literature released that the PBoC could not efficiently and timely sterilize the all liquidity caused by the central bank bills issuance. The more capital inflows such as FDI or speculative capital in FDI formation, the more RMB liquidity will be injected into China's financial system, thereby increasing the pressure of high inflation and RMB appreciation. Thus China's the great deal of FDI inflows may have effect on the RMB misalignment. We will include China's FDI as one of economic fundamentals into the BEER model to measure the RMB misalignment.

Figure 3.2: China's FDI inflows, 1982-2011



Source: World Bank database.

Since July 2005 when the new exchange rate policy was announced by the PBoC¹⁴, it is notable that the RMB nominal exchange rate has appreciated by 23.79 per cent until the end of 2012 (see Figure 2.2), which is at about 3-4 per cent of annual rate. Meanwhile, the REER of RMB also increased considerably by 29 per cent until the end of 2012, although it dropped during the period of crisis. Appreciation of the RMB in nominal and real terms suggests that the RMB may be approaching its equilibrium level. In other words, RMB misalignment is declining, if the RMB was undervalued.

¹⁴ On July 21, 2005, People's Bank of China publicly announced that China would reform its exchange rate regime by moving to a managed floating exchange rate regime based on market supply and demand with reference to a basket of currencies. It means that the RMB will no longer be pegged to the US dollar and the RMB exchange rate regime would be more flexible.

3.3.2 Equilibrium exchange rate

When judging one currency is undervalued or overvalued, we assume that there exists an “appropriate” level of exchange rate for this currency, although some do not believe that such “appropriate” situation exists (Dixit, 1990). In principle, we could call this “appropriate” exchange rate as the “equilibrium” exchange rate. *Robinson (1947) once wrote that “there is an equilibrium rate corresponding to each rate of interest and level of effective demand, and a rate of exchange, can be turned into the equilibrium rate by altering the rate of the interest appropriately”.*¹⁵ Some argue that the equilibrium exchange rate is the rate determined by country’s macroeconomic elements at any economic situation (Clark and Macdonald, 1998). On the other hand, according to Williamson (1994), the equilibrium exchange rate is the rate when one economy can achieve macroeconomic balance, *i.e.* internal and external balances simultaneously. It is a stable level of the exchange rate which is consistent with a desired macroeconomic outcome (Williamson, 1985). We should note here that the “equilibrium” situation is a dynamic rather than a static process, which means that the equilibrium exchange rate reflects the external and internal economic situation at the specific period. Assuming there existing a real equilibrium exchange rate for any currency, we could define the degree of deviation of the actual exchange rate from its equilibrium exchange rate as the currency misalignment from its equilibrium level (Williamson, 1985). The magnitude of deviation from its equilibrium level illustrates how a currency is misaligned from its equilibrium exchange rate.

Nevertheless, measuring one currency’s equilibrium exchange rate is still a challenging task for economists, although there are different economic models based on various economic theories and econometric methods to estimate the equilibrium exchange rate, such as PPP-based approach, fundamental equilibrium exchange rate (FEER), behavioral equilibrium exchange rate (BEER) and so on. These approaches are applied in estimating the RMB equilibrium exchange rate. Cline and Williamson (2007) argues that PPP-based approach is useful for examining the trend rather than the equilibrium exchange rate at a point over time. For the FEER approach, Frankel (2008) argues that it is difficult to decide where the internal and external balance lies. He also points out that the exchange rate itself is not enough to achieve the internal and external balances. It is practically true for emerging economies. Isard (2007) argues that macroeconomic balance framework likes the FEER approach, may be not applicable for countries which are in period of rapid economic growth and attracting a large deal of capital inflows. Obviously, China is a country of this kind. Considering China’s economic characteristics, the BEER approach which is more straightforward is more suitable for estimating the RMB equilibrium exchange rate.

The empirical results in previous studies indicate that it is still difficult to judge how much the RMB is misaligned from its equilibrium exchange rate over the period. The majority of empirical literature by employing various methodologies conclude that the RMB was undervalued by a broad range from about 3 to 67 per cent (Zhang 2001;

¹⁵ See Williamson (1994), “Estimating Equilibrium Exchange Rate”, Institute for International Economics, page 179.

Couder and Couharde 2005; Funke and Rahn 2005, Cline and William 2005, 2007, 2008, 2010, 2011 and 2012, Chen 2007 and Cheung *et al.* 2010). Empirical results vary with the various economic methodologies. However, the difficulty in assessing the currency misalignment does not necessarily imply that it is meaningless to estimate the RMB equilibrium exchange rate. Different results from various methodologies complement each other to provide us with a relatively robust assessment on RMB equilibrium exchange rate in the medium and long terms.

3.4 Data and Analytical Framework

3.4.1 Data

In this chapter, we will employ the BEER model with monthly data covering a long period to find more detailed evidences on RMB misalignment. However, the monthly data for China and some countries are limited. For instance, Russia's monthly CPI data is available from 1992, while Vietnam's monthly CPI data is available only from 1995. Furthermore, China started to publish PPI data since September 1996 and monthly FDI data from 1997. Therefore the longest period we could cover in this study is from January 1997 to December 2012. Majority of data is from the CEIC, International Monetary Fund (IMF) and World Bank's WDI database and National Bureau of Statistics of China (see Appendix 3.1).

In order to measure the RMB equilibrium exchange rate, we need to calculate China's real effective exchange rate and other trade-weighted explanatory variables. We use the share of China's trade with its the largest twenty trading partners in China's total foreign trade with these twenty trading partners in 2010 as the trade weight of each trading partners. From Table 3.1, we can see that the US is China's largest trading partner which accounted for 12.96 per cent China's total trade, followed by Japan, Hong Kong SAR and Korea in 2010. Vietnam is the smallest trading partner among China's top 20 trading partners, which accounted for 0.99 per cent of China's total trade with these 20 trading partners in 2010. Compared with China's trading partners in 2009, there is little change in composition of China's main trading partners. It is also notable that China's trade with these 20 trading partners accounted for more than 70 per cent of China's total trade in 2010. Therefore our sample is sufficient enough to include China's main trading partners.

Table 3.1: China's top 20 trading partners in 2009 and 2010

Country (Region)	2009		Country (Region)	2010	
	Total (USD, bn)	Share to total trade		Total (USD, bn)	Share to total trade
United States	298.26	13.51	United States	385.64	12.96
Japan	228.78	10.36	Japan	296.57	9.97
Hong Kong, China	174.93	7.92	Hong Kong, China	227.71	7.66
Korea Rep.	156.21	7.08	Korea Rep.	206.83	6.95
Taiwan, China	106.22	4.81	Germany	142.45	4.79
Germany	105.64	4.79	Taiwan, China	112.88	3.79

Australia	60.13	2.72	Australia	86.93	2.92
Malaysia	51.97	2.35	Malaysia	74.19	2.49
Singapore	47.86	2.17	Brazil	62.50	2.10
India	43.38	1.97	India	61.74	2.08
Brazil	42.40	1.92	Singapore	56.19	1.89
Netherlands	41.81	1.89	Netherlands	55.40	1.86
United Kingdom	39.16	1.77	Russia	52.96	1.78
Russia	38.75	1.76	Thailand	50.08	1.68
Thailand	38.19	1.73	United Kingdom	45.13	1.52
France	34.46	1.56	Italy	44.97	1.51
Saudi Arabia	32.55	1.47	France	44.87	1.51
Italy	31.25	1.42	Indonesia	37.00	1.24
Canada	29.73	1.35	Canada	30.09	1.01
Indonesia	28.39	1.29	Vietnam	29.33	0.99
<i>Sub total</i>	<i>1,630.06</i>	<i>73.84</i>	<i>Sub total</i>	<i>2,103.45</i>	<i>70.72</i>
<i>Total</i>	<i>2,207.53</i>	<i>100.00</i>	<i>Total</i>	<i>2,974.47</i>	<i>100.00</i>

Source: Author's summery.

3.4.2 Methodology

Clark and MacDonald (1998) firstly developed the BEER model and used it to estimate the equilibrium exchange rates of German mark, Japanese yen and the US dollar. Unlike the FEER approach which focuses on the internal and external balances, the BEER approach interprets the behaviors of real exchange rate by a set of economic fundamentals. In other words, the behaviors of a set of economic fundamentals determine the equilibrium exchange rate. The BEER is a function of a number of key economic fundamentals in the long term. In essence, any movement of one country's real exchange rate, to some extent, reflects the fluctuation of its economic fundamentals, such as interest rate, current account, terms of trade, foreign reserves and so on. The misalignment of exchange rate is the deviation of the actual real exchange rate from the BEER. According to Clark and MacDonald (1998), it can be described in a reduced-form equation:

$$q_t = \beta'Z_t \quad (3.1)$$

where q_t is the BEER, Z_t denotes a vector of economic fundamentals and β is a vector of coefficients.

Actual real effective exchange rate is composed of the BEER, transitory factor and disturbance term as below:

$$q'_t = \beta'Z_t + \tau'T_t + \varepsilon_t \quad (3.2)$$

where q'_t is the actual real exchange rate, Z_t denotes a vector of economic fundamentals, T_t is a vector of transitory factor effecting the real exchange rate in the short term, and β and τ are the vectors of coefficients.

So current misalignment is the deviation of the actual exchange rate from its equilibrium real exchange rate:

$$q'_t - q_t = \tau' T_t + \varepsilon_t \quad (3.3)$$

Meanwhile, the long-run equilibrium real exchange rate is:

$$\bar{q}_t = \beta' \bar{Z}_t \quad (3.4)$$

where \bar{q}_t is the long-run equilibrium exchange rate, \bar{Z}_t is the vector of long-run economic fundamentals.

So the total misalignment is the deviation of actual real exchange rate from its long-run equilibrium exchange rate:

$$q'_t - \bar{q}_t = \tau' T_t + \varepsilon_t + \beta'(Z_t - \bar{Z}_t) \quad (3.5)$$

From equation (3.5), we can see that the total misalignment is composed of transitory factors, disturbance term and effects of deviation of economic fundamentals from their long-run values.

When employing the BEER approach to measure one currency's equilibrium exchange rate, one of the most important things is how to choose the economic fundamentals which determine the behavior of real exchange rate over the period. Accuracy and rationality of results by using the BEER approach much depend on an appropriate set of economic fundamentals which are believed to determine one country's equilibrium exchange rate, especially for a transitional economy like China. Clark and MacDonald (1998) apply three economic fundamentals, including terms of trade, relative price of non-traded to traded goods and net foreign assets, to estimate the equilibrium exchange rate for German mark, Japanese yen and the US dollar. In Zhang (2001)'s study, the economic fundamentals includes the gross fixed capital formation, government consumption (fiscal policy), growth rate of export and ratio of sum of foreign trade to GDP (openness). Funke and Rahn (2005) apply the same methodology to assess "how undervalued is Chinese RMB". Economic fundamentals in their research are the relative price of non-tradable to tradable goods and net foreign assets. Iossifov and Loukoianova (2007) estimate Ghana's equilibrium exchange rate by employing the real GDP growth, real interest rate differential and real world prices of Ghana's main

export commodities. Chen (2007) chooses the relative price of non-tradable to tradable goods, net foreign assets, terms of trade and degree of openness as economic fundamentals to assess RMB misalignment. Wang *et al.* (2007) include more economic fundamentals as explanatory variables in the BEER model in assessing RMB equilibrium exchange rate. These variables are the money supply, foreign reserves, terms of trade and relative price of non-tradable to tradable goods.

3.4.3 Econometric theory

In multiple time series analysis, vector autoregression (VAR) model, a generalized univariate autoregression (AR) model, is widely used in multivariate data analysis. An unrestricted VAR can be presented as:

$$x_t = \varphi_1 x_{t-1} + \varphi_2 x_{t-2} + \cdots + \varphi_p x_{t-p} + \varepsilon_t \quad (3.6)$$

i.e.
$$x_t = \sum_{i=1}^p \varphi_i x_{t-i} + \varepsilon_t \quad (3.7)$$

where x_t is a vector of variables ($n \times 1$), ε_t is a vector of white noise disturbance term with $E(\varepsilon) = 0$, φ_i is a coefficient matrix for $i = 1, \dots, p$ is the order of autoregression. According to Engle and Granger (1987), x_t is a set of variables that may be stationary [$I(0)$] or non-stationary [$I(1)$]. It can be tested by using Augmented Dickey-Fuller (ADF) test. Johansen (1987, 1991) initially developed two likelihood ratio tests of cointegration which are trace statistic and maximum eigenvalue statistics. Compared with the Engle-Granger test, Johansen test allows testing not only cointegration relations among more than two time series variables, but also the number of cointegrating relationships.

It is likely to find some variables are nonstationary and there exist cointegrating relationships among variables. We use vector error correction model (VECM) in a VAR framework to find the long-term relationship and short-term impact among variables. The VECM can be expressed as follow:

$$\Delta x_t = \Pi x_{t-1} + \varphi_1^* \Delta x_{t-1} + \cdots + \varphi_{p-1}^* \Delta x_{t-p+1} + \varepsilon_t \quad (3.8)$$

i.e.
$$\Delta x_t = \Pi x_{t-1} + \sum_{i=1}^{p-1} \varphi_i^* \Delta x_{t-i} + \varepsilon_t \quad (3.9)$$

where φ^* are functions of φ and Π is a matrix ($n \times n$), that are:

$$\varphi_i^* = - \sum_{j=i+1}^p \varphi_j \quad i=1, \dots, p-1 \quad (3.10)$$

$$\Pi = - \sum_{i=1}^p \Pi - I \quad (3.11)$$

where I is the identity matrix.

3.4.4 The BEER model

The BEER model establishes a behavioral link between the real exchange rate and relevant economic fundamentals by applying econometric skills. As mentioned early, the selection of a set of economic fundamentals which play important roles in determining equilibrium exchange rate is crucial in estimating RMB equilibrium exchange rate and RMB misalignment. In this study, we choose five economic fundamentals to as below:

$$BEER = F(BSE, ToT, OPENNESS, FR, FDI)$$

where:

<i>BSE</i> is Balassa-Samuelson Effect	
(Relative price of non-tradable to tradable goods)	(+)
<i>ToT</i> is terms of trade (ratio of export price to import price)	(+/-)
<i>OPENNESS</i> is the ratio of foreign trade to GDP	(+/-)
<i>FR</i> is the ratio of foreign reserve to GDP	(+)
<i>FDI</i> is the ratio of foreign directive investment to GDP	(+)

This research closely follows Chen (2007) to calculate above variables. Chen (2007) employs the BEER to estimate the RMB's equilibrium exchange rate by using quarterly data with reference to 13 China's trading partners. To make possible contribution, in this research, in addition to extend the sample period, we compute the explanatory variables by using monthly data and referring to China's 20 largest trading partners to more detailed information about RMB misalignment. The calculation and expected sign of each variable are explained as follow:

(1) The REER

The REER is the exchange rate weighted by the trade share of home country to its trading partners with reference to the relative prices (inflation). This trade weighted index is an economic instrument to compare the international competitiveness between countries. Several institutions such as IMF, World Bank, Bank for International settlement (BIS) and so on, publish their REER indices. For example, the BIS reports

the REER index which is calculated as geometric weighted averages of bilateral exchange rates adjusted by relative consumer prices for total 61 economies. In this research, we calculate our own REER index with reference to the selected 20 economies which are China's main trading partners. We calculate our own REER index rather than use the indices from other institutions because we need to keep the same weight in calculating other variables. Increase in the value of REER represents the real appreciation of the currency, while decrease of REER indicates currency depreciation. The REER can be defined as:

$$REER = \prod_{i=1}^{N=20} \left[\frac{S^{PRC} \cdot CPI^{PRC}}{S^i \cdot CPI^i} \right]^{W^i} \quad (3.12)$$

where S^{PRC} (S^i) is the nominal exchange rate of the RMB (nominal exchange rate of the currency of trading partner i). Both are bilateral exchange rates in the US dollar (measured as US dollar price of one unit of other currencies). CPI^{PRC} (CPI^i) is the consumer price index of China (consumer price index of trading partner i). W^i is the trade weight which is China's trade share with China's trading partner i in China's total trade with these trading partners.

Rewriting (3.12) by taking natural log for both sides, we have:

$$\begin{aligned} reer &= \ln REER \\ &= \sum_{i=1}^{N=20} W^i (\ln S^{PRC} + \ln CPI^{PRC} - \ln S^i - \ln CPI^i) \\ &= \sum_{i=1}^{N=20} W^i (s^{PRC} + cpi^{PRC} - s^i - cpi^i) \end{aligned} \quad (3.13)$$

(2) Terms of trade

Terms of trade (ToT) is the ratio of exports price index to import price index. The ToT reflects one country's international economic environment. The higher ToT implies one country can earn more from what they export and pay less for what they import. An improved long-term ToT indicates that one country can purchase more goods through the international trade, thereby increasing overall national welfare. There could be a positive relationship between the ToT and real exchange rate because the increase in export prices relative to import prices will improve country's current account balance, thereby pushing currency's value to increase. On the other hand, a rise in the ToT may induce a shift in demand from future consumption to current consumption (Baak, 2012). So the ToT could have a negative relation with real exchange rate. According to the definition, the ToT could be expressed as follow:

$$ToT = \frac{EX^{PRC} / IM^{PRC}}{\prod_{i=1}^{N=20} (EX^i / IM^i)^{W^i}} \quad (3.14)$$

where EX^{PRC} (IM^{PRC}) is the export price index of China (import price index of China). EX^i (IM^i) is the export price index of trading partner i (import price index of trading partner i). W^i is the trade weight which is China's trade share with China's trading partner i in China's total trade with these trading partners.

Rewriting (3.14) by taking natural log for both sides, we have:

$$\begin{aligned} tot &= \ln ToT \\ &= (\ln EX^{PRC} - \ln IM^{PRC}) - \sum_{i=1}^{N=20} W^i (\ln EX^i - \ln IM^i) \\ &= (ex^{PRC} - im^{PRC}) - \sum_{i=1}^{N=20} W^i (ex^i - im^i) \end{aligned} \quad (3.15)$$

(3) The Balassa-Samuelson effect (relative price of non-tradable to tradable goods)

The Balassa-Samuelson effect (Balassa, 1964 and Samuelson, 1964) signifies that differentials of productivity growth between tradable goods sector and non-tradable goods sector result in distortion of purchasing power parity (PPP). This attributes to the fact that productivity improves faster in tradable goods sector than that in non-tradable goods sector. Under a fully international competitive environment, prices in non-tradable goods sector will grow along with the price increase in tradable goods sector, although productivity in non-tradable goods sector does not grow at the same pace as that in tradable goods sector. However, total price index for total economy comprised the prices of and tradable goods and non-tradable goods. Therefore, total price index increases more rapidly in the fast-growing economy than others which implies that real exchange rate needs to appreciate. Thus we expect a positive relationship between the Balassa-Samuelson effect and real exchange rate.

We define the ratio of the domestic consumer price index (CPI) to the domestic producer (wholesale) price index (PPI) relative to the corresponding trade-weighted ratios of trading partners as a proxy to Balassa-Samuelson effect (*BSE*). It can be expressed as follow:

$$BSE = \frac{CPI^{PRC} / PPI^{PRC}}{\prod_{i=1}^{N=20} (CPI^i / PPI^i)^{W^i}} \quad (3.16)$$

where CPI^{PRC} and PPI^{PRC} are China's consumer price index and producer price index, respectively. Correspondingly, CPI^i and PPI^i are the trading partner i 's consumer and producer (wholesale) price index. W^i is the same as above.

Rewriting (3.16) by taking natural log for both sides, we have:

$$\begin{aligned}
 bse &= \ln BSE \\
 &= (\ln CPI^{PRC} - \ln PPI^{PRC}) - \sum_{i=1}^{N=20} W^i (\ln CPI^i - \ln PPI^i) \\
 &= (cpi^{PRC} - ppi^{PRC}) - \sum_{i=1}^{N=20} W^i (cpi^i - ppi^i)
 \end{aligned} \tag{3.17}$$

(4) Openness

Degree of openness significantly influences country's real exchange rate because the extent of openness has effect on the prices and volume of country's imports and exports which are sensitive to exchange rate. Moreover, degree of openness captures the dynamics of current account balance which is influenced by the exchange rate to some extent. However, how the openness affects the real exchange rate is not certain. For a catching-up economy, on the one hand, higher degree of openness stimulates importing more goods which may impair country's terms of trade. So there may be a negative relationship between openness and real exchange rate. On the other hand, higher openness may indicate better current account situation which results in currency appreciation. Therefore openness may have positive effect on real exchange rate. Conventional measurement of degree of openness is the ratio of total foreign trade to nominal GDP as below:

$$OPENNESS = (EX^{PRC} + IM^{PRC}) / GDP^{PRC} \tag{3.18}$$

where $OPENNESS$ is the degree of openness, EX^{PRC} (IM^{PRC}) is China's monthly value of exports (imports) and GDP^{PRC} is China's nominal GDP.

(5) Foreign reserves

We also include the ratio of foreign reserves to nominal GDP as an economic fundamental into the BEER model to estimate the degree of RMB misalignment. The amount of foreign reserves reflects the situations of country's current account and financial account. In principle, the increase of current account surplus which is tightly related to the level of exchange rate would build up country's foreign reserves. Therefore, foreign reserves make contribution to the determination of country's equilibrium exchange rate. It is particularly true for China. Figure 3.1 shows tremendous increase in China's foreign reserves during the period of 1980 to 2010.

Accumulation of foreign reserves created by the current account surplus requires currency appreciation to balance the current account. Thus a positive relationship between foreign reserves and real exchange rate is expected. We employ the ratio of China's foreign reserves to nominal GDP as follow:

$$FR = \text{foreign_reserves}^{PRC} / GDP^{PRC} \quad (3.19)$$

(6) Foreign direct investment (FDI)

The FDI positively promotes China's exports during the process of China's rapid economic growth, thereby improving China's current account situation. Therefore it has effect on China's real exchange rate. More recently, FDI became a channel for foreign capital to flow into China when China remained its capital account tightly controlled. China's PBoC had to issue more central bank bills to sterilize such foreign capital inflows. It not only increased operation costs of central bank, also caused higher inflation. Thus we expect positive effect of FDI inflow on real exchange rate. It is expressed as follow:

$$FDI = FDI_inflow^{PRC} / GDP^{PRC} \quad (3.20)$$

(7) Weights of trading partners

The weight is the foreign trade share of each trading partner with China in China's total trade with these 20 trading partners. In this paper, we calculate the percentage of each China's top 20 trading partner in China's total foreign trade in 2010 as the average weight of each trading partner. It includes almost all of China's main trading partners from 1997 to 2012 (See Table 1).

$$W^i = Trade^i / Totaltrade \quad (3.21)$$

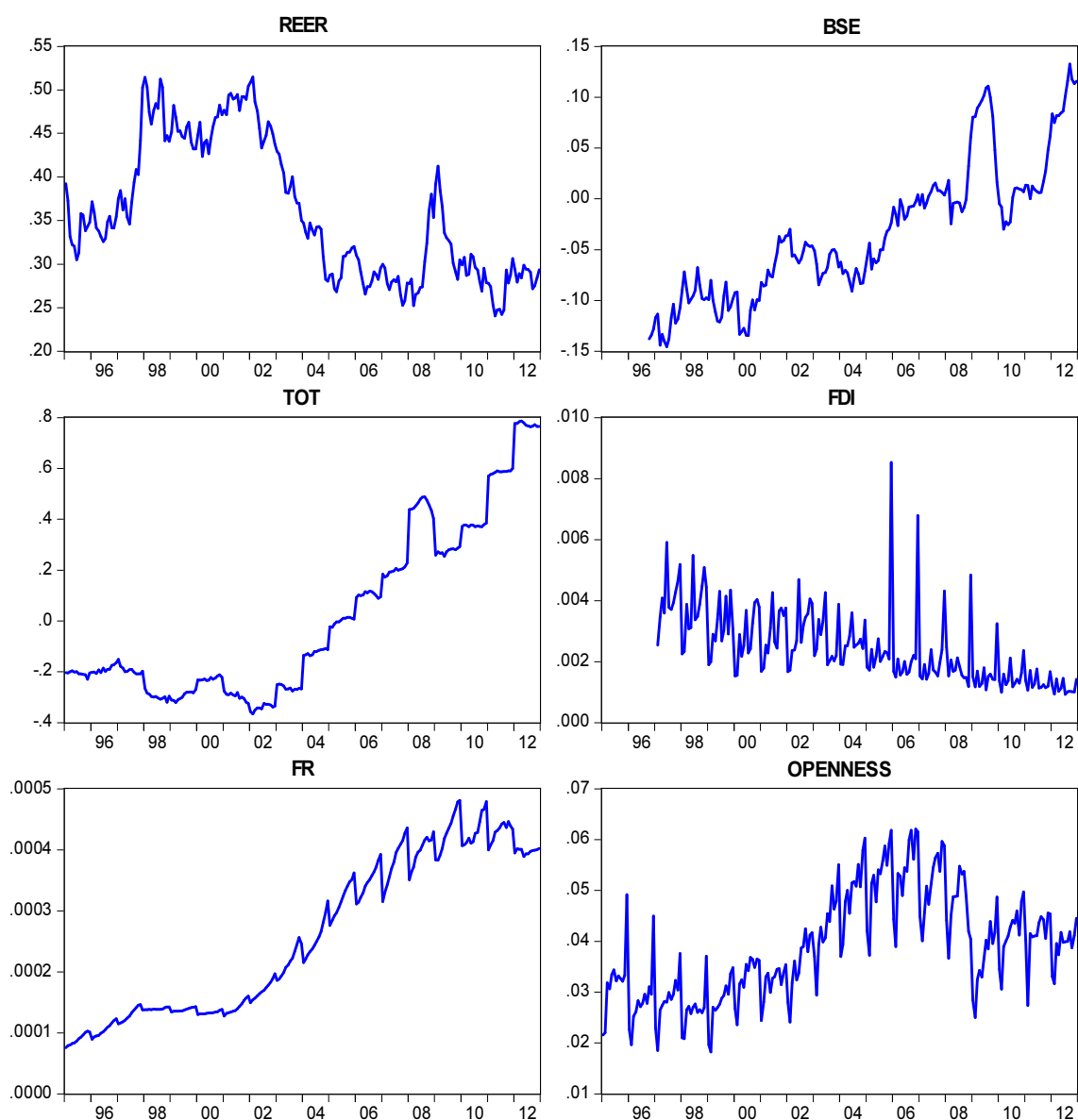
where W^i is the weight of China's trading partner i , $Trade^i$ is the amount of China's foreign trade with trading partner i and $Totaltrade$ is total amount of China's foreign trade with these 20 trading partners.

3.5 Results Analysis

Figure 3.3 reports the dynamics of the RMB's REER and China's five economic fundamentals over the period. The REER of the RMB we calculated, fluctuated from 1995 to 1997, and then increased sharply in 1998. It dropped from 1999 to mid-2000 and recovered boldly by the end of 2001. Since 2002, it declined sharply until the end of 2004. From 2005, the RMB's REER remained relatively stable except 2008 and 2009

when the global financial crisis struck the world economy. The fluctuation of REER of the RMB is very different from the movement of its nominal exchange rate. It reflects the fact that the real exchange rate of RMB did not appreciate continuously as its nominal exchange rate did (see Figure 3.3). For the Balassa-Samuelson effect, in general, there is an upward trend, although it decreased in 1997 and 2008. It reflects the impact of Asian financial crisis of 1997 and global financial crisis of 2007-2008 on China's export industry. China's terms of trade deteriorated since 1997 mainly because Asian Financial Crisis 1997 negatively impacted on China's exports. It then recovered dramatically from 2002 until the end of 2008. Because of the global financial crisis which seriously struck China's exports, China's terms of trade dropped considerably again in 2008, although it recovered boldly since 2009. China's openness increased continuously except for 2008 and 2009 when China's growth rate of exports declined due to weak demand for China's exports during the period of crisis. Also, China's foreign reserves were accumulated since 1997. In addition, we can see from Figure 3.3 that the ratio of foreign reserves to GDP increased continuously, reaching the peak in 2010. It dropped steadily in 2011 and 2012. What's more, China's FDI inflows increased considerably during the period we covered. In contrast, the ratio of FDI inflows to GDP did not grow but declined slightly over the period.

Figure 3.3: The RMB's REER and economic fundamentals of the BEER, 1995-2012



Source: Author's calculation.

Empirically, for the vector autoregression (VAR) analysis, we need to test if all variables are stationary or not. Result of augmented Dickey-Fuller (ADF) test shows that all variables in level are non-stationary and there is unit root $I(1)$ in each variable except for the fr (see Table 3.2).

Table 3.2: Unit root test by ADF test

Variable	ADF test	Critical value		ADF test	Critical value		$I(1)$ or $I(0)$
		at 1%	at 5%		at 1%	at 5%	
		Levels		First difference			
<i>reer</i>	-2.0198	-4.0013	-3.4309	-12.8439	-4.0045	-3.4310	$I(1)$

<i>bse</i>	-3.0908	-4.0063	-3.4333	-12.3043	-4.0063	-3.4333	<i>I</i> (1)
<i>tot</i>	-1.5154	-4.0013	-3.1391	-14.1724	-4.0015	-3.4310	<i>I</i> (1)
<i>fr</i>	-1.4535	-4.0039	-3.4321	-2.0462	-4.0039	-3.4321	<i>I</i> (2)
<i>openness</i>	-1.6945	-3.4627	-2.8757	-2.9450	-3.4627	-2.8757	<i>I</i> (1)
<i>fdi</i>	-2.4558	-4.0101	-3.4351	-17.3107	-4.0101	-3.4351	<i>I</i> (1)

Source: Author's calculation.

We exclude the *fr* because it is *I*(2). We then adopt the Johansen test to see if there is cointegration relationship among the variables. Johansen test provides two cointegration tests: the trace test and the max-eigenvalue test. Table 3.3 shows that there is one cointegration relationship among variables.

Table 3.3: Johansen test for cointegration

Number of obs.=175					
Lags=14					
Rank	Trace statistic		5% critical value	Max-eigenvalue	5% critical value
None	95.1214	*	69.8189	52.1982	*
1	42.9232		47.8561	18.0935	
2	24.8297		29.7971	16.2111	
3	8.6186		15.4947	7.1094	
4	1.5092		3.8415	1.5092	

Source: Author's calculations.

Note: * significant at 5 per cent.

We then proceed to estimate the VECM model. Table 3.4 presents the coefficient of each variable. Coefficient of the *bse* is positive and significant, while coefficients of the *tot*, *openness* and *fdi* are negative and significant. Equation (22) can be used to calculate the BEER of the RMB.

Table 3.4: VECM results

beta	Coefficient	Std. Err.	t-statistics
<i>reer</i>	1.00		
<i>bse</i>	0.863205 *	0.10466	- 8.24975
<i>tot</i>	- 0.372578 *	0.02995	12.4405
<i>openness</i>	- 6.389598 *	0.28019	22.8044
<i>fdi</i>	- 30.35652 *	8.90196	3.41009
<i>constant</i>	0.739328 *	.	.

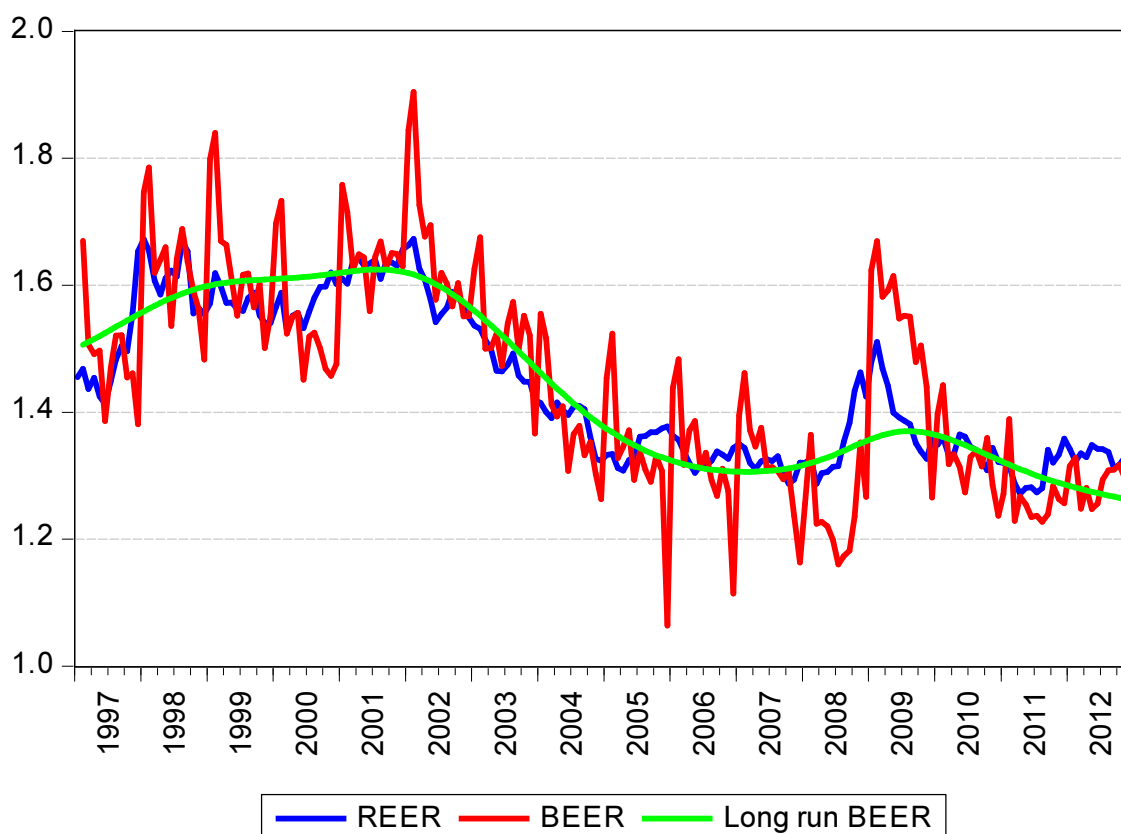
Source: Author's calculations.

So the long-run relationship between the BEER of the RMB and China's economic fundamentals is:

$$\begin{aligned}
 BEER = & 0.863 \times BES - 0.373 \times ToT - 30.357 \times FDI \\
 & - 6.390 \times OPENNESS + 0.739
 \end{aligned} \tag{3.22}$$

All explanatory variables have expected signs except for the *FDI*. As the theory suggests, there should be a positive relation between the FDI inflow and the real exchange rate. Negative signs of the *FDI* may imply that the FDI inflow did not significantly affect RMB equilibrium exchange rate as much as do other economic fundamentals during the period we covered. We could calculate the RMB's BEER by using the equation (3.22). According to Clark and Macdonald (1998), the long-run economic fundamentals can be obtained by using Hodrick-Prescott filter. Therefore the RMB's long-run BEER also can be computed from the equation (3.22) (see Figure 3.4).

Figure 3.4: The RMB's actual REER, BEER and long-run BEER, base year=2005



Source: Author's calculation.

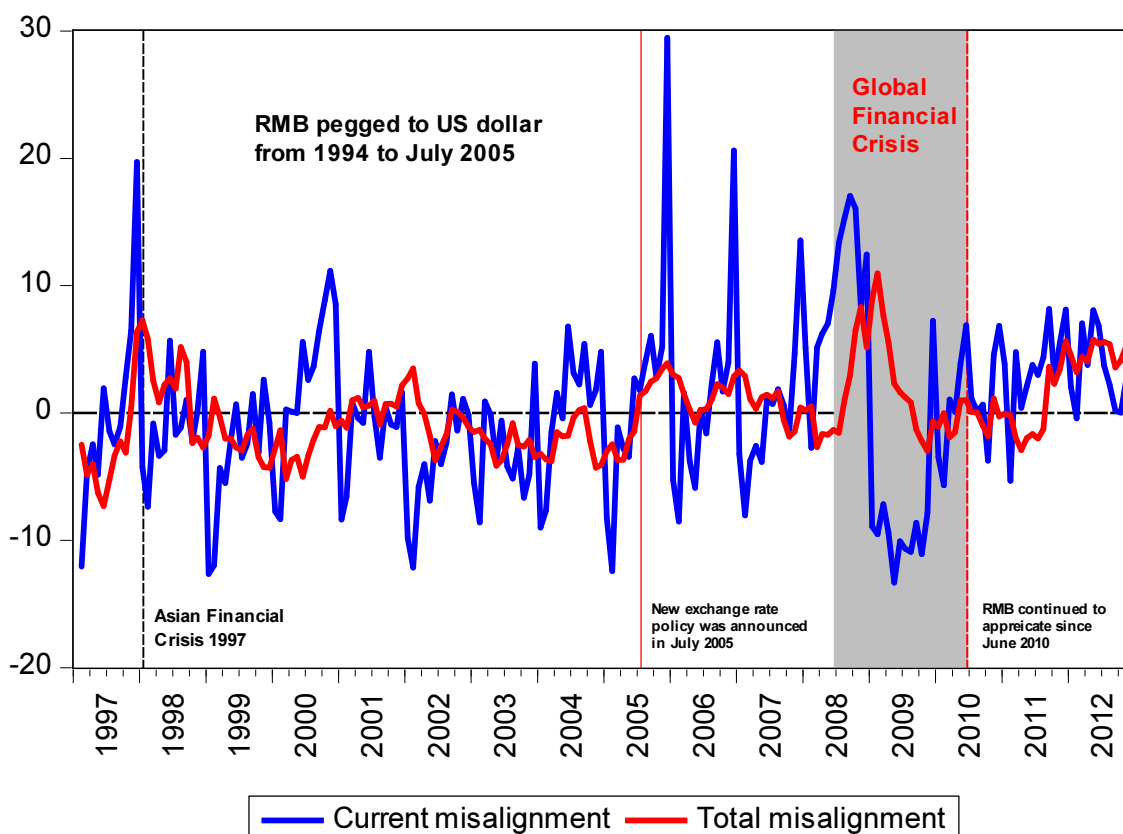
The RMB misalignment is the deviation of the RMB's actual REER from its equilibrium exchange rate which is the BEER. So we have:

$$misalignment = (actual_REER - BEER) / BEER \times 100\% \quad (3.23)$$

Using the equation (3.23), we could calculate the RMB's current misalignment which is computed by dividing the difference between the RMB's actual REER and BEER by the RMB's BEER. In the same way, the RMB's total misalignment can be computed by replacing the BEER with the long-run BEER. The RMB is overvalued when RMB

misalignment is more than zero, while the RMB is undervalued when RMB misalignment is less than zero. Figure 3.5 illustrates the dynamics of the RMB's current and total misalignment over the period.

Figure 3.5: The RMB's current misalignment and total misalignment



Source: Author's calculations.

Figure 3.5 illustrates an explicit image that how the RMB was misaligned from its equilibrium level over the period of 1997-2012. Before 2005, the RMB was undervalued by 5 to 10 per cent during the most of periods. It is also notable that the RMB was overvalued in 1997 mainly because of the Asian Financial crisis in 1997 which significantly deteriorated China's terms of trade. During the period of crisis, China kept the RMB not to be devaluated, while other currencies of East Asian countries depreciated remarkably. It caused China's export goods more expensive than those of its competitors. China's trade surplus to GDP shrank sharply in 1997 (see Figure 3.1). In 1998, the RMB misalignment gradually declined when China's exports recovered. From 1999 to 2005, the RMB gradually shifted from overvaluation to undervaluation. It reflects the remarkable growth of China's economy and exports. During this period, the RMB was tightly pegged to the US dollar. Also, China's terms of trade improved, and the current account surplus and foreign reserves increased substantially.

After the announcement of new exchange rate policy in July 2005, the RMB began to be revaluated gradually in nominal and real terms. From Figure 3.5, we can see that the RMB began to approach its equilibrium level and RMB misalignment narrowed since 2005. The RMB even became overvalued from 2005 to 2006, although it is not significantly. However, the global financial crisis disrupted the trend of the RMB approaching its equilibrium level. In 2008, the RMB was overvalued and the total misalignment of the RMB rose to about 5 per cent by the end of 2008. It may be because that the crisis hit China's economy, especially China's exports. China also suffered the relatively high inflation compared to other countries during the same period. In addition, the currencies of China's major trading partners depreciated during the period of crisis. Since the second half year of 2008, the RMB was re-pegged to the US dollar until the mid-2010 (see Figure 2.2). So we find that the RMB's total misalignment dramatically decreased from overvaluation to undervaluation by up to 5 per cent in the beginning of 2010. After that, the RMB exchange rate fluctuated around its equilibrium exchange rate. More recently, the RMB continued to be revaluated since 2011 (see Figure 2.2). At the same time, China's current account surplus ratio to GDP shank sharply from 10.1 per cent in 2007 to 2.6 per cent in 2012. Such significant macroeconomic changes may cause the RMB overvaluation at about 3-5 per cent in 2012.

Our results are consistent with the findings in recent studies on RMB misalignment (Cline and Williamson, 2009, 2010, 2011 and 2012). In their studies, they find that RMB misalignment reduced gradually and RMB was undervalued by only 3 per cent in the first half of 2012, although we find that the RMB was slightly overvalued by 5 per cent by the end of 2012. However, it is worthwhile to note that it is still difficult to make consensus on what degree of the RMB misalignment is. As Cheung, Chinn and Fujii (2010) point out, it is unlikely to reach an agreement on RMB equilibrium exchange rate and RMB misalignment due to theoretical and empirical difficulties. As mentioned early, the conclusions on the degree of RMB misalignment differ with various economic methodologies. Our findings provide a new estimation result of RMB misalignment, although it should be interpreted cautiously.

3.6 Chapter Conclusions

It is widely believed that the RMB was undervalued over the last decade. Recently, the RMB appreciated significantly in both nominal and real terms. Debate on RMB misalignment remained unclear, although Chinese authorities argued that the RMB is approaching its equilibrium level. In this chapter, by applying the BEER approach, we estimated how the RMB was misaligned from its equilibrium exchange rate during the period of January 1997 to December 2012. We find that the RMB was undervalued during the period of 1997 to 2005, although it was slightly overvalued in 2001. Since 2005 when the RMB began to be revaluated, the RMB gradually shifted from undervaluation to overvaluation for a short period. It then became undervalued when China's macroeconomic situation improved significantly and China's trade surplus continued to increase. However, the RMB became overvalued when the global financial crisis hit China's exports and many emerging economies' currencies were significantly

devaluated during the period of crisis. Since 2008 when the RMB was re-pegged to the US dollar, China's economy gradually recovered from the crisis. The RMB was undervalued by about 3 per cent in beginning of 2008. More recently, Chinese monetary authorities reaffirmed that China would further reform the RMB exchange rate regime and enhance the RMB exchange rate flexibility, the RMB continued to appreciate. In the meantime, the ratio of current account surplus to GDP of China shrank considerably. These macroeconomic changes caused the RMB overvaluation in 2012, but not significantly. We could conclude that the RMB is not significantly undervalued as before and it has approached its equilibrium level since China launched the exchange rate reform in July 2005. The RMB was even slightly overvalued in 2012.

Chapter 4: RMB Revaluation and China's International Competitiveness

4.1 Background

After employing the Reform and Opening policy at the end of 70s, China has gradually accumulated and international competitiveness advantage based on its abundant labor force and rapid productivity improvement. In addition, China's "wise" exchange rate policy substantially strengthened its international competitiveness in the global market (Nugyen, 2011). Recently, however, it appeared that China's long-lasting international competitiveness is vanishing. China's "unlimited" and cheap labor force supply has weakened. Cyclical labor shortages in the coastal area of China where manufacturing industries concentrated were reported more frequently since 2004. Also, Chinese workers' wages have increased considerably since 2008. According to the IMF's World Economic Outlook Database (October 2010), total labor costs in China are higher than in most of Association of Southeast Asian Nations (ASEAN) countries, which are usually regarded as China's competitors in manufacturing goods exports. What's more, since July 2005 when the PBoC announced a new exchange rate policy that allowed greater flexibility of the nominal exchange rate vis-à-vis the US dollar, the RMB has significantly appreciated in both nominal and real terms. Some foreign-invested firms based in China and Chinese firms themselves have begun to move out from China and have relocated in some Southeast Asian countries for the cheaper labor and lower costs. As evidence of this, China's overseas direct investment (ODI) to ASEAN countries increased considerably to US\$ 4,404.64 million in 2010 from US\$ 335.75 million in 2005.¹⁶ In the meantime, Japan's FDI to ASEAN countries grew from US\$ 5.1 billion in 2005 to US\$ 19.4 billion in 2011. The above evidence implies that China's international competitiveness, which significantly contributed to its economic miracle over the past several decades, is weakening.

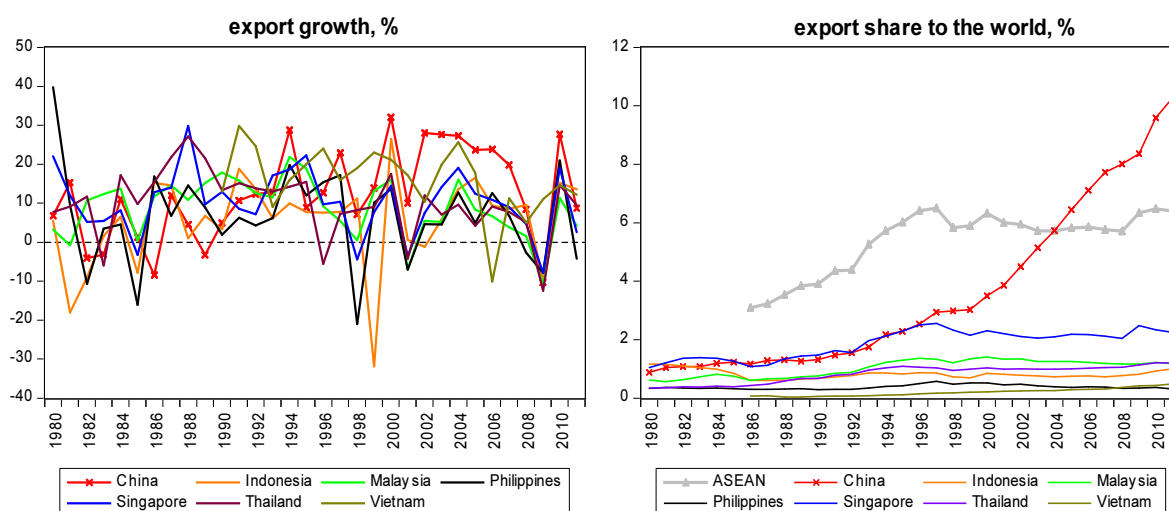
Nevertheless, China's striking regional disparity should not be neglected when we assess China's international competitiveness relative to other countries. The higher costs at the national level do not necessarily mean all regions of China are less competitive. The level of economic development in China's coastal area reached the levels of middle-developed countries in terms of GDP per capita. However, some provinces in western area of China with abundant surplus labor and low wages are still poor. Fan (1997) and Cai *et al.* (2002) argue that China's regional disparity is still significant, although there is evidence of conditional convergence in economic growth across regions. China's big size in terms of economy and geography as well as regional disparity could be burdens to China, although they significantly contribute to China's economic development (Liu, 2011). But we argue that such regional disparity also provides Chinese policymakers with the time and space to prolong the period of economic growth according to the Flying Geese Model (Akamatsu, 1962). But why could China do it? We expect to find some evidence for this argument by comparing

¹⁶ See 2011 Statistical Bulletin of China's Outward Foreign Direct Investment, reported by Ministry of Commerce of People's Republic of China.

unit labor costs (ULCs) between China and ASEAN countries at both national and regional levels.

The reason we choose ASEAN countries to compare with China is because to some extent, ASEAN countries are looked at as the main rivals to China in traditional low-cost and labor-intensive goods exports (Holst and Weiss, 2004). Share of exports in the world's total trade provides us with a sense of one country's international competitiveness in the global market. Figure 4.1 shows that China's exports grew more rapidly than ASEAN as a whole, surpassing ASEAN's exports in 2004. By 2011, China became the world's largest exporter, accounting for 10.27 per cent of the world's total exports, while the share of ASEAN's exports is about 6.27 per cent of the world's total exports. The increasing weight of exports of China and ASEAN countries in the world trade system highlights that international competitiveness of both China and ASEAN countries improved significantly compared to the rest of the world (Holst and Weiss 2004 and Thorbecke *et al.* 2010). The recent tendency for shifting manufacturing firms from China and increasing China's ODI toward ASEAN countries imply that it is increasingly important to assess China's international competitiveness relative to ASEAN countries.

Figure 4.1: China and ASEAN's export growth and shares to the world's total exports, 1980-2012



Source: WDI of World Bank.

How did recent wage increase and RMB revaluation impact on China's exports? Is China still competitive compared with Southeast Asian countries, in particular, ASEAN countries? What should China do to prolong the period of economic growth against the background of rising wages and RMB revaluation? To answer these questions, a comparison of international competitiveness between China and ASEAN countries is needed. There are several indicators to measure a country's international competitiveness such as the GDP deflator, real effective exchange rate (REER), the

ULCs and so forth. In this chapter, we attempt to assess China's international competitiveness not only at the national level, but also at the regional level, with particular emphasis on ULCs comparison. Also, the impact of RMB revaluation and ULCs change on China's exports is estimated. To our knowledge, this is the first attempt to assess China's international competitiveness by comparing ULCs between China and ASEAN countries at both the national and regional levels.

The rest of this chapter is organized as follows. Section 2 is literature review. In Section 3, we review the RMB revaluation and recent development of the labor market in China. Some indicators of measuring international competitiveness between China and ASEAN countries are compared in Section 4. Section 5 presents comparison of ULCs between China and ASEAN countries at the national and regional levels. Possible impacts of RMB appreciation and ULCs rising on China's exports are estimated in Section 6. Section 7 concludes this chapter.

4.2 Literature Review

Kwan (2002) finds that China's export competitiveness still lagged far behind Japan and some Asian countries based on a comparison of the rated structures among Asian countries. By doing a comprehensive comparison including the relative comparative advantage, exchange rate, labor costs and other factors influencing competitiveness, Adams *et al.* (2002) find China's international competitiveness is not only just matter of an undervalued exchange rate and extremely low labor costs, but also the capacity to meet the world requirements for quality and product design. Yang *et al.* (2010) find China still enjoys enormous labor cost advantages by comparing the wages between China and its neighboring developed economies. However, some studies find China's ULCs increased considerably since 2000 (Marconi and Cui, 2013). They find some evidence that the ULCs in the inland and western area of China grew more rapidly than those in the coastal area of China. On the other hand, Chen *et al.* (2007)'s findings show that the faster growth in productivity relative to labor compensation has led to China's ULCs declined significantly in all provinces of China.

Only few papers study the comparison of ULCs between China and other countries. Van Ark *et al.* (2008) compare the productivity, labor costs in the manufacturing sector between China and India, and argue that China is less competitive than India in terms of ULCs in manufacturing sectors because the increasingly higher compensation overweighed the labor productivity improvement in China than the relative level in India. Ceglowski and Golub (2012) investigate China's relative ULCs considering recent RMB appreciation. They find that the relative ULCs in China fell until 2003, followed by an increase since then. However, China's ULCs in the manufacturing sector remains relatively low compared with the levels in developed countries and a number of emerging economies, although both labor compensation and productivity have increased much more rapidly in China than these in the US. However, there is no literature which puts attention on the comparison between China's regional ULCs and ASEAN countries' national ULCs. We attempt to fill this gap.

4.3 RMB Revaluation and Recent Development of the Labor Market in China

We have shown in Chapter 2 that the RMB has appreciated considerably since 2005 when the PBoC lifted controls on the RMB exchange rate (see Figure 2.2). As an exports and investment oriented economy, China's international competitiveness is significantly influenced by the RMB exchange rate. The significant increase of the RMB's REER implies that China's international competitiveness weakened due to RMB revaluation. In the meantime, China's labor market experienced drastic changes in the last several years. China's "unlimited" labor supply seemed to disappear. Labor shortages occurred more frequently in some areas of China. Meanwhile, labor costs in China also increased dramatically in the aftermath of the global financial crisis. In 2011, 25 provinces and regions of China's 31 prefectures raised the standard local minimum wage¹⁷ (see Table 4.1). In the first half of 2011, 18 provinces or regions adjusted their minimum wage standards with an average increase of 22 per cent. Moreover, compared with other countries, the wages of Chinese workers are relatively higher than some emerging Asian countries. According to *IMF World Economic Outlook* (October, 2010), the average minimum wage in China was US\$ 1,500 per year, and US\$ 2,250 per year, if including mandatory welfare, in 2010. Only Malaysia and Thailand's average minimum wages were higher than China's (see Table 4.2).

Table 4.1: Adjustment of minimum wage standard in China by prefecture, until January of 2012

Region	Date of implementation	Monthly minimum wage standard, unit: yuan							Hourly minimum wage, unit: yuan					
		Tier 1	Tier 2	Tier 3	Tier 4	Tier 5	Tier 6	Tier 7	Tier 1	Tier 2	Tier 3	Tier 4	Tier 5	Tier 6
Beijing	1/1/2011	1160							13.00					
Tianjin	4/1/2011	1160							11.60					
Hebei	7/1/2011	1100	1040	960	860				11.00	10.40	9.60	8.60		
Shanxi	4/1/2011	980	900	820	740				10.80	9.90	9.00	8.10		
Inner Mongolia	11/1/2011	1050	980	900	820				8.90	8.30	7.60	6.90		
Liaoning	7/1/2011	1100	900	780					11.00	8.50	7.50			
Jilin	5/1/2011	1000	950	890	830				7.70	7.30	6.80	6.30		
Heilongjiang	7/1/2010	880	840	720	700	670	620	600	7.50	6.50	6.00	5.80	5.50	
Shanghai	4/1/2011	1280							11.00					
Jiangsu	2/1/2011	1140	930	800					9.20	7.50	6.50			
Zhejiang	4/1/2011	1310	1160	1060	950				10.70	9.50	8.60	7.70		
Anhui	7/1/2011	1010	900	800	750	720	680		10.60	9.40	8.40	7.80	7.50	7.10
Fujian	3/1/2011	1100	950	850	750				11.60	10.00	9.00	7.90		
Jiangxi	7/1/2010	720	660	600	550	500			6.80	6.20	5.70	5.20	4.70	
Shandong	3/1/2011	1100	950	800					11.50	9.80	8.70			
Henan	10/1/2011	1080	950	820					10.20	8.90	7.70			
Hubei	12/1/2011	1100	900	750					10.00	8.50	7.70			
Hunan	7/1/2011	1020	930	840	770				10.00	8.50	7.00			
Guangdong	3/1/2011	1300	1100	950	850				12.50	10.50	9.30	8.30		
Guangxi	9/1/2010	820	710	635	565				6.00	5.50	5.00	4.50		
Hainan	7/1/2010	830	730	680					7.20	6.30	5.90			
Chongqing	1/1/2011	870	750	710					8.70	7.50	7.10			
Sichuan	8/1/2010	850	780	710	650				8.90	8.20	7.50	6.80		
Guizhou	9/1/2011	930	830	740					10.00	9.00	8.00			
Yunnan	9/1/2011	950	845	720					9.00	8.00	7.00			

¹⁷ China does not have a national minimum wage standard, but a prefectural standard.

Tibet	8/1/2010	950	900	850					8.50	8.00	7.50			
Shaanxi	1/1/2011	860	780	730	680				8.60	7.80	7.30	6.80		
Gansu	10/1/2010	760	710	670	630				7.90	7.50	7.10	6.60		
Qinghai	12/1/2011	920	910	900					9.30	9.20	9.10			
Ningxia	4/1/2011	900	820	750					9.00	8.50	8.00			
Xinjiang	6/1/2011	1160	960	880	800				11.60	9.60	8.80	8.00		

Source: Ministry of Human Resources and Social Security of the People's Republic of China, published on Jan. 19, 2012¹⁸.

Note: Shaded provinces or regions indicate that the minimum wage standard was increased in 2011.

The above evidence indicates that China's international competitiveness is not as strong when the RMB is being revaluated and Chinese workers' wages are increasing. Wage rises could cut down Chinese exporters' profit margins, which are already extremely thin. China's exports, especially manufacturing goods exports, are sensitive to the RMB exchange rate. RMB appreciation causes China's goods to become less competitive in the global market. Thus, recent wage increasing and RMB revaluation implies that China's international competitiveness has significantly weakened.

Table 4.2: Wage overheads in some Asian countries, 2010

Country	Average minimum annual salary, per worker, in US\$	Average mandatory welfare, % of salary	Total labor costs, in US\$
Bangladesh	798	n/a	798
Cambodia	672	n/a	672
China	1,500	50	2,250
India	857	10	943
Indonesia	1,072	6	1,089
Laos	1,057	9.5	1,157
Malaysia	4,735	23	5,824
Mongolia	2,004	n/a	2,004
Myanmar	401	n/a	401
Nepal	1,889	n/a	1,889
Pakistan	984	7	1,052
Philippines	2,053	9.4	2,246
Sri Lanka	1,619	n/a	1,619
Thailand	2,293	6.9	2,451
Vietnam	1,002	15	1,152

Source: IMF World Economic Outlook Database, October 2010.

4.4 Some Measurements of International Competitiveness

International competitiveness is a complex concept to measure. The European Commission defines competitiveness as achieving high and rising standards of living of

¹⁸ See:

http://www.mohrss.gov.cn/SYrlzyhshbzb/ldbk/gongzishourufenpei/zuidigongzi/201201/t20120119_87287.htm (in Chinese)

a nation with the lowest possible level of involuntary unemployment on a sustainable basis. A comprehensive assessment of competitiveness is needed to measure all aspects of competitiveness for a country. According to The Global Competitiveness Report 2011–2012 of World Economic Forum,¹⁹ China was ranked at 26th among 142 economies in the world, and 27th position in the 2010–2011 report. For ASEAN countries, Singapore moved up one place to 2nd from 3rd position last year. Malaysia also improved to 21st from 26th last year. Thailand and Indonesia kept an unchanged position at 39th and 46th. Vietnam dropped to 65th from 59th position and Philippines climbed to 75th from 85th position last year. Generally speaking, China and most of the ASEAN countries, except for Vietnam, all improved or maintained their international competitiveness over the past several decades.

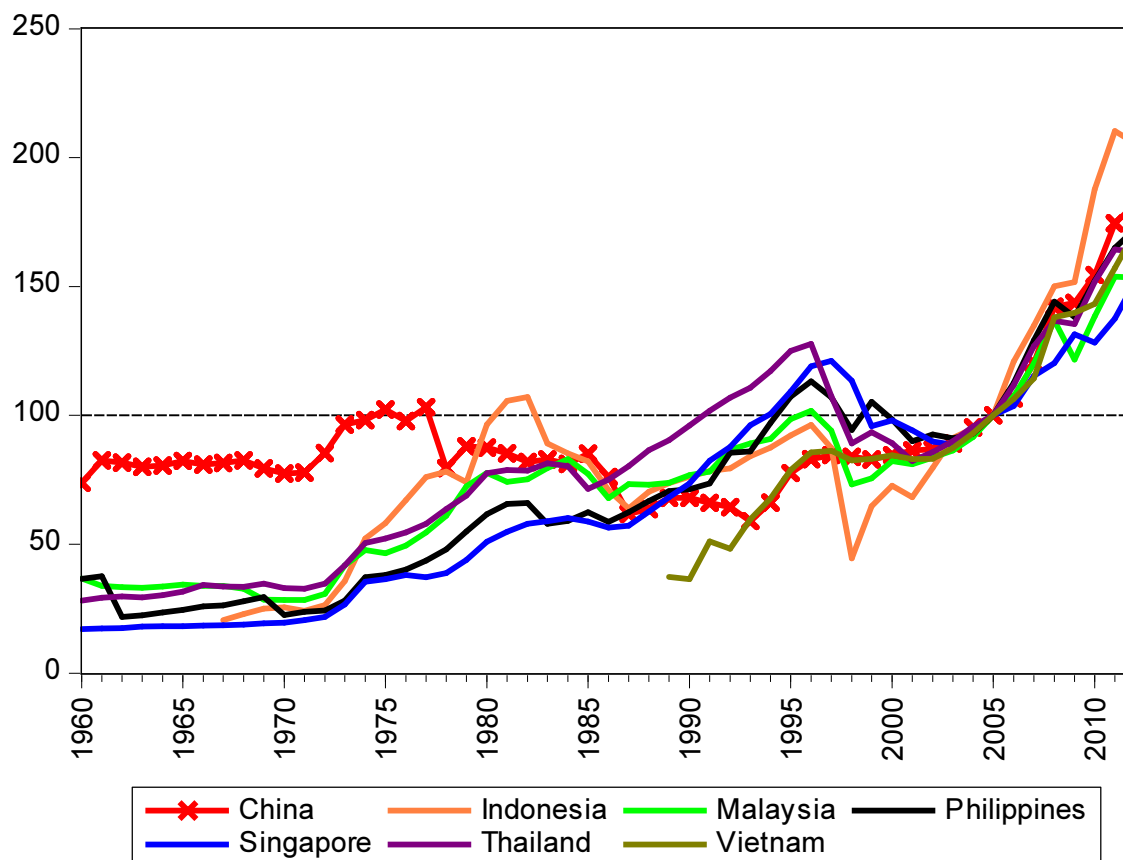
Nevertheless, to assess competitiveness for a specific industry between countries, we can use some indicators measure one country's price competitiveness such as the GDP deflator and the REER, and cost competitiveness such as average labor costs, ULCs and so forth. In following section, we compare competitiveness between China and ASEAN countries by using the above indicators. We will pay particular attention to ULCs in the next two sections.

4.4.1 GDP deflator

The GDP deflator is the ratio of GDP in the current local currency to GDP in constant local currency which reflects the effect of overall inflation on competitiveness. Unlike the consumer price index (CPI), the GDP deflator considers all prices of final goods and services. Thus it is used as an indicator to assess one country's price competitiveness. A lower GDP deflator means higher competitiveness of one country and *vice versa*. Figure 4.2 depicts the dynamics of the GDP deflators of China and some ASEAN countries over the period of 1960–2012. We can see that China accumulated price competitiveness compared with some ASEAN countries since the early 1980s, although the GDP deflators of Vietnam, Indonesia and Malaysia were lower than this in China over the period 1997–2003, meaning that these three countries were more competitive than China during this period. However, China's price competitiveness sharply weakened from 2005 when China's GDP deflator increased and surpassed those of most ASEAN countries. Among ASEAN countries, only the GDP deflator of Indonesia was higher than China's GDP deflator in the last several years, while Singapore enjoyed the most price competitiveness advantage compared to other countries since 2008 in terms of the GDP deflator.

¹⁹ Since 2005, the World Economic Forum reported the Global Competitiveness Index (GCI) which measures the microeconomic and macroeconomic foundational of national competitiveness based on its competitiveness analysis. They define competitiveness as “the set of institutions, policies, and factors that determine the level of productivity of a country”. They group the factors which affect competitiveness into 12 pillars: Institutions, Infrastructure, Macroeconomic environment, Health and primary education, Higher education and training, Good market efficiency, Labor Market Efficiency, Financial market development, Technological readiness, Market size, Business sophistication and Innovation.

Figure 4.2: GDP deflators of China and ASEAN countries, base year=2005, 1960–2012



Source: WID of World Bank.

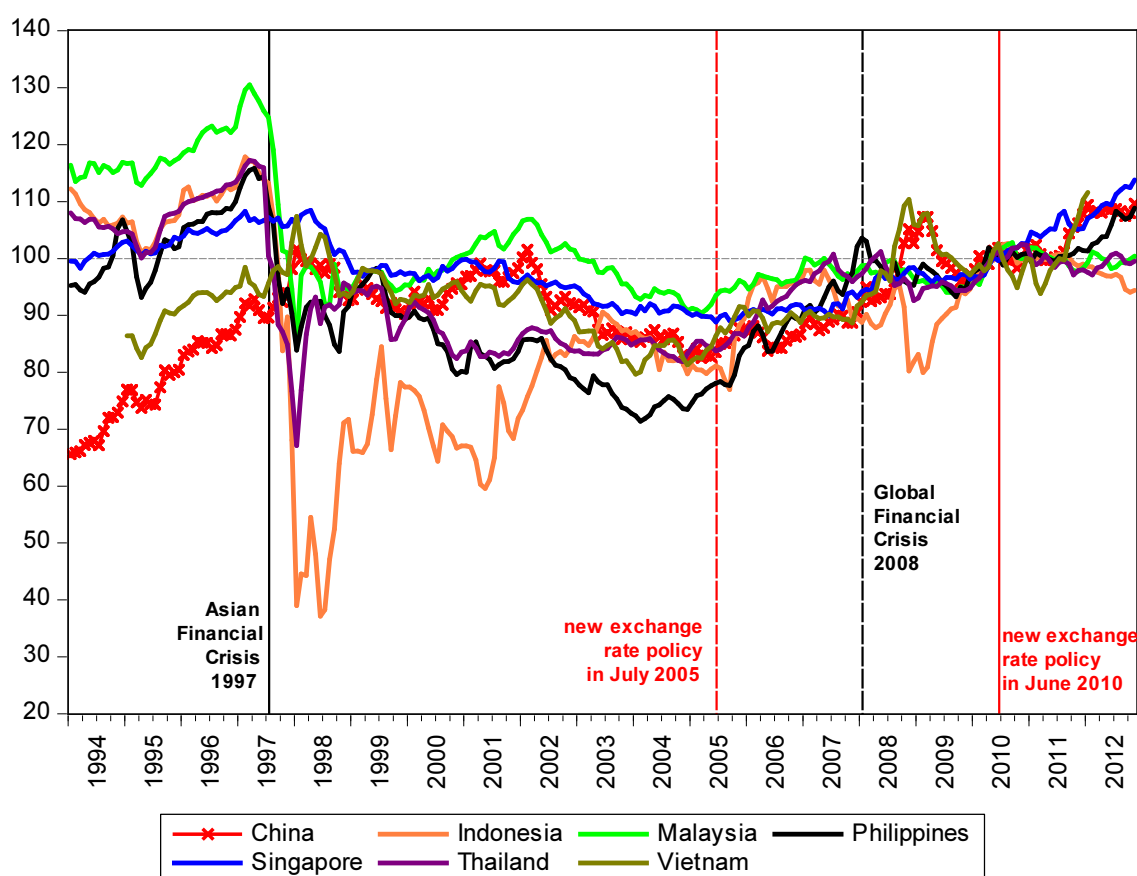
4.4.2 The REER

International competitiveness is to a large degree exchange rate development. However, it is the real exchange rate rather than nominal exchange rate that should be used in comparisons of international competitiveness. Currency appreciation in nominal terms does not mean deterioration of international competitiveness if its real exchange rate remains stable. Real exchange rate (RER) is the exchange rate adjusted by relative consumer prices between domestic and foreign countries. Furthermore, the REER is a trade weighted index with reference to its trading partners. So the fluctuation of REER signals the change of international competitiveness of one country in the global market. REER rising implies that a country's international competitiveness worsens, while declining REER signals that a country becomes more competitive in the global market. Both China and ASEAN countries are export-driven economies which are sensitive to exchange rate levels and fluctuations. Exchange rate policy as a trade policy instrument takes a crucial role in economic growth of East Asian countries over the past several decades. Exchange rate issues do matter for these countries' international competitiveness. Exchange rate appreciation could hurt exports and encourage imports, thereby deteriorating a country's terms of trade. It is widely believed that China's

exchange rate policy and “undervalued” RMB enhanced China’s international competitiveness. Therefore, it seemed that ASEAN countries strengthened their international competitiveness in labor-incentive and its low-cost manufacturing sector when China gradually revalued the RMB from 2005.

Figure 4.3 presents the dynamics of the REERs of China and some ASEAN countries over the period of 1994–2012. It shows that China’s international competitiveness deteriorated when the RMB’s REER increased dramatically from 1994, when the PBoC launched the exchange rate policy reform. The Asian Financial Crisis in 1997 disrupted this reform process. The REER of the RMB dropped slightly in 1997, but increased boldly again. Since then, fluctuation of the RMB’s REER intensified. Since July 2005, when the new exchange rate policy was announced by the PBoC, the REER of the RMB climbed until 2008, and then decreased for a short period in 2009 due to the global financial crisis. It then continued to increase from 2010. Compared with some ASEAN countries, China is more competitive than most of the ASEAN countries before 2008 when the REER of the RMB was lower than those of the ASEAN countries. Due to continuous RMB revaluation, the RMB’s REER surpassed other currencies’ REERs in 2010, except for Vietnam and Singapore. It implies that China lost export competitiveness compared with most of the ASEAN countries when the RMB appreciated considerably. Indonesia, Malaysia and Thailand have relatively high export competitiveness in terms of the REER since 2011.

Figure 4.3: The REER of China and ASEAN countries, base year 2010=100, 1994-2012

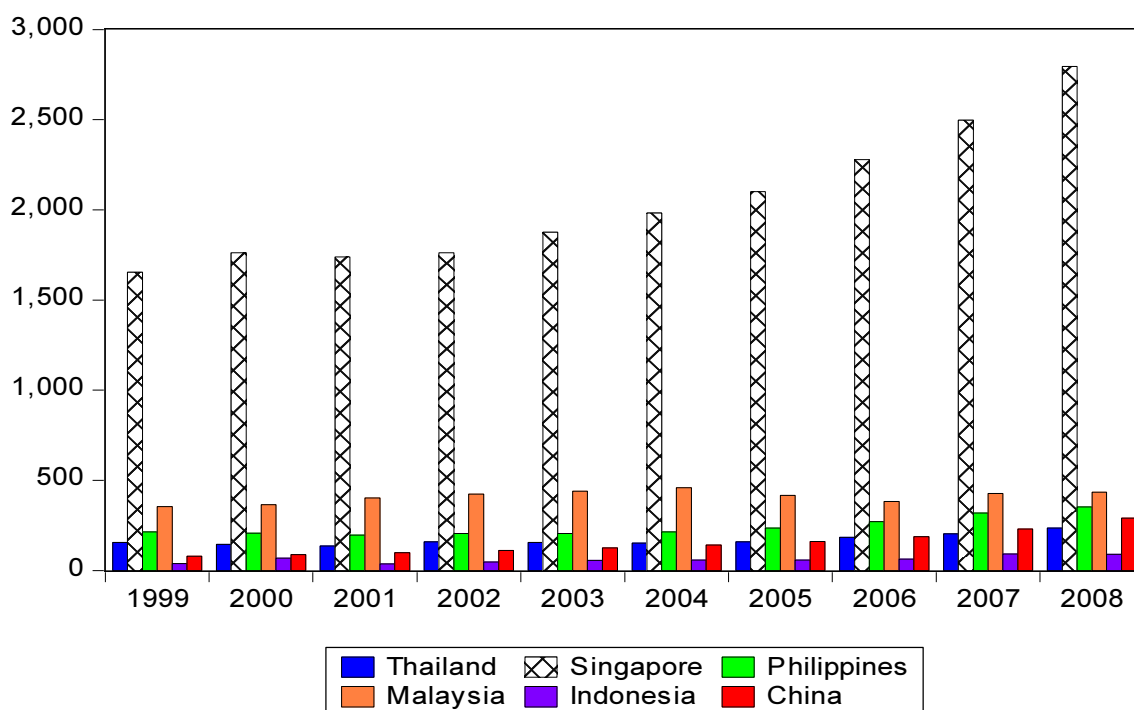


Source: The BIS.

4.4.3 Wages and productivity

Before exploring international competitiveness in terms of ULCs between China and ASEAN countries, we compare average labor costs (ALCs) and average labor productivity (ALP) which are two factors affecting the ULCs. From Figure 4.4, we find that the ALCs in the manufacturing sector rose from 1999 to 2008 for all countries, although increasing trends were not consecutive in some ASEAN countries. Singaporean workers in the manufacturing sector enjoyed the highest wage compared with their counterparts in other countries. Workers in China's manufacturing sector earned about US\$ 236 per month in 2008 which is slightly lower than workers in Malaysia and Philippines, but higher than those in Thailand and Indonesia. In contrast, Indonesian workers in the manufacturing sector earned about US\$ 90 per month in 2008, which was less than half of the wage of Chinese workers. It is also notable that Chinese workers' wages in the manufacturing sector increased much faster than those in ASEAN countries during the period 1999–2008.

Figure 4.4: Wages of China and ASEAN countries in the manufacturing sector, per month, in US\$, 1999-2008

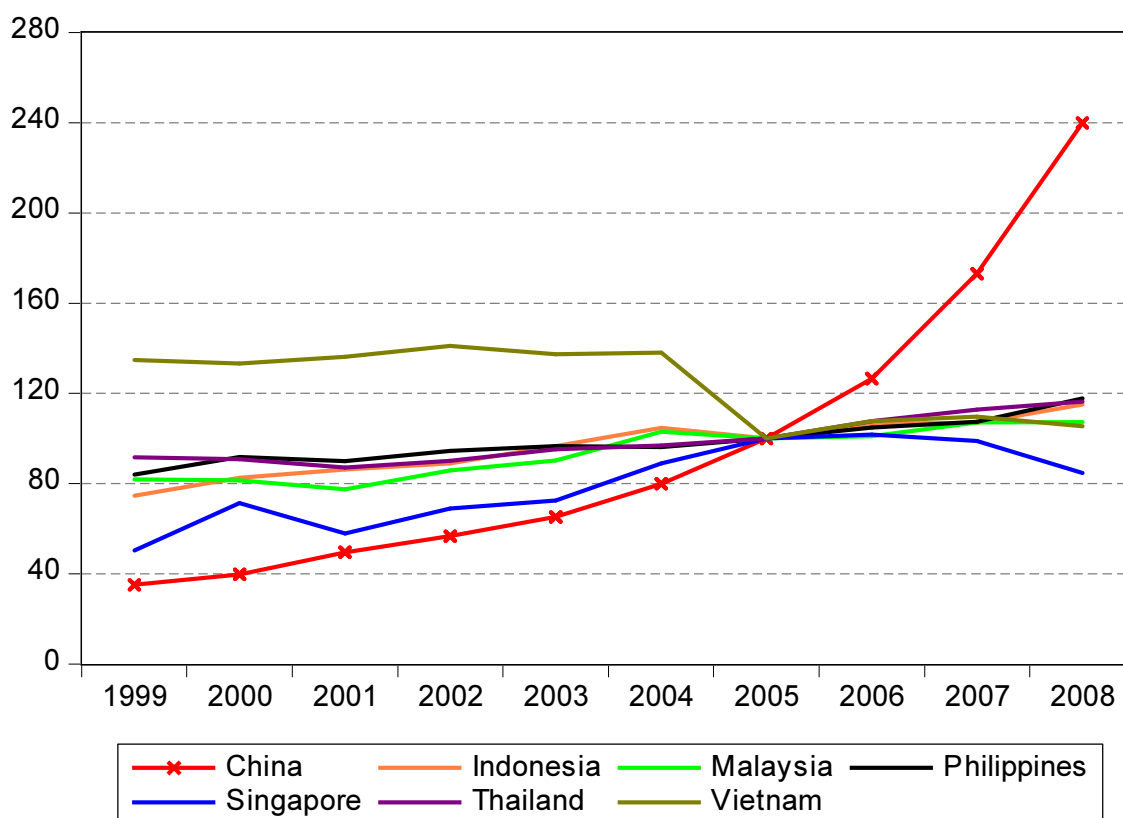


Source: LABORSTA of ILO.

Note: Wage data from International Labor Organization (ILO) is until 2008.

The ALP, which is output per unit of labor, also improved significantly in both China and most ASEAN countries during the last decade. Figure 4.5 shows us that from 1999 to 2008, China and ASEAN countries' ALPs in the manufacturing sector increased, except for Vietnam and Singapore whose productivity dropped in 2005 and in 2007. In particular, China's productivity dramatically increased compared with those of other countries. It reflects the rapid development of China's manufacturing sector, which significantly contributed to China becoming the world's largest export country and "world factory". Remarkable productivity improvement in China mainly comes from foreign direct investment (FDI) induced technology progress and innovation. Meanwhile, some ASEAN countries like Malaysia, Philippines and Thailand also improved their productivity, although not as remarkably as China did.

Figure 4.5: China and ASEAN countries' productivity index in the manufacturing sector, base year=2005, 1999-2008



Source: Based on data from LABIRSTA of ILO.

4.5 The ULCs between China and ASEAN

The ULCs as a measure of international competitiveness has some advantages compared with other indicators. This is because the ULCs assesses whether wages evolve in line with productivity. In 2007, the OECD launched the ULCs indicator report for monitoring all member countries' economic situation. More recently, the EU has taken on the issue of ULCs when they realized the lack of consideration of the diverging price and cost conditions among member states. However, ULCs should not be interpreted as a comprehensive measure of competitiveness, but as a reflection of cost competitiveness. In this section, we calculate and compare China and ASEAN's ULCs so as to assess China's competitiveness relative to ASEAN countries.

4.5.1 Data

Data on wages in the manufacturing sector is difficult to obtain because of data constraints for China and ASEAN countries. The International Labor Organization (ILO) reports wage data by economic activity covering various periods for each country. To assess China's international competitiveness, we include five large ASEAN countries: Indonesia, Malaysia, Philippines, Singapore and Thailand, to compare with China. Vietnam is excluded because its wage data is not available in the database of ILO. We collected wage data in the manufacturing sector from the LABORSTA

database of ILO for ASEAN countries, although some data is not consecutive. For instance, Philippines reports workers' wage every two years since 2001. We simply calculated the average wage for the year when wage data is not reported in LABORSTA so as to obtain a complete dataset. Malaysia's wage data in the LABORSTA is available until 2001. However, we found the data of real wage growth from the Ministry of Finance of Malaysia, thereby allowing us to calculate Malaysia's wage data for more years from 2002–2011 (see Appendix 4.1). For China, national and provincial wage data is from the National Bureau of Statistics of China (NBSC).²⁰ But the NBSC only reports wage data by industry. Thus we use the wage data in secondary industry as proxy to wage data in the manufacturing sector. It is the best proxy we could have if we don't have wage data for Chinese Manufacturing sector. Also, it is reasonable to do it because China's secondary industry mainly consists of manufacturing sectors. To compute the equilibrium ULCs, we use Wu's (2009) results of China's provincial capital stock series since the NBSC does not report it.²¹ In addition, wage data from the ILO is available until 2008. Therefore the period we could cover is ten-years, from 1999 to 2008. The rest of the data such as real GDP and employment are collected from the WDI of the World Bank and NBSC.

4.5.2 Methodology

Nominal ULCs is defined as the average costs for labor per unit of output, in other words, nominal ULCs is the ratio of total labor compensation to real GDP:

$$ULCs = \frac{W}{y} = \frac{wL}{y} \quad (4.1)$$

where w is average wages per labor, L is the number of employees and y is real GDP.

We define, average labor productivity (ALP) is:

$$ALP = \frac{y}{L} \quad (4.2)$$

where w is average labor costs (ALCs), so nominal $ULCs$ can be written as:

²⁰ Wages refers to the average wages in money terms per person during a certain period of time for staff and workers in enterprises, institutions, and government agencies, which reflects the general level of wage income during a certain period of time.

²¹ Wu (2009)'s China's provincial capital stock series is from 1978 to 2006. Professor Wu sent us updated series data up to 2010.

$$ULC = \frac{ALCs}{ALP} \quad (4.3)$$

From the above equation, we see that there are two factors that affect a country's ULCs: average labor compensation and productivity. The change of ULCs is determined by change of average labor compensation relative to average labor productivity. When wages rising overweighs the improvement of productivity, the ULCs will increase which implies the country becomes less competitive. In contrast, if wage increase is less than productivity improvement, the country's competitiveness improves, although wages rise.

In order to remove the effect of inflation, we further define the real ULCs which is nominal ULCs deflated by GDP deflator:

$$RULCs = \frac{ULCs}{P} = \frac{wL}{Py} \quad (4.4)$$

We can see that wL is total labor compensation and Py is nominal GDP. So $RULCs$ is the wage share in the total output.

Nevertheless, increase in ULCs does not necessarily mean that a country's competitiveness has deteriorated relative to other countries. Each country has its proper level of ULCs, which is determined by its economic fundamentals. A country could be still competitive if its actual ULCs is lower than this proper ULCs, which could be called equilibrium ULCs. According to Collignon (2011), equilibrium ULCs is the ULCs when return on capital is the same among regions or countries. Assuming there are two factors in an economy: labour and capital, which could complement with each other. When the ULCs is high, investors could pursue capital to replace labour. Inversely, when capital is not implemented efficiently, investors would use more labour. So we could calculate equilibrium ULCs in assumption that return on capital will converge in the long run. By definition, the return on capital is:

$$R = \frac{Py - wL}{P_k K} \quad (4.5)$$

where P_k is capital price, K is real capital stock.

We call the nominal output produced per one unit of capital is the Average Capital Efficiency (ACE), which is inverse of ratio of capital to nominal output, i.e.

$$ACE = \frac{Py}{P_k K} \quad (4.6)$$

So we have:

$$R = \frac{Py - wL}{Py} \frac{Py}{P_k K} = \left(1 - \frac{w}{P} \frac{1}{\lambda}\right) \cdot ACE = \left(1 - \frac{ULCs}{P}\right) \cdot ACE \quad (4.7)$$

where $\gamma = y/L$, which is labour productivity.

Assuming in a competitive capitalistic economy, R should converge among different regions or countries in the long run. So we have:

$$R_A^* = R_B^* \Rightarrow \left[1 - \frac{ULCs_A^*}{P_A}\right] \cdot ACE_A = \left[1 - \frac{ULCs_B^*}{P_B}\right] \cdot ACE_B \quad (4.8)$$

From above equation, we could have:

$$ULCs_A^* = \frac{ACE_B}{ACE_A} \cdot \frac{P_A}{P_B} \cdot ULCs_B^* - \left[\frac{ACE_B}{ACE_A} - 1\right] P_A \quad (4.9)$$

If we choose China's national ULCs as a benchmark, we could have equilibrium ULCs of each China's regions.

To assess competitiveness of each region of China over time, we further define competitiveness index which is deviation of nominal ULCs from its equilibrium ULCs:

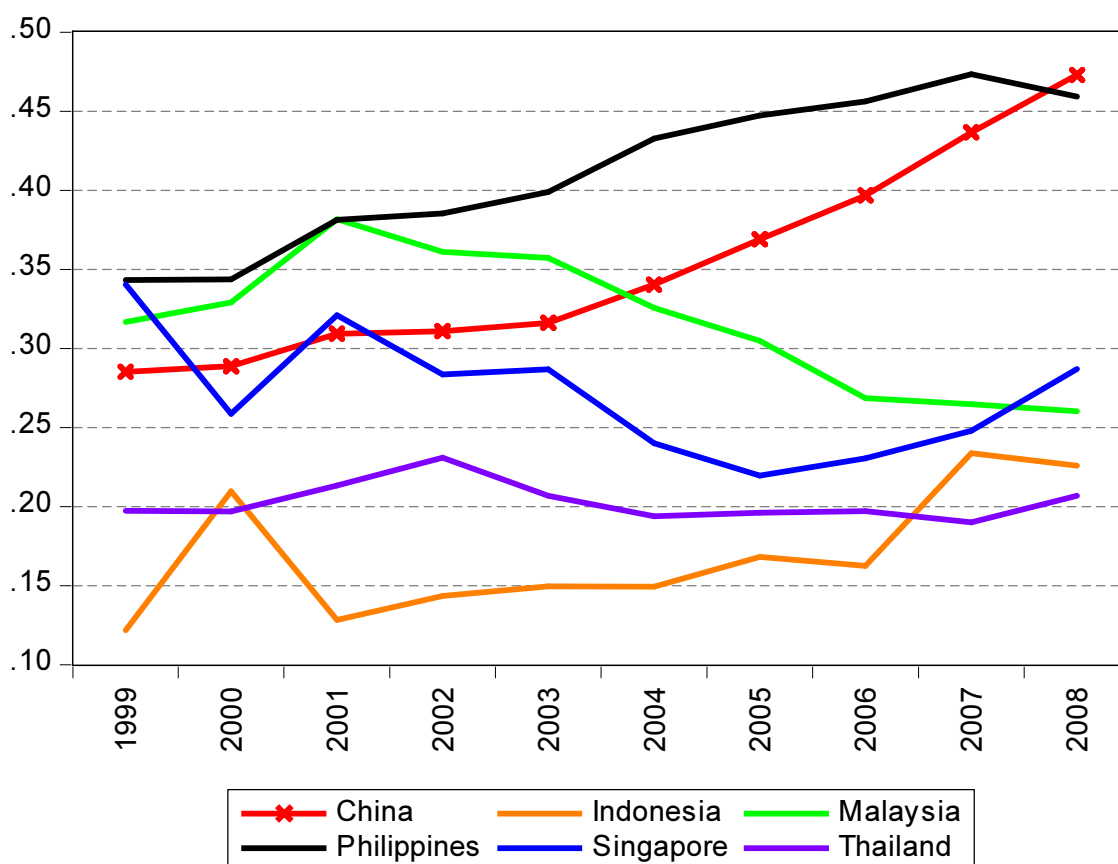
$$Competitiveness_index = Actual_ULCs - Equilibrium_ULCs \quad (4.10)$$

4.6 Provincial ULCs and Competitiveness Index of China

To compare China's international competitiveness with ASEAN countries in terms of ULCs, we firstly take a look at national ULCs in the manufacturing sector between countries. Figure 4.6 illustrates the dynamics of nominal ULCs of China and ASEAN countries over the period 1999 to 2008. China experienced a steady increase in nominal ULCs before 2003. After that, the increase in China's nominal ULCs in the manufacturing sector accelerated. It surpassed the ULCs of some ASEAN countries except for the Philippines in 2004, and reached the highest level among countries in

2008. Nominal ULCs in the Philippines in the manufacturing sector rose too, but dropped in 2008. In contrast, nominal ULCs in the manufacturing sector of Malaysia decreased considerably since 2001, meaning that Malaysia's competitiveness improved. Singapore, Thailand and Indonesia's nominal ULCs remained relatively stable during the same period. Sharp increase in the nominal ULCs of China implies that China's international competitiveness deteriorated considerably. By 2008, China was the less competitive than all other ASEAN countries in term of nominal ULCs. In contrast, Indonesia owned the highest competitiveness advantage during the most periods, followed by Thailand, Singapore and Malaysia.

Figure 4.6: China and ASEAN countries' nominal ULCs, 1999-2008

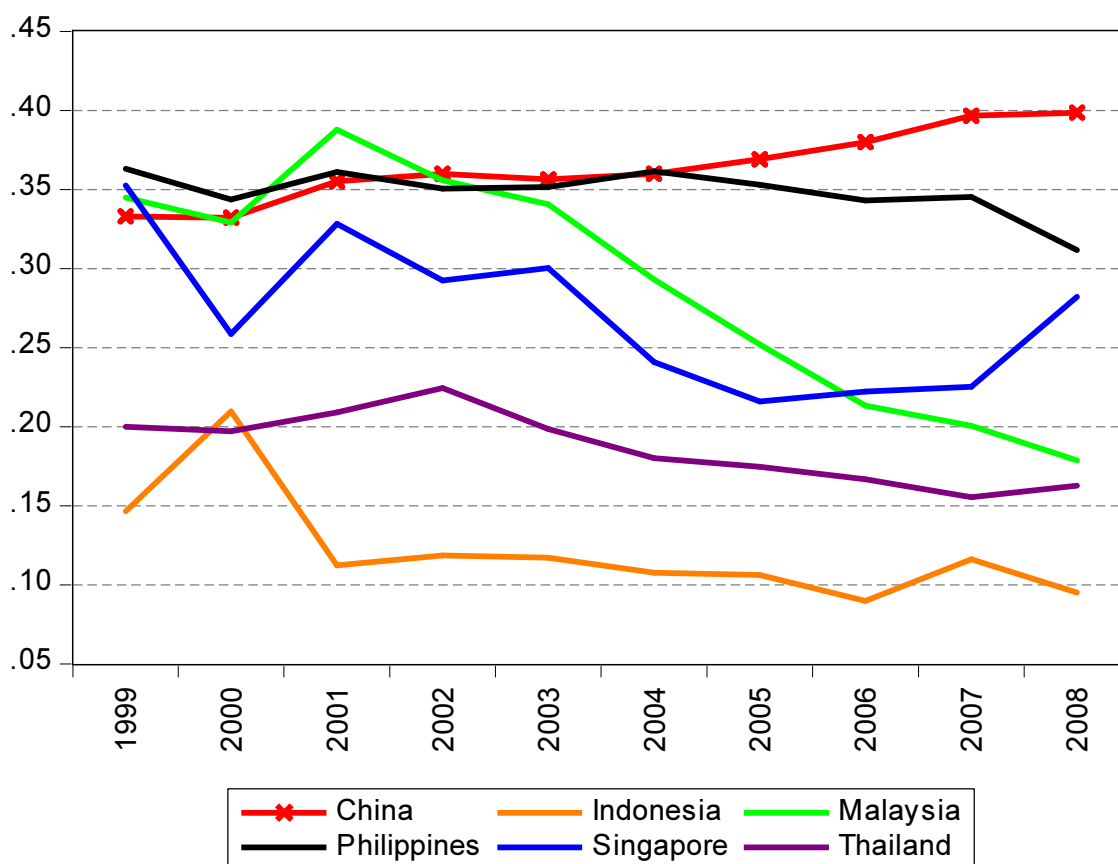


Source: Author's calculation.

Changes in the real ULCs of these countries reaffirm our findings that China's international competitiveness worsened in the last decade. As Figure 4.7 shows, China's real ULCs continuously increased and was the highest than these in ASEAN countries from 2004. The real ULCs of Indonesia was the lowest among China and other ASEAN countries, followed by Thailand and Malaysia. One striking feature in Figure 4.7 is that all ASEAN countries' real ULCs declined except for Singapore, whose real ULCs rose in 2008. It tells us that China gradually lost its international competitiveness while ASEAN countries accumulated competitiveness advantage in the manufacturing sector

from 1999 to 2008 in term of real ULCs. As shown in equation (4.4), real ULCs is the share of total compensation in the total output. So the wage share of Chinese workers in manufacturing sector was about 40 per cent of total output in 2008. While in Indonesia, the wage share in the manufacturing sector was only about 10 per cent of total output in the same year. Labor compensation in China's manufacturing sector accounts for an increasingly large proportion of total output. It implies that China is less competitive than ASEAN countries because of a higher share of labor compensation in the total output.

Figure 4.7: China and ASEAN countries' real ULCs, 1999-2008

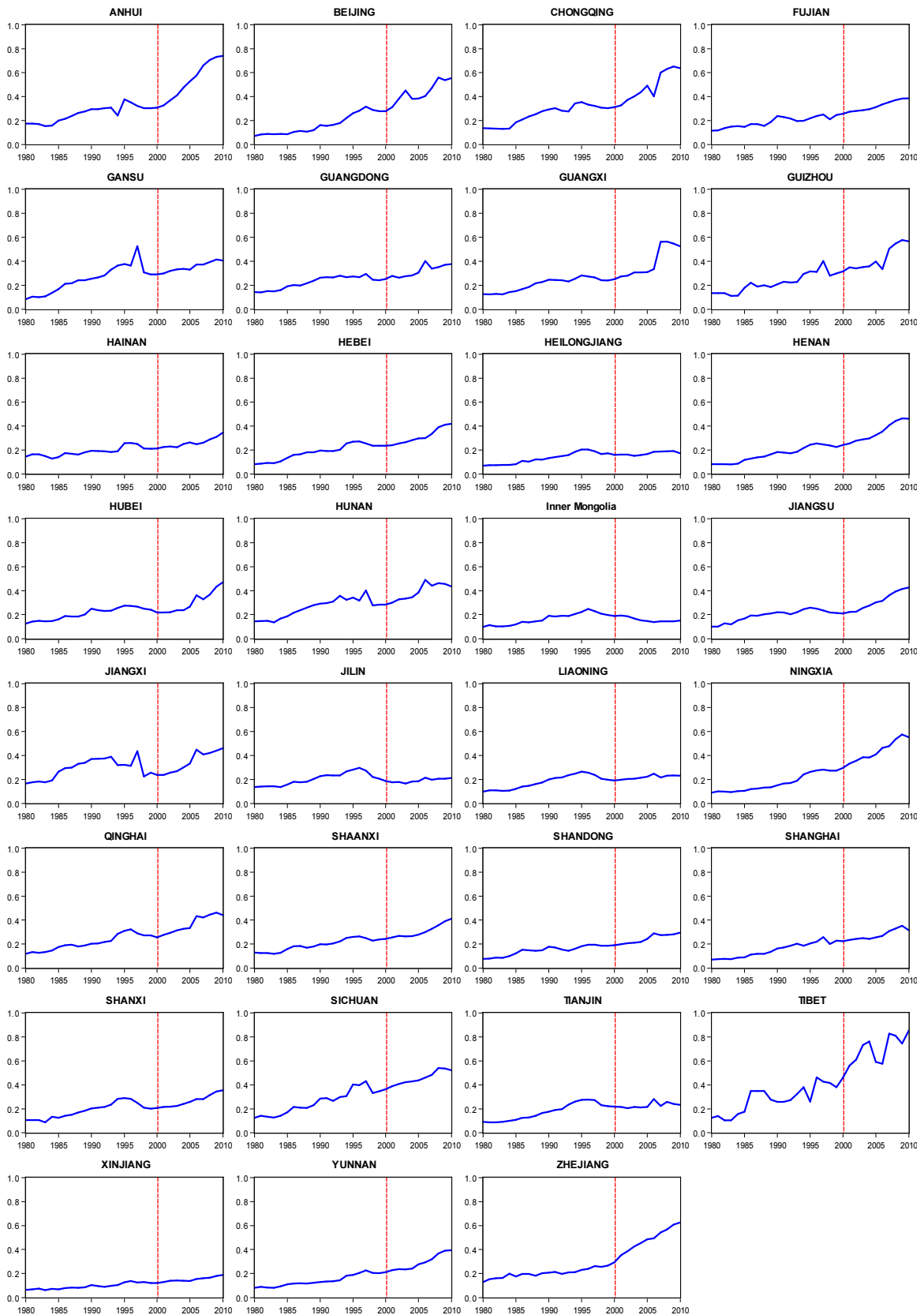


Source: Author's calculation.

China's regional disparity may lead to ULCs disparity among Chinese regions. So it is worthwhile exploring China's regional ULCs to see the difference in ULCs dynamics among China's 31 provinces. As shown in Figure 4.8, we find that nominal ULCs in all provinces increased gradually over the period 1980 to 2010. Also, it is notable that nominal ULCs in some provinces, particularly in Anhui, Chongqing, Guangxi, Guizhou, Ningxia, Sichuan and Tibet which are underdeveloped and non-coastal provinces were higher than these in some coastal provinces such as Fujian, Guangdong, Liaoning, Shandong, Shanghai and Tianjin over the period. It could be used to explain the outstanding performance of manufacturing export growth in the coastal region. It is

probably because the ULCs in the coastal region were relatively low compared with other regions. Also, we find that the nominal ULCs of non-coastal provinces, such as Anhui, Chongqing, Guizhou, Ningxia, Sichuan and so on, increased much faster than those in coastal provinces in the last several years. This reflects the fact that economic growth in the western and inland China was more rapid than in the coastal area in the last decade when the Western Development plan in 2001, Northeast Area Revitalization Plan in 2003 and other incentive policies were introduced in non-coastal areas with the aim of narrowing the gap of economic development between coastal and non-coastal areas.

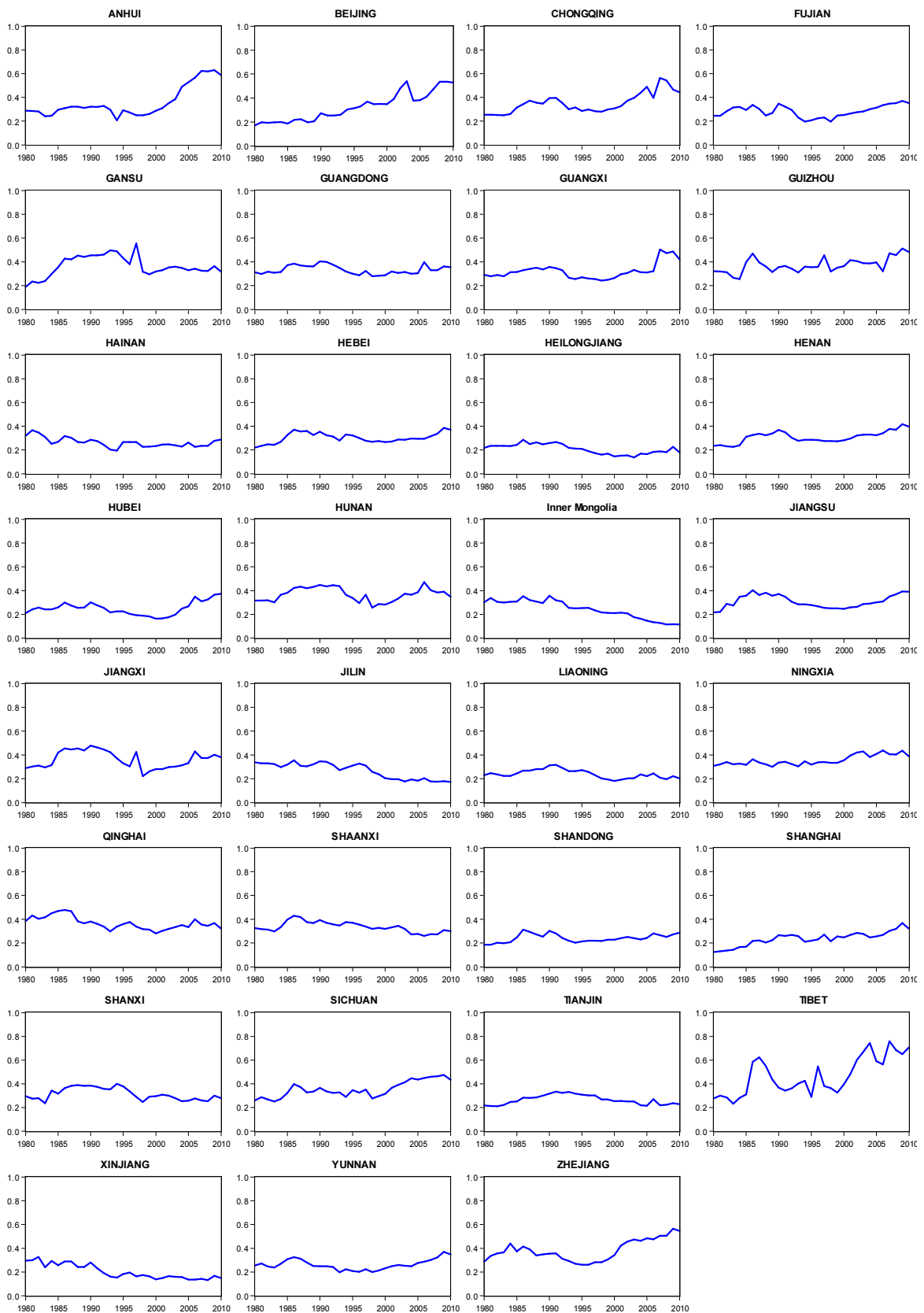
Figure 4.8: The nominal ULCs of China's 31 provinces, 1980-2010



Source: Author's calculation based on data from NBSC.

The dynamics of China's provincial real ULCs over the period of 1980 to 2010 looks different from nominal ULCs (see Figure 4.9). Similar to the nominal ULCs, the real ULCs in coastal provinces such as Fujian, Liaoning, Shandong and Shanghai, were relative lower than these in non-coastal provinces like Anhui, Guizhou, Hunan and Qinghai. However, in contrast with the nominal ULCs, the real ULCs in the most provinces did not rise as fast as the nominal ULCs did over the period. This implies that China's international competitiveness did not significantly deteriorate in terms of real ULCs. Many provinces' real ULCs remained relatively stable over the period, and even decreased in some provinces such as Hainan, Heilongjiang, Inner Mongolia, Jilin, Heilongjiang, Shanxi and Xinjiang, which are agricultural sector-dominated and underdeveloped provinces. This means that competitiveness of some provinces enhanced because their real ULCs declined. This finding suggests that China's regional disparity caused regional competitiveness disparity across regions. We need to pay particular attention to such regional competitiveness disparity when we assess China's international competitiveness relative to other countries.

Figure 4.9: The real ULCs of China's 31 provinces, 1980-2010

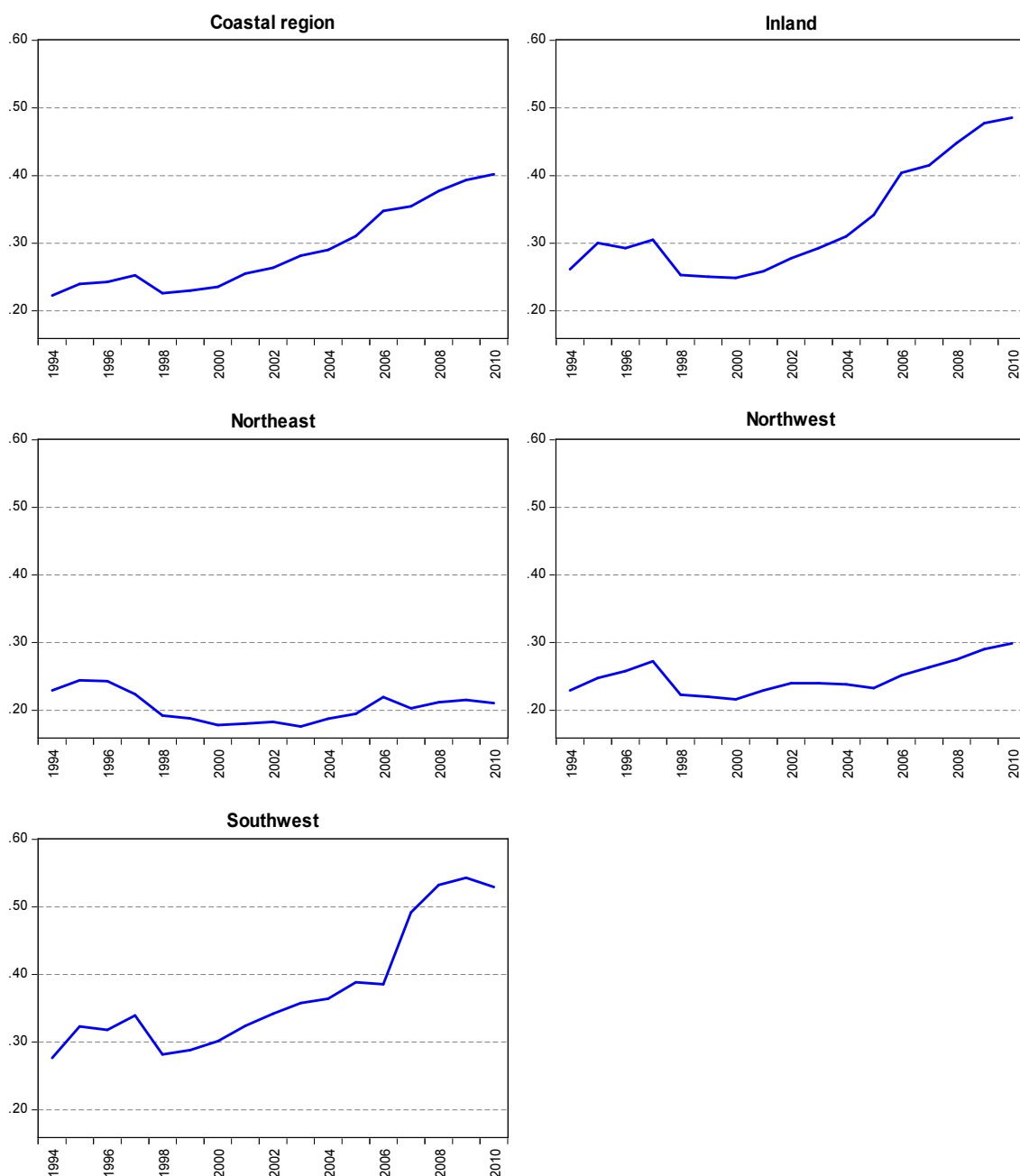


Source: Author's calculation based on data from NBSC.

We move further to calculate the GDP-weighted regional nominal and real ULCs so as to have a deeper insight into the dynamics of regional ULCs in China. We classified China's 31 provinces into five regions: coastal region, inland, northeast, northwest and southwest.²² As Figure 4.10 shows, the nominal ULCs in the coastal region, inland and southwest of China increased continuously during the period 1994-2010, while northwestern and northeastern China's nominal ULCs did not grow but kept relatively stable. This reaffirms that there is a striking regional competitiveness disparity in terms of nominal ULCs, mainly due to regional disparity among China's regions. What is more, we find that the nominal ULCs in the northwest and northeast China are lower than in the coastal region, inland and southwest during the most periods, indicating that these two regions are more competitive than other regions in terms of nominal ULCs.

Figure 4.10: China's regional nominal ULCs, 1994-2010

²² Coastal region includes Beijing, Fujian, Guangdong, Hainan, Hebei, Jiangsu, Shandong, Shanghai, Tianjin and Zhejiang. Inland includes Anhui, Henan, Hubei, Hunan, Jiangxi and Shanxi. Northeast includes Liaoning, Jilin and Heilongjiang. Northwest includes Gansu, Inner Mongolia, Ningxia, Qinghai, Shanxi, Tibet and Xinjiang. Southeast includes Guangxi, Guizhou, Sichuan, Yunnan, Chongqing and Gansu.

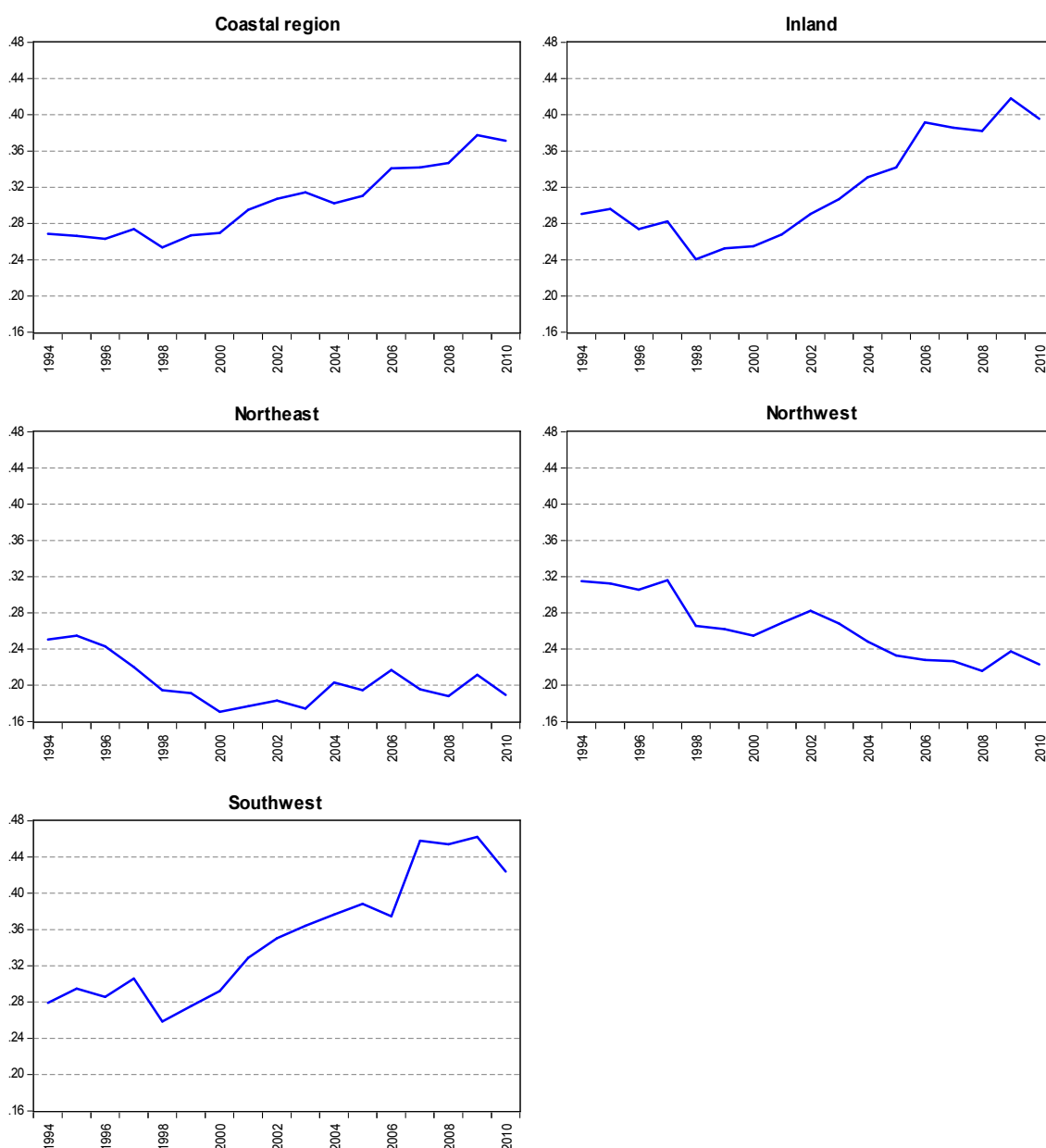


Source: Based on author’s results.

The trends in the real ULCs of five regions were similar to the nominal ULCs except for northwest China (see Figure 4.11). The real ULCs in northwest China steadily declined over the period, indicating that the competitiveness of northwest was enhanced. This was probably because productivity improvement outperformed the real wage rising in this region over the period, resulting in a decline of the real ULCs. In addition, the real ULCs in the inland and southwest of China were higher in the coastal region. It tells us that productivity improvement relative to rising wages was higher in the coastal region than those in the other two areas, although wages in the inland and southwest of

China were still lower than the coastal region of China. We also notice that the growth of real ULCs in inland and southwest of China were faster than the coastal region from 2000. Although wages in the coastal region rose considerably, productivity in the coastal region, where the manufacturing sector is mainly located, improved more rapidly than in non-coastal areas. This could be used to explain why the manufacturing sector in the coastal region grew more rapidly than the rest of China, although wages in the coastal region remained higher than other areas.

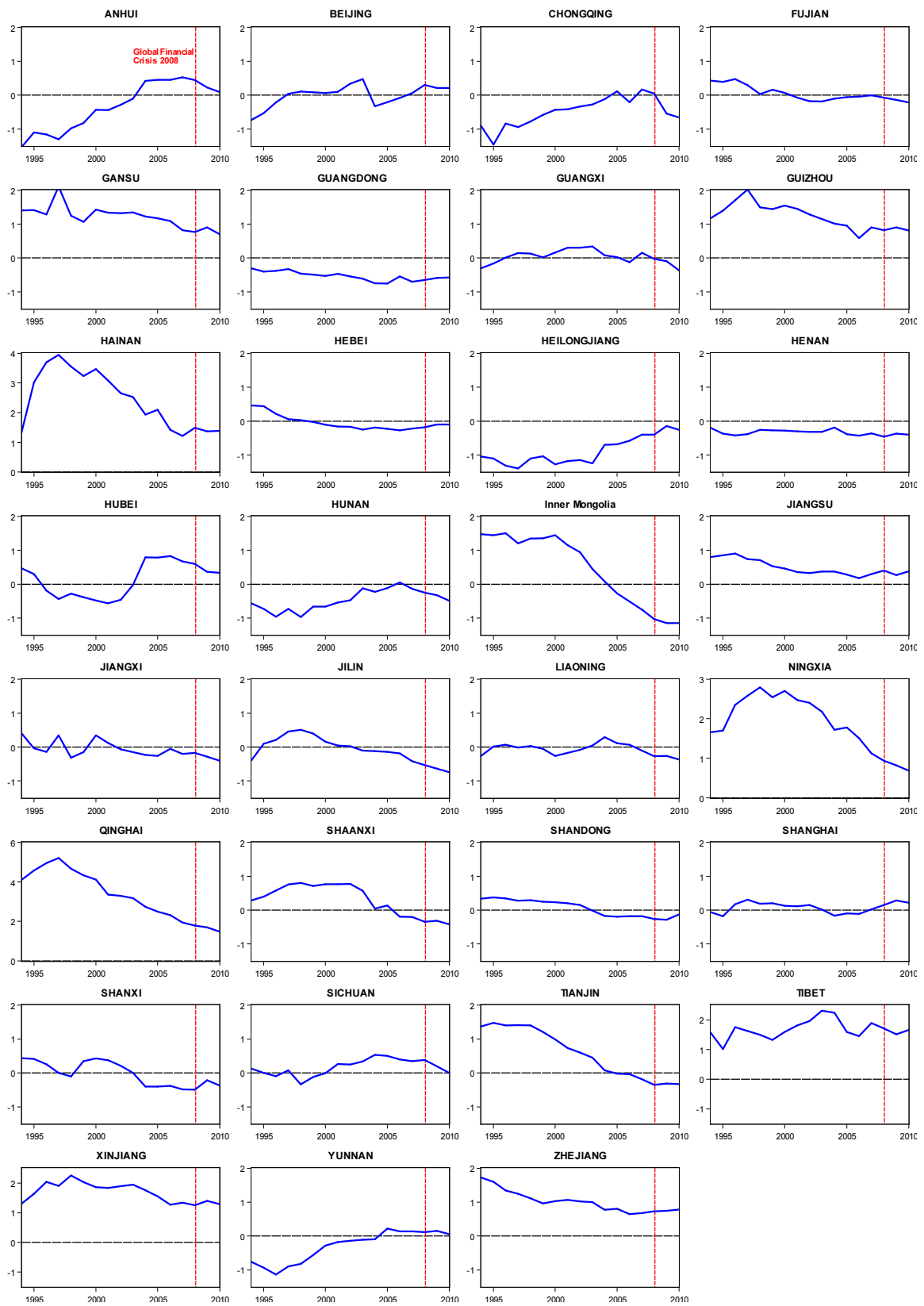
Figure 4.11: China's regional real ULCs, 1994-2010



Source: Based on author's results.

As we defined earlier, the competitiveness index is the differential between nominal ULCs and equilibrium ULCs. An increase in the index means that competitiveness has worsened because actual ULCs deviates from its equilibrium ULCs further, while a decline in the index indicates that competitiveness of this region improved. If the competitiveness index is positive (above the zero line), it implies that capital is not used efficiently, which leads to labour becoming more expensive. Conversely, when the competitiveness index is negative, capital may be used excessively and labour is too cheap.

Figure 4.12: Competitiveness index of China's 31 provinces



Source: Author's calculation.

Figure 4.12 depicts dynamics of competitiveness index of China's 31 provinces from 1994 to 2010. It is hard to say that we find a regular pattern in the competitiveness index among provinces of China. However, we can see that competitiveness has changed over the period and differs among provinces in China. In general, competitiveness in most provinces improved except for Anhui, Chongqing, Heilongjiang and Yunnan, which are less-developed provinces. In particular, since 2000, the competitiveness of Gansu, Guizhou, Hainan, Inner Mongolia, Ningxia, Qinhai, Shannxi and Zhejiang, which are mostly non-coastal provinces, enhanced substantially. Some developed coastal provinces like Fujian, Zhejiang and Tianjin improved their competitiveness, but not significantly. It is notable that competitiveness of some provinces deteriorated in the last few years. This happened in Guangdong, Hebei, Jiangsu, Liaoning, Shandong, Shanghai and Zhejiang, which are China's main exporting provinces. This is probably because China's economy recovered from the global financial crisis in 2008. Labour shortages appeared frequently in the coastal area, which caused Chinese labour wages to rise substantially. On the contrary, Anhui, Chongqing, Gansu, Guangxi, Jiangxi and Sichuan experienced competitiveness improvement since 2008. A possible reason is that wage increases in these provinces, which are in non-coastal regions did not increase as fast as those in the coastal region in the aftermath of the global financial crisis.

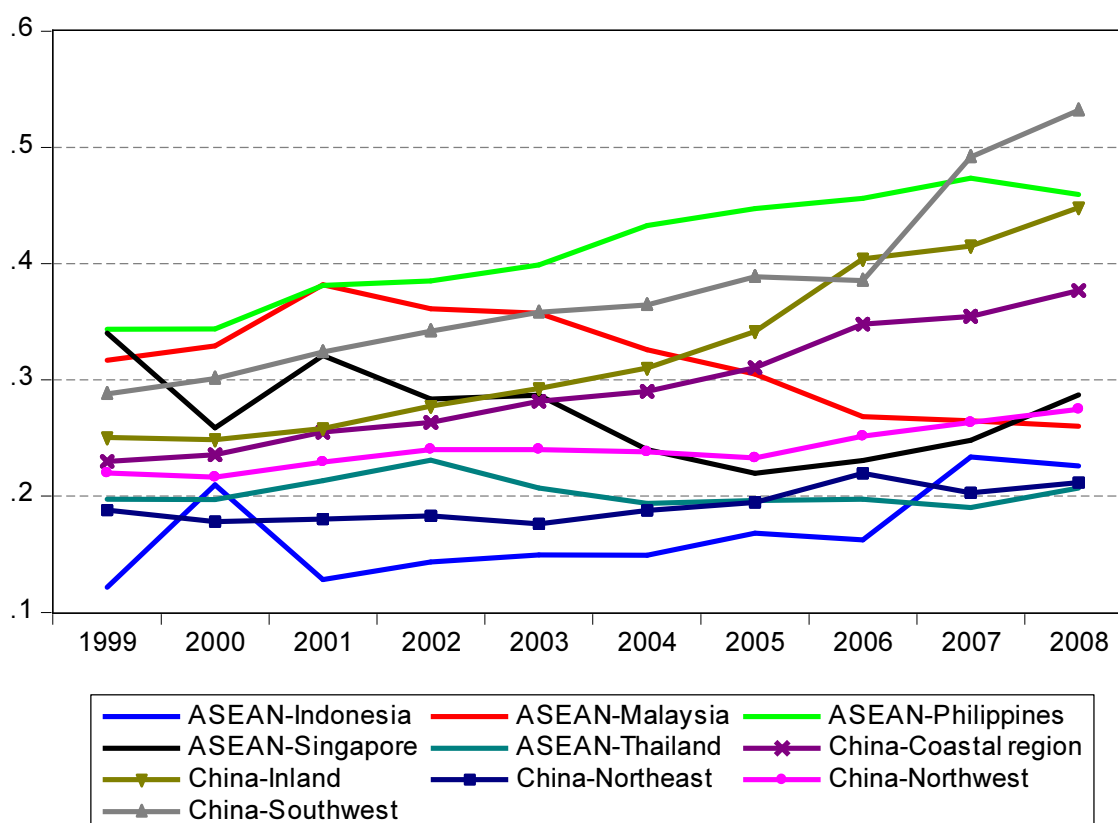
In addition, we find that Gansu, Guizhou, Hainan, Ningxia, Qinghai, Tibet and Xinjiang's competitiveness index lines have been above zero line over the period, which means that labour costs has been relatively high in these provinces which are mostly non-coastal and less developed provinces. Meanwhile, in other provinces like Beijing, Fujian, Guangdong, Liaoning, Shandong, Shanghai which are coastal provinces, but also Heilongjiang, Henan and Hunan, their competitiveness index lines are around the zero line or even lower. This finding could be used to explain why non-coastal regions of China grew slowly compared with the coastal region. From our results of the competitiveness index, this is because labour in non-coastal provinces was more expensive relative to capital than in coastal provinces. Thus, the manufacturing sector, which is cost-sensitive, boomed rapidly in the coastal region.

4.7 Comparison of ULCs between China and ASEAN Countries

We have found that the dynamics of nominal and real ULCs varied in different areas of China over the specified period. Therefore it is worthwhile to compare ULCs in China's regions and ASEAN countries to assess China's international competitiveness relative to ASEAN countries. Figure 4.13 illustrates a comparison of nominal ULCs in the manufacturing sector between China's five regions and ASEAN countries over the period 1999–2008. The nominal ULCs in the coastal region, inland and southwest of China became higher than those in ASEAN countries from 2005, except for the Philippines, indicating that these three regions lost competitiveness relative to ASEAN countries because of higher nominal ULCs. Before 2008, the Philippines nominal ULCs remained the highest among these regions and countries, implying that the Philippines was the least competitive country compared with other countries and regions in the manufacturing sector. However, China's northeast and northwest were more

competitive than some ASEAN countries because the nominal ULCs in these areas were still lower than those in ASEAN countries, like the Philippines, Malaysia, Singapore and Thailand during most of the periods. Meanwhile, Indonesia's nominal ULCs remained the lowest than all China's regions and other ASEAN countries which suggests larger growth potential in manufacturing sector than other ASEAN countries and China.

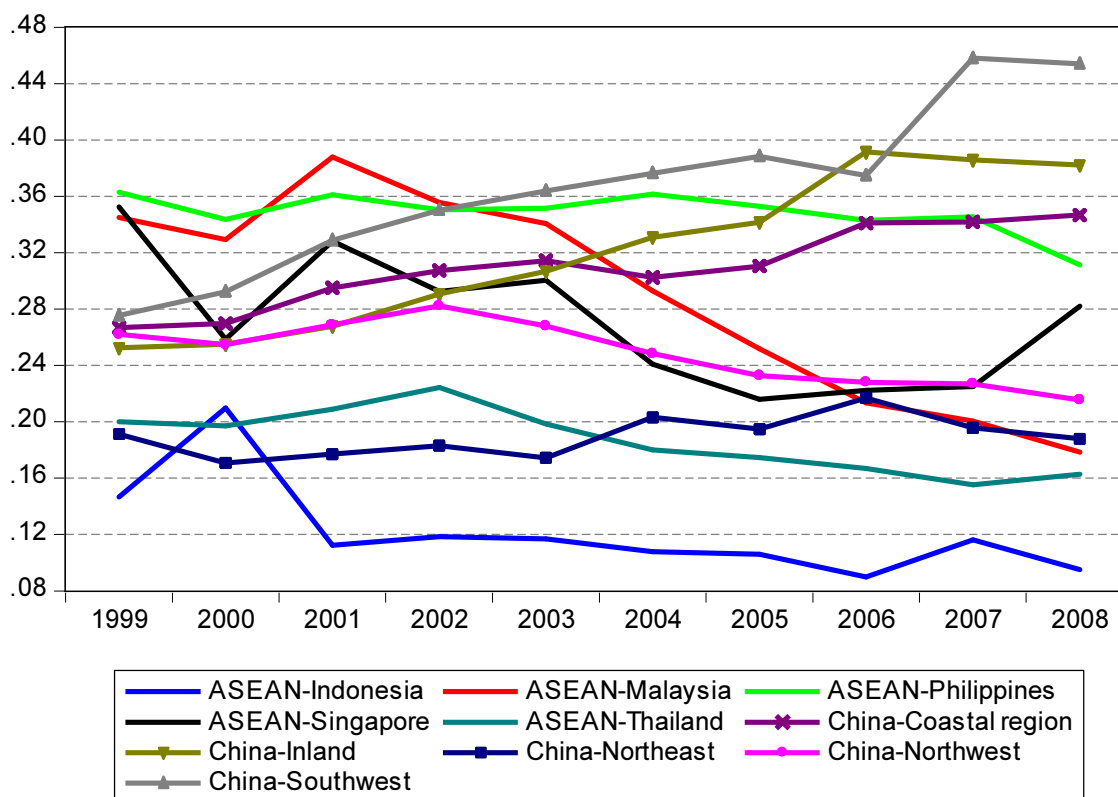
Figure 4.13: Comparison of nominal ULCs between China's five regions and ASEAN countries, 1999-2008



Source: Based on author's results.

In term of real ULCs between China's five regions and ASEAN countries, as shown in Figure 4.14, the real ULCs in southwest, inland and the coastal region of China surpassed Malaysia, the Philippines and Singapore in the early of 2000s and remained higher than those in all ASEAN countries from 2006. It suggests that some areas of China are not as competitive as before due to rising wages and RMB revaluation. On the other hand, the real ULCs in northeast and northwest China were still lower than those in Singapore, the Philippines and Malaysia during most of the periods. It proves that some areas of China, such as northeastern and northwestern areas of China, still have competitive advantage compared with most of the ASEAN countries in terms of real ULCs, although China as a whole lost competitiveness relative to ASEAN countries.

Figure 4.14: Comparison of real ULCs between China's five regions and ASEAN countries, 1999-2008

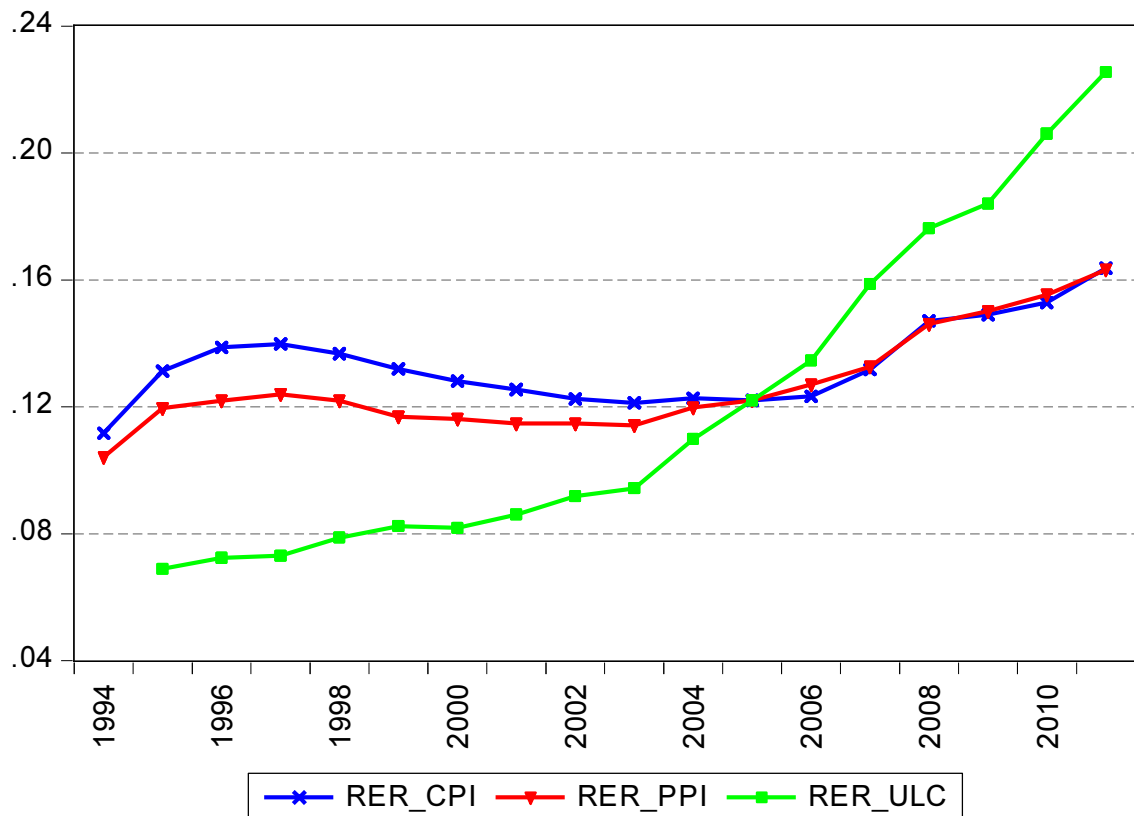


Source: Based on author's results.

4.8 Impact of Rising ULCs and RMB Revaluation on China's Exports

By using our estimates of ULCs in the manufacturing sector, we calculate ULCs deflated real exchange rate (RER). We find that China's RER, deflated by ULCs, appreciated by around 84.7 per cent by 2011 (or 14.1 per cent per year), indicating a very large loss of competitiveness relative to its main trading partners (see Figure 4.15). Such deterioration in competitiveness is largely due to the more rapid increase in ULCs since the nominal RMB exchange rate appreciation was only about 26.8 per cent by 2011 (or 4.47 per cent per year). By contrast, price-based real exchange rate indicators show a much smaller real appreciation: 34.1 per cent for a CPI-based RER and 33.7 per cent for a PPI-based RER. This result indicates, among other things, that Chinese export enterprises may have reduced their profit margins in order to keep market shares. It implies that China's relatively higher ULCs will sooner or later result in a deterioration of trade volumes.

Figure 4.15: Real exchange rate (RER) of the RMB, base year=2005, 1994-2011



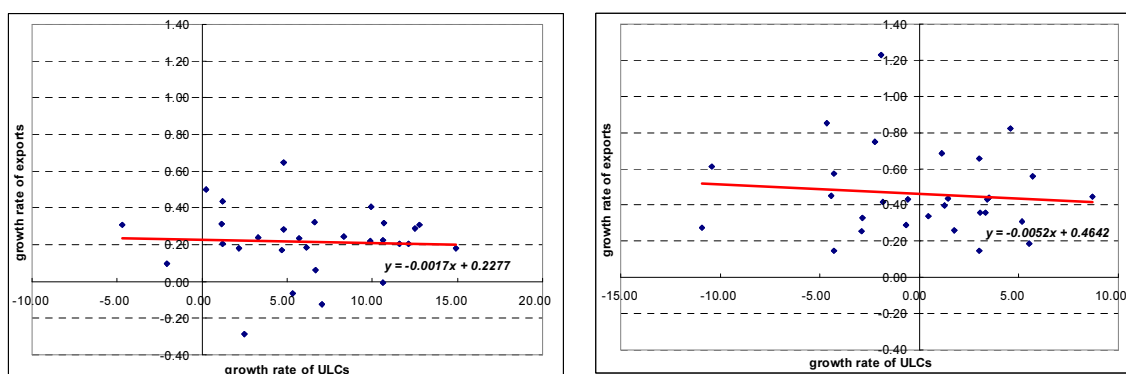
Source: Based on data from OECD and author's results.

In principle, there is a negative relationship between the growth of ULCs and growth of exports. The higher growth of ULCs results in the lower or negative growth of exports. As shown in Figure 4.16, we compared the relationships between growth of ULCs and exports among China's 31 provinces in 2005 and 2010. We confirm that there is a negative relationship between growth of ULCs and growth of exports as expected. Also, the slope of the OLS line in 2010 is steeper than that in 2005 (-0.0052 in 2010 and -0.0017 in 2005), which implies that the negative impact of ULCs rising on China's exports was more significant in 2010 than in 2005. This suggests that recent rapidly rising ULCs weakened China's international trade more seriously than before.

Figure 4.16: Changes of ULCs and exports for China's 31 provinces, 2005 and 2010

2005

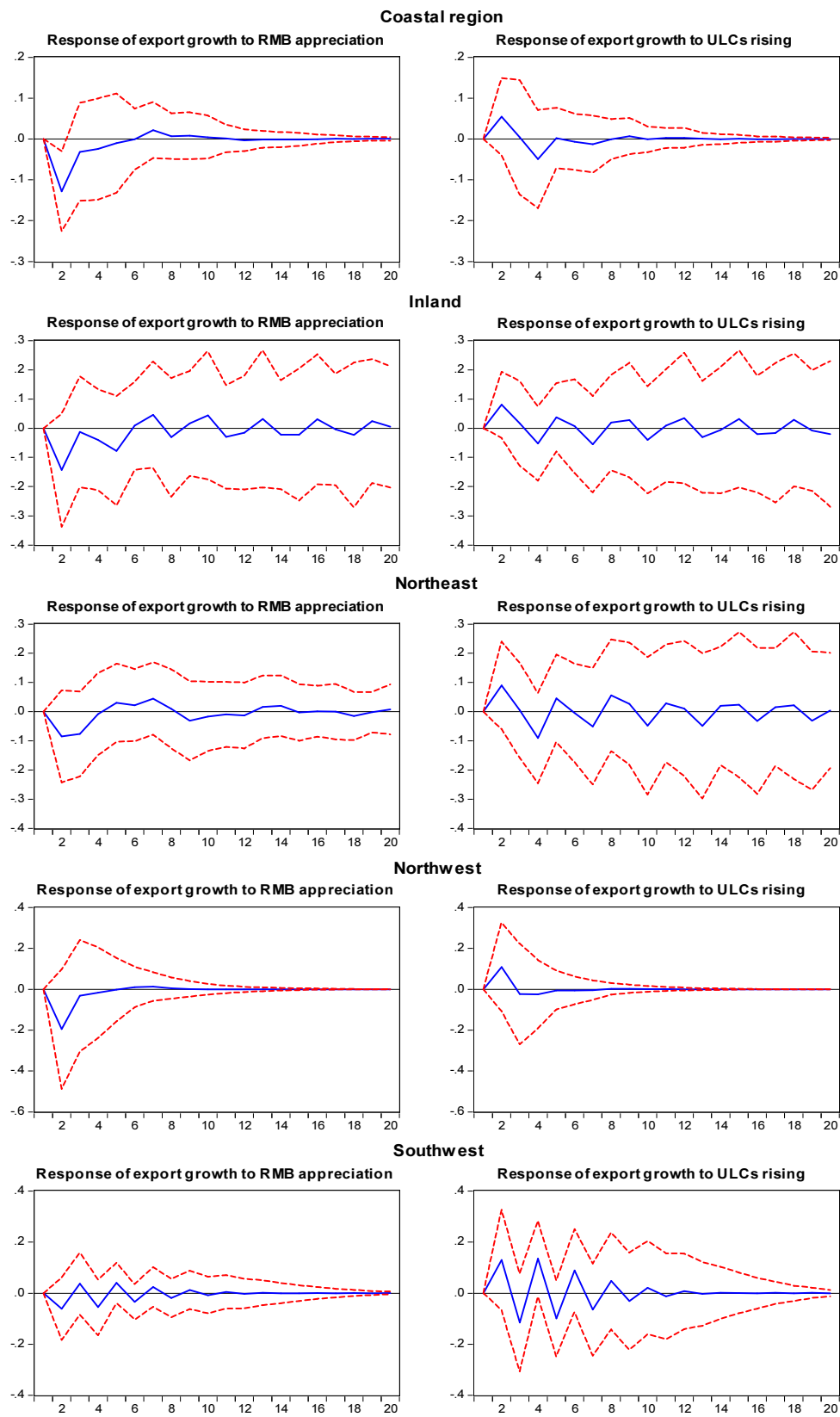
2010



Source: Based on author's results.

In addition to the RMB exchange rate, ULCs is another factor influences China's exports. We estimate a VAR model using China's growth of exports, change of RMB exchange rate and growth of ULCs by region. We then further compute the impulse response of China's export growth to a rising ULCs shock and RMB appreciation shock of one standard deviation. We find that only coefficients for the coastal region and northwest of China are significant. Here we only place attention on the coastal region of China because China's export industry is mainly located in the coastal region, which is more sensitive to rising ULCs and RMB appreciation. We attempt to find how rising ULCs and RMB appreciation impact regional exports. Figure 4.17 shows that one standard deviation of RMB appreciation shock decreases the coastal region's export growth and the peak response appears in the second year after the shock. Then the response of export growth to RMB appreciation begins to decline gradually. A positive response to RMB appreciation occurs in the seventh year after the shock, but it is very small. For a rising ULCs shock, it seems that there is a two-year lag in the respond of export growth to rising ULCs shock. The largest negative response, rising ULCs reducing export growth of the coastal region, appears in the fourth year after shock. After that, this response to rising ULCs then gradually declined. Therefore, we find that there are negative effects of rising ULCs and RMB appreciation on export growth. By comparing the degree of response of export growth to rising ULCs and RMB appreciation, it appears that the impact of RMB appreciation on exports is more significant than that of rising ULCs in the coastal region of China.

Figure 4.17: Impulse response of export growth to RMB appreciation and ULCs rising by Chinese regions



Source: Based on author's results.

4.9 Chapter Conclusions and Policy Implications

It appears that China is less competitive than before, with RMB revaluation and rapidly increasing wages. By comparing the GDP deflator, REER, average the REER, labour cost and productivity between China and ASEAN countries, we confirm that China's international competitiveness relative to ASEAN countries deteriorated in the past decade. In term of ULCs, our results show that China's nominal and real ULCs in the manufacturing sector increased sharply and was higher than those in ASEAN countries in 2008, indicating that China lost international competitiveness relative to ASEAN countries. More interestingly, we find remarkable regional competitiveness disparity in China which was probably mainly caused by regional disparity. The pace and scale of changes of ULCs in each of the provinces are various. Provinces in coastal, inland and southwest China lost competitiveness when their ULCs in nominal and real term increased faster than other areas of China. In contrast, some areas, like northwest China gained a competitive advantage since their ULCs dropped over the period. Therefore, for a large economy like China, the higher ULCs at the national level do not necessarily mean that all regions are less competitive.

By comparing China's regional ULCs with ASEAN countries' national ULCs in the manufacturing sector, we find that China's coastal region, inland and southwest are less competitive than most of the ASEAN countries because of higher ULCs in nominal and real term in these areas of China. However, ULCs in northeast and northwest China are still lower than these in ASEAN countries such as the Philippines, Singapore and Malaysia, although they are higher than ULCs in Indonesia and Thailand in recent years. This implies that these regions of China are still more competitive than some ASEAN countries in the manufacturing sector in terms of ULCs. This regional competitiveness disparity could provide Chinese authorities time and space to prolong China's economic growth period, although China has lost competitiveness relative to ASEAN countries at the national level. Also, we find that rising ULCs impacted on China's exports more significantly in 2010 than in 2005, indicating that recent rapidly rising ULCs weakened China's international competitiveness. However, it seems that the impact of RMB appreciation on exports is more significant than that of increasing ULCs in the coastal region of China.

RMB revaluation and wages rising has caused extensively debates on how China could continue its economic growth by still heavily relying on labor-intensive and low-cost goods exports. According to the Flying Geese model (Akamatsu, 1962), within a group of countries with different levels of economic development, the leading country shifts labor-intensive industries to less-developed countries when it is no longer competitive due to rising labor costs. The less-developed countries (recipient countries), which possess comparable labor cost advantages will develop their economies by duplicating the leading country's development pattern by focusing on labor-intensive industries. This model well describes the pattern of East Asian countries' economic development over the past several decades. It is also applicable to a large economy with striking regional disparity like China. China itself could form a domestic flying geese formation to further develop its economy. We find that some regions in China are still

competitive compared to most ASEAN countries in term of ULCs, although China as a whole lost competitiveness relative to ASEAN countries. China could absorb the likely adverse impacts of RMB revaluation and wages rising on its economic growth by making the manufacturing industry move from the coastal area to non-coastal areas of China, where it is still more competitive than some ASEAN countries. By doing so, the coastal area of China could upgrade its industrial structure from being labor-intensive to being capital and technology-intensive. Recipient areas could duplicate the coastal area's successful economic development model to accelerate economic growth. This could help China to buffer the adverse impacts and prolong its economic growth despite RMB revaluation and rising wages.

Chapter 5: Lessons Learnt from Japan, Korea and Taiwan's Exchange Rate Regime Reform

5.1 Background

The East Asian countries adopted diverse exchange rate regimes from currency board regime (Hong Kong SAR) to free floating exchange rate regime (Japan and Korea). Others are in the midst by adopting *de facto* or *de jure* managed floating exchange rate regime. Over the past several decades, the exchange rate policy significantly affected East Asia's economic development which is called the "East Asian Miracle" (World Bank, 1993). The International Monetary Fund (IMF) regularly reported its member countries' exchange rate arrangements on the basis of the degree of flexibility of arrangement and a formal or informal commitment to a given exchange rate path²³. It based on member countries' *de facto* exchange rate arrangements rather than their officially announced arrangements. Thus, this classification system provides us a relatively objective reference to assess one country's exchange rate regime. According to the IMF's latest annual report of 2012, Japan and Korea are classified into the category of "Free floating" and "Floating", respectively²⁴. While China is in the category of "Crawl-like arrangement" compared to the category of "Other conventional fixed peg arrangement" in the IMF's report of 2004. It reflects the fact that the flexibility of the RMB exchange rate increased since the PBoC launched the exchange rate regime reform in July 2005. Also, it is notable that China is not in the category of "Pegged exchange rate within horizontal bands" even though China claimed that its exchange rate policy is "with reference to a basket of currencies".

Since implementing the Reform and Opening policy at the end of 70s, China has made remarkable achievement in economic development over the last three decades. But at the same time, China's exchange rate policy is under increasingly internal and external pressure. In chapter 3, we find that there is a declining trend in RMB misalignment. The costs of tightly pegging to a single currency or a basket of currency are increasingly high for the PBoC. A free floating exchange rate regime enables Chinese authorities to manage the domestic money and credit policy more effectively (Eichengreen and Hatase, 2005). Given the rapid RMB revaluation and uncertain world economy, the question about how China should reform its exchange rate regime attracted extensively debates. The recent financial crisis highlighted the importance of RMB exchange rate regime reform when the "Currency War" posed a great threat to the restoration of world economy.

²³ The IMF published the Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER) annually from 1950. Since 2009, the IMF introduced the renewed categories of exchange rate arrangement that include: No separate legal tender, Currency board, Conventional peg, Stabilized arrangement, Crawling peg, Crawl-like arrangement, Pegged exchange rate within horizontal bands, Other managed arrangement, Floating and Free floating. This classification helps assess the implications of the choice of exchange rate arrangement for the degree of independence of monetary policy.

²⁴ Taiwan (Republic of China) was not included by the IMF possibly because it is not the IMF's member country.

Some researches provide the possible roadmap of the RMB exchange rate policy reform (Frankel 2005 and Yu 2010). In Chapter 2 and 3, we examined the RMB currency basket and estimated the RMB misalignment. They are valuable studies for China to reform its exchange rate regime, thereby deeply participating into the international financial system reform triggered by the global financial crisis. However, apart from empirical studies on the RMB exchange rate regime, we believe that reviewing and analyzing the experience of other countries' exchange rate regime reform could provide us with another perspective to make valuable policy suggestions for China. In this Chapter, we attempt to draw policy implications for China's ongoing exchange rate regime reform by conducting a historical comparative analysis. We review the process of exchange rate regime reform of some East Asian countries with particular emphasis on the macroeconomic background, the exchange rate and monetary policy applied and the corresponding consequence of reform in each of periods.

We choose Japan, Korea and Taiwan, Republic of China (thereafter, Taiwan) as the target countries to study. We review the process of exchange rate regime reform in these economies so as to draw lessons from their experiences and avoid repeating policy mistakes. The reason why we select Japan, Korea and Taiwan as targets to study is that these three economies had the similar economic situation which China is facing now when they started to reform their exchange rate regimes (Japan in the 1970s-1980s and Korea and Taiwan in the 1980s-1990s, respectively). Second, their economic take-off (or economy miracle) were mainly driven by foreign trade and investment as China did during the last three decades. The exchange rate policy is one of key policy instruments to drive economic growth for these three economies as well as for China. Third, these three economies began with single currency (the US dollar) peg exchange rate regime when their economies started to take-off, then shifted toward the floating exchange rate regimes gradually or in *one-off*. Therefore, their experiences and lessons on the exchange rate regime reform are valuable for China.

The remainder of this chapter is organized as follows. Section 2 is literature review. In Section 3, Section 4 and Section 5, we review the process of exchange rate regime reform of Japan, Korea and Taiwan, respectively. Also, we draw policy implications from their experiences for China's ongoing exchange rate reform. Section 6 concludes the chapter by policy suggestions and implications.

5.2 Literature Review

Japan's exchange rate regime reform has been relatively well studied. Kuroda (2004) reviews two failed cases in Japan's exchange rate policy: Nixon Shock in 1971 and Plaza Agreement in 1985. He suggests that China should start exchange rate adjustment with a medium term strategy sooner rather than later. The RMB should be allowed to be revaluated gradually by 7-10 per cent annually. Kanamori and Zhao (2005) assess the similarities between Japan in the 1980s and China in the 2000s. From Japan's experience, exchange rate adjustment alone cannot achieve external balance. Also, they argue that the long-run impact of RMB appreciation needs to be carefully considered because currency revaluation would trigger the adjustment of industrial structure. Ishida (2006) points out that Japan failed in adjusting the undervalued yen in the period of

from 1960s to 1970s, resulting into weakening Japan's industrial base. By reviewing how the yen has appreciated and related monetary policies from Japanese authorities, he provides some suggestions for China's ongoing exchange rate regime reform. He argues that the cooperation by government, academics and businesses under powerful political leadership could make the better exchange rate policy. Obstfeld (2009) reviews the links between the macroeconomic developments and the level of exchange rate during the period of bubble economy and lost decade of Japan. He finds that rapid appreciation of the yen contributed to pushing Japanese economy into the prolonged recession and deflation.

There is less literature studying Korea's experience of exchange rate regime reform. Willett and Kim (2003) find that Korea's exchange rate regime after the Asian Financial Crisis of 1997 was neither a free float nor a heavily managed floating exchange rate regime. It was a mixed exchange rate regime with considerable flexibility and management. Nam and Kims (1999) describe Korea's exchange rate regimes and the behavior of the won exchange rate from 1970 to 1995. They find that Korean authorities used the exchange rate policy as an instrument to adjust the imbalance in its current account. During the 1980s, Korea pegged the won to a basket of currencies comprised of its major trading partners, although this peg regime was relatively loose. But their results of counterfactual simulation exercises show that a rigidly pegging to a basket currency would cause a larger fluctuation in inflation. As a small economy, Taiwan's exchange rate regime reform has not been extensively studied. Xu (2008) finds that the sharp appreciation of Taiwan dollar in 1986-1992 caused a painful decline in Taiwan's exports and employment in the short run. However, in the long run, appreciation of the Taiwan dollar accelerated manufacturing industry upgrading, and boosted the development of service sector in Taiwan.

5.3 Review of Japan's Exchange Rate Regime Reform

5.3.1 Background

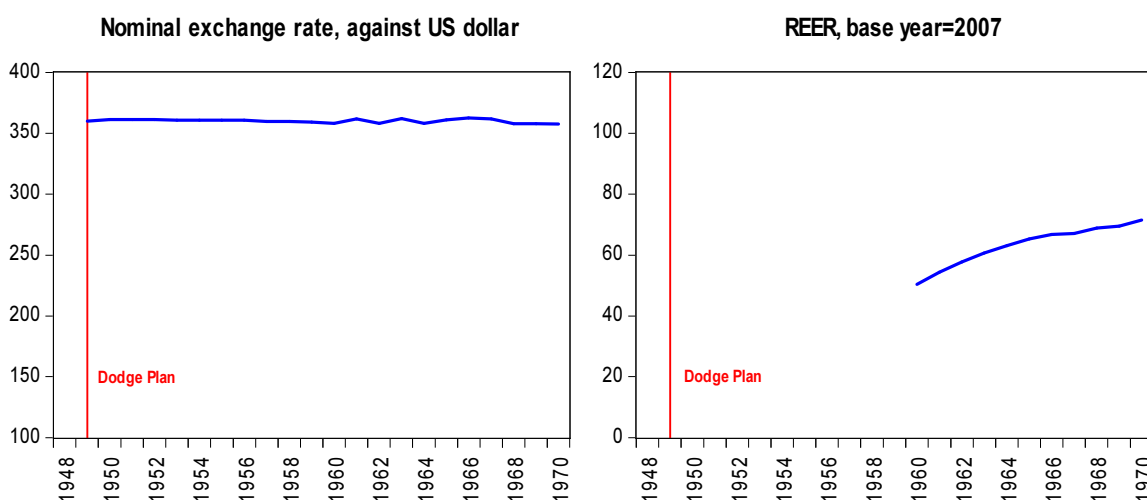
Japan achieved a remarkable economic development after World War II. It took twenty three years to become the world's second largest economy in 1968. However, Japan fell into prolonged economic recession which is called the Lost Decade. It is widely believed that Japanese currency, the yen's sharp appreciation is one of reasons for Japan's long-term deflation since the end of 1989. On the other hand, some argue that it was Japan's follow-up easing monetary and expansionary fiscal policies after Plaza Accord in 1985 rather than sharp yen appreciation to create bubbles in the economy, thereby driving Japanese economy into persistent recession when bubble burst in 1989. Given the high similarity of internal and external situations between Japan in the 80s and China now, Japan's experience is referable for China's ongoing exchange rate regime reform. The Plaza Accord in 1985 was regarded as cornerstone of Japan's modern economic history. We review Japan's exchange rate regime and relevant policies applied before and after the Plaza Accord.

5.3.2 Pre-Plaza Accord of 1985

(1) Dodge Plan (Dodge Line) in 1949

After the World War II, in the late of 1940s, Japan's economy was severely challenged by the high postwar inflation. Japanese currency, the yen, almost lost the most of its value. Along with other policies aiming at stabilizing Japan's economy, Nine Principles to Stabilize Economy was carried out to curb increasing inflation by Supreme Commander of the Allied Powers (SCAP) government in 1948. Furthermore, the yen was fixed to the US dollar at about 360 yen per dollar to maintain the stability of financial markets and international competitiveness of Japan's exports. It was well known as Dodge Plan which was officially announced on March 17, 1949²⁵. The yen exchange rate maintained stable at 360 yen per dollar until 1970. During this period, the REER of the yen has also been kept relatively stable (see Figure 5.1). This fixed exchange rate regime significantly helped Japan's postwar government to stabilize the yen exchange rate and encourage investment flowing into Japan. In addition, at the end of 1949, the Foreign Exchange and Foreign Trade Law was introduced. Under this law, foreign exchange transactions were strictly restrained with exemption of approval by the government.

Figure 5.1: The yen's nominal exchange rate and REER, 1949–1970

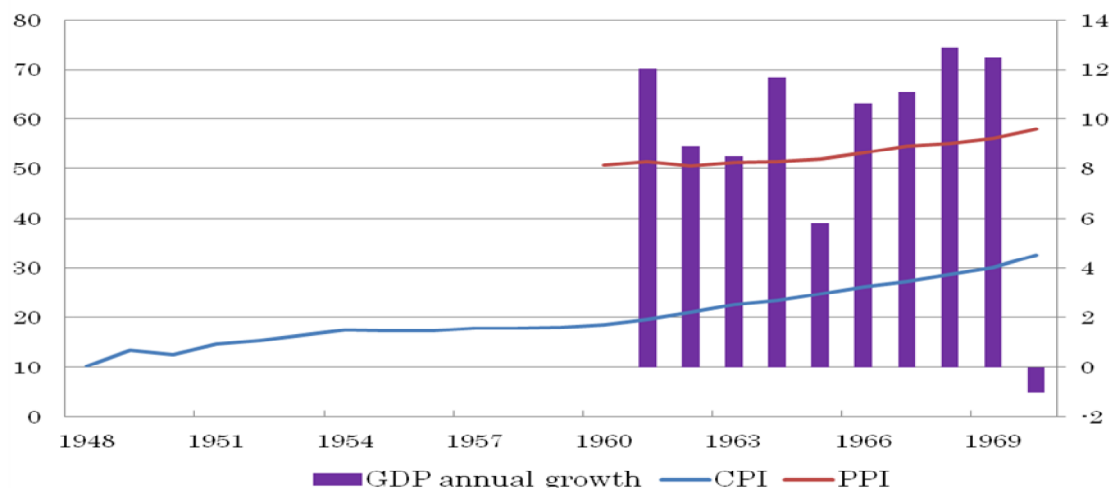


Source: CEIC Database and BIS.

The fixed exchange rate policy and foreign exchange transaction constraints significantly contributed to Japan's economic take-off after the World Second II. By applying above policies, Japanese authorities effectively stabilized its postwar economy and began to develop export-driven economy through fixing the yen exchange rate against the US dollar. Figure 5.2 shows us that since 1949, Japan's domestic inflation kept relatively stable until 1963. After that, both CPI and PPI increased faster, but moderately. As a result of that, Japan's economy grew at a rapid speed, which was described as "Economic Miracle of Japan".

²⁵ Dodge Plan was named after Joseph Dodge who drafted a financial and monetary contraction policy for Japan to curb inflation and gain economic independence after the Second World War.

Figure 5.2: Japan's annual growth of GDP (%), CPI and PPI index (2005=100), 1948–1970

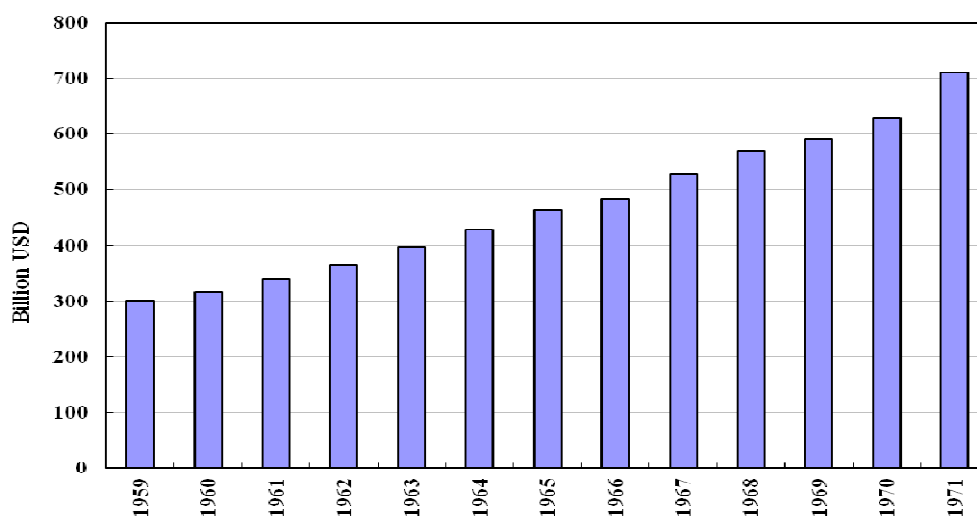


Source: CEIC Database.

(2) Nixon Shock in 1971

After rapid economic growth for almost twenty years, Japan accumulated a great deal of trade surplus. Japan's exchange rate regime, which pegged the yen to the US dollar, began to face increasing pressure from Japan's trading partners, especially from the US. Since 1968, Japan's current account surplus appeared and foreign reserves were accumulated to approximate US\$ 2 billion by the end of 1960s (Fukao, 2003). Germany and other European countries also gained increasing trade surplus against the US. In contrast, the US recorded the so-called double deficits: trade deficit and current account deficit, for the first time in the postwar period (Kuroda, 2003). In the meantime, the US experienced the high inflation driven by expansionary monetary policy and military expenditure because of the Vietnam War. Figure 5.3 shows that money supply (M2) rose continuously since 1958. Also, we can see from Figure 5.4 that the US's inflation rate climbed dramatically since the beginning of the 1960s, reaching 6 per cent in 1970 which was the highest inflation rate since 1945. Financial market's confidence on the US dollar which had dominated in the global financial system for more than half century weakened. It was widely believed that the US dollar was overvalued and Bretton woods system, which was a fixed exchange rate arrangement by pegging other currencies to the US dollar based on gold standard, could not survive.

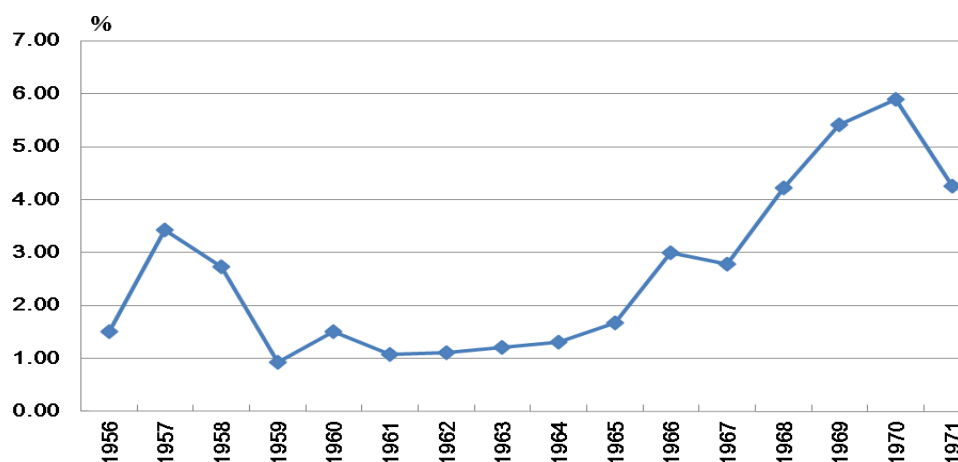
Figure 5.3: Money supply (M2) of the US, 1959–1971



Source: CEIC Database.

The Nixon Shock refers to a series of economic measures employed by the US's Nixon administration in 1971. On August 15, 1971, the US president, Richard Nixon, unilaterally announced to cancel the direct convertibility of the US dollar to gold, meaning the end of Bretton Woods system. In addition, a 10 per cent of import surcharge, 90-day wages and price freezing were imposed (Lowenstein, 2011). It reflected the change of world economic power since the World War II. Japan and some European countries' economies recovered from the destruction of war, while the US's domination in the world economy considerably weakened. After the Nixon Shock, Japan continued to peg the yen to the US dollar by intervening in foreign exchange markets for two weeks. Then the yen began to be revaluated, even though Japanese authorities still controlled the pace of yen appreciation (Eichengreen and Hatase, 2005).

Figure 5.4: Changes of the US's CPI, 1956–1971

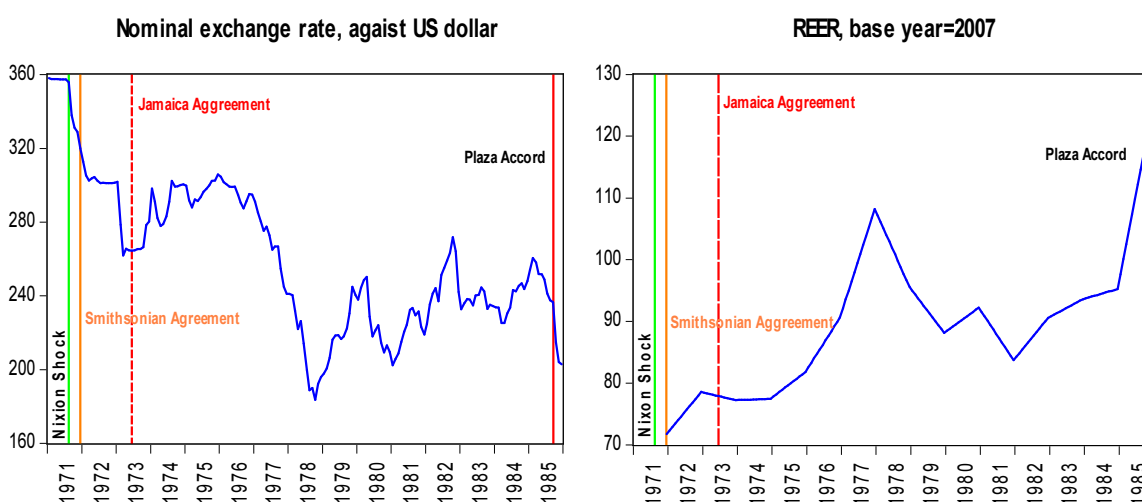


Source: CEIC Database.

(3) Smithsonian Agreement in 1971

After collapse of Bretton Woods system in 1971, the Japanese yen and other major currencies started to collectively appreciate against the US dollar. Japanese authorities extensively intervened in foreign exchange markets to control the pace of yen appreciation so as to minimize the possible adverse impact on Japan's exports. But such actions were interpreted as a signal of further yen appreciation by market (Eichengreen and Hatase, 2005). Other major currencies confronted the same problem. In order to respond such fundamental adjustment and reduce the impact of excessive exchange rate fluctuation on the world economy, in December 1971, Group of Ten²⁶ signed the Smithsonian Agreement at the Smithsonian Institution of the US. Countries agreed to establish a transitional international monetary system and revalue their currencies against the US dollar. The US dollar should depreciate by 7.89 per cent against the gold, and the US's government would cancel the measure of 10 per cent of import surcharge imposed by Nixon administration. Since then, the yen appreciated by 16.88 per cent to 308 from 380 yen per dollar (see Figure 5.5). Then the yen was pegged to the US dollar at this level for a few months. But soon it was proved that such extent of revaluation was not enough to meet market expectation (Fukoda, 2003). By March 1973, the most advanced countries announced to float their currencies with each other, which signified the end of Bretton Woods system.

Figure 5.5: The yen's nominal exchange rate and REER, 1970–1985



Source: CEIC database and World Bank WDI.

As the most participating countries of Smithsonian Agreement, Japan allowed the yen to be revaluated gradually. Relaxing monetary policy was introduced in order to cushion the possible impacts on its exports and economic growth. The REER of the yen also increased considerably (see Figure 5.5). Japanese authorities reduced discount rate to 4.25 per cent which was the lowest rate during the postwar period (see Figure 5.7), and

²⁶ Group of Ten refers to the group of countries including Belgium, Canada, France, West Germany, Italy, Japan, Netherlands, Sweden, United Kingdom and United States.

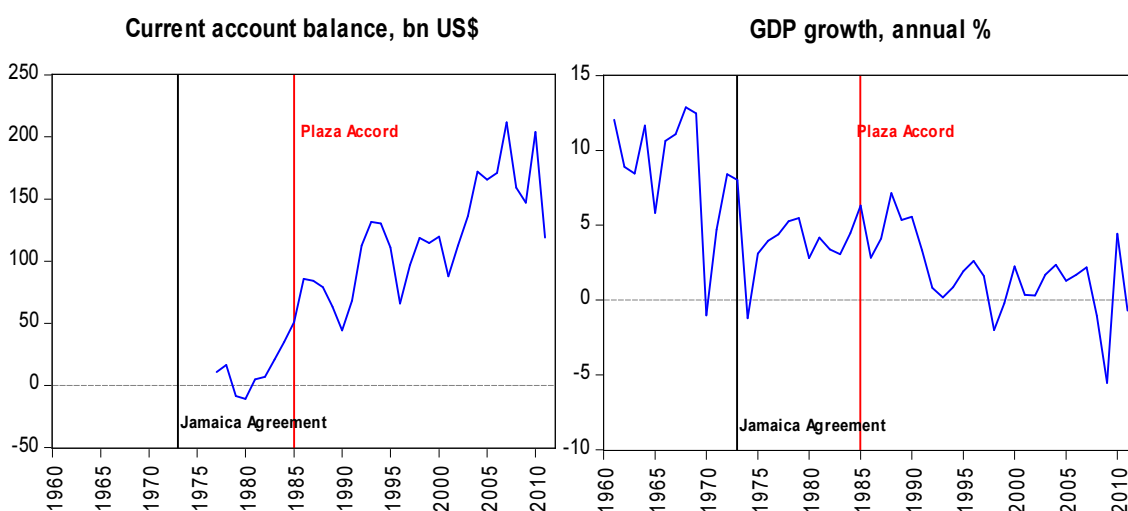
introduced a large supplementary budget to keep economy growing (Fukao, 2003). These policies were necessary for Japan to reduce the impacts of yen appreciation on its relatively vulnerable economy at that time. As a result, the short-term impact of yen revaluation on Japan's exports and economic growth was mild because of these easing monetary policy and expansionary fiscal policy.

(4) Jamaica Agreement in 1973

Due to the Oil Crisis occurred in 1973, a worldwide high inflation spread over the world including Japan and the US (Lowenstein, 2011). It increased the pressure on Japanese authorities to further revalue the yen. In addition, Japan's trade surplus with the US continued to increase (see Figure 5.6). In June 1973, the IMF member countries held a series of negotiations aimed at establishing a united system to replace the Bretton Woods system. Two years later, in April 1976, the Board of Governors of IMF approved these changes and the Jamaica Agreement came into effect. This agreement legalized the existing floating exchange rates system and permitted member nations to fix or to float their currency exchange rates (Meier, 1976). Therefore, the fixed exchange rate system based on the Bretton Woods system officially ended in 1976.

Because of the Oil Crisis and double-digit domestic inflation, Japan had to implement tight monetary and fiscal policies since the end of 1973. Interest rate was lifted from 4.25 to 9 per cent in December 1973. Since then, the yen was revaluated faster, although there were some reversal adjustments. The yen exchange rate against the US dollar peaked at 170 yen per dollar in 1978 which was more than double value than that in the 1960s (see Figure 5.5). The sharp yen appreciation resulted into the negative GDP growth in 1974 which was the first time since 1947, but recovered in the following year. Japan's current account surplus, however, continued to increase which was opposite to what has been expected (see Figure 5.6).

Figure 5.6: Japan's GDP growth and current account surplus, 1960–2011



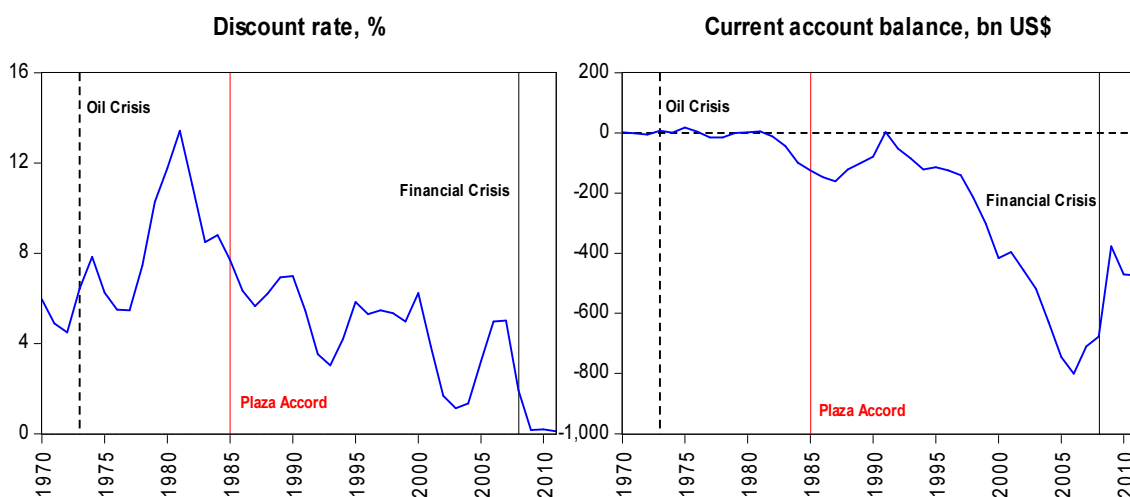
Source: WDI of World Bank.

5.3.3 Post-Plaza Accord of 1985

(1) Plaza Accord in 1985

By the 1980s, the US's economy experienced deteriorated current account deficit and fiscal deficits, so-called the "twin deficits" (see Figure 5.7). This is mainly because of Reaganomics which was implemented by the President Ronald Reagan in the 1980s (Kuroda, 2003). Reagan administration adopted tight monetary policy to rein deterioration of two-digit inflation, which resulted in the US's economy shrinking. To respond to it, the US's authorities then cut interest rate to stimulate economic growth in 1982 (see Figure 5.7). Meanwhile, they also dramatically increased its public expending and military budget (Kanamori and Zhao, 2006). These policies resulted into a strong the US dollar and excessively high interest rate. Between 1980 and 1985, the US dollar had appreciated considerably against the Japanese yen, the Deutsche mark and the British pound, which were the currencies of other three largest economies in the world at that time. The US's manufacturing industries confronted more serious competition from Japan and some European countries. The strong US dollar made things worse. As an evidence for this, the US's exports shrank from 1983. Figure 5.7 illustrates that the US's current account kept balance before 1973 when the Oil Crisis broke up, maintained relatively stable until 1983. Then current account deficit sharply worsened, although it recovered in 1992. In addition, Japan became the largest creditor and the US became the No. 1 debtor in the world. Japan, along with other European countries, was under enormous pressure to allow their currencies to appreciate.

Figure 5.7: The US's discount rate and current account balance, 1970–2011



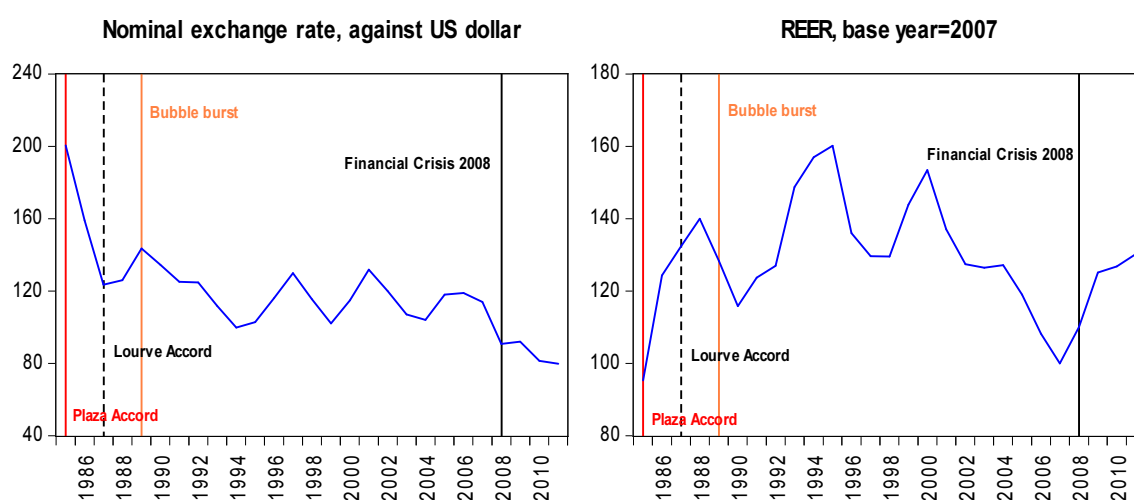
Source: The Federal Reserve of the US and World Bank WDI.

Note: The rate is average discount rate before 1991 and Federal Fund rate since 1991.

Under the above background, on September 22, 1985, France, West Germany, Japan, the United Kingdom and the United States held multilateral meeting with temptation of addressing the imbalance in the world economy at the Plaza Hotel, the US. Five

countries reached an agreement which is well known as the Plaza Accord. All parties agreed that close coordination of exchange rate policy was needed and the US dollar should depreciate orderly against other major currencies. After the Plaza Accord signed, five countries jointly initiated extensive intervention to devalue the US dollar which was extremely overvalued. The US dollar depreciated sharply against other major currencies. Figure 5.8 exhibits that the yen exchange rate increased by 20 per cent and reached 200 yen per dollar within three months of signing agreement. By 1987, the yen had appreciated until 120 yen per dollar. In other words, the US dollar devaluated by more than 50 per cent against the yen during the two-year period.

Figure 5.8: The yen's nominal exchange rate against the US dollar and REER, 1985–2011



Source: CEIC Database and BIS.

(2) Louvre Accord in 1987

Since the Plaza Accord signed, the speed of the US dollar depreciation was faster than what five major economies expected. Excessive exchange rate volatility not only impaired the economy the US and Japan, but also other countries' economy. In order to prevent inordinate depreciation of the US dollar, the US called Group of Seven²⁷ together to have a multilateral coordination meeting in Louvre, Paris on February 22, 1987 aimed to stabilize international currency markets. In this meeting, Japan agreed to decrease its trade surplus and cut down interest rate. While the US agreed to reduce fiscal deficit and government spending and keep interest rate low (Kuroda, 2003). Since then, the yen was devaluated gradually to 150 yen per dollar until 1989 when the bubble in property and stock markets burst (See Figure 5.8). During this period, the REER of the yen also decreased by more than 30 per cent.

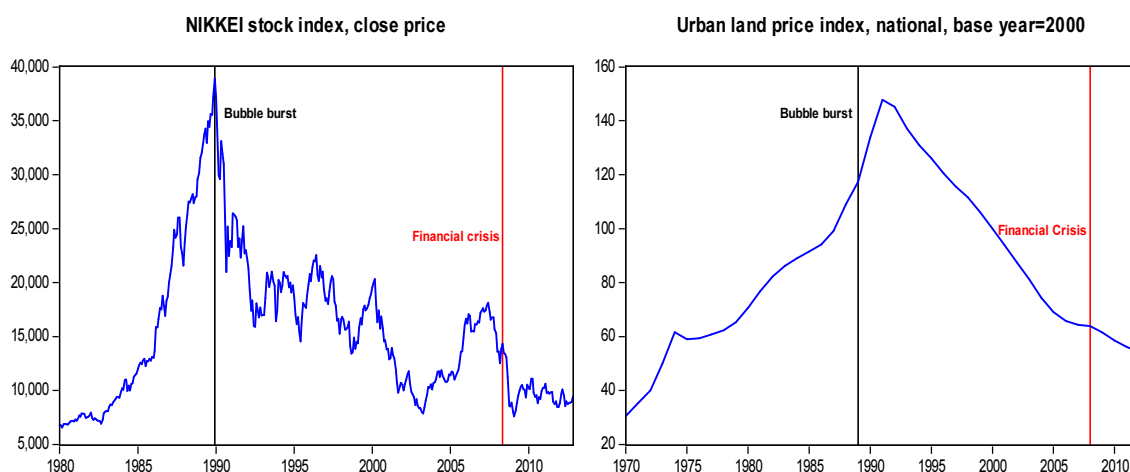
(3) Bubble Economy

²⁷ Louvre Accord was signed by France, West Germany, Japan, Canada, the United States and the United Kingdom. Italy was a participating country, but declined to sign this agreement.

After the Plaza Accord and following Louvre Accord, Japan passively allowed the yen to appreciate. In Japan, it was widely believed that such rapid yen revaluation would seriously impair Japanese economy, particularly Japan's export industry (Obstfeld, 2009). Accordingly, Japanese authorities employed a series of relaxing monetary and expansionary fiscal policy to minimize the possible impact of yen appreciation on Japan's economy. To do so, they cut down the discount rate for four times in 1986, decreased it further from 5 to 2.5 per cent in 1987 (Kuroda, 2003), which was the lowest level in modern economy of Japan aimed at maintaining export competitiveness and economic growth. During this period, the CPI remained relatively low although monetary policy was loose. It is because that the sharp yen appreciation kept the inflation stable. When we looked back the decision of keeping low discount interest by Bank of Japan (the BoJ), it was the relatively low inflation made the BoJ to keep interest rate at a low level for a long period, although Japan's economy appeared overheating. It was a dilemma faced by the BoJ (Ito and Mishkin, 2004).

Such excessive easing monetary policy, however, created too much liquidity. Much of capital flowed into Japan's property market and stock market. In addition, international speculative capital which speculated further yen appreciation, also contributed to excessive liquidity. These investment and speculation capital pushed Japan's stock and property markets to the peak. As Figure 5.9 shows, the Tokyo NIKKEI index and national land price index increased sharply. By 1989, Japan's bubble economy reached its peak.

Figure 5.9: Japan's NIKKEI stock index and urban land price index, 1970–2011



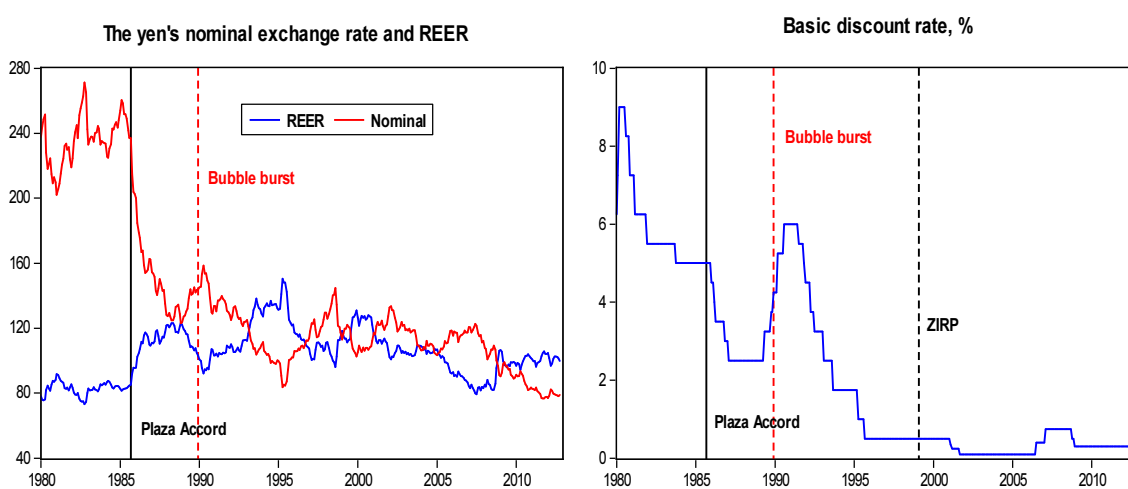
Source: NIKKEI Inc. and Ministry of Internal Affairs and Communications, Japan.

(4) Lost Decades

Japanese authorities realized that the economy was overheating and such growth driven by excessive investment was not sustainable (Ahearne *et al.*, 2002). The property price and stock price were deviated from the economic fundamentals. Therefore, at the end of 1989, Japanese authorities changed its monetary policy drastically. In May 1989, the BoJ increased the discount rate from 2.5 to 3.25 per cent, which had been kept for

27 months (Kuroda, 2003). Furthermore, the BoJ successively raised the discount rate for four times until 6 per cent, combined with other policies such as limiting banks' lending to real estate-related projects and companies to rein the property price (Jinushi *et al.*, 2000). As a result, the stock price collapsed in December 1989. Figure 5.9 shows that the Tokyo Nikkei 225 index declined sharply to 20,983.50 in September 1999 from its peak at 38,915.87 in November 1989. The same thing happened in the land and property markets. The land price plunged although it lagged few years (also see Figure 5.9). Speculative capital escaped from Japan, thereby further accelerating the decline of the land price. Thus, the bubble burst completely and Japan's economy entered into the long-period recession, also called the "Lost Decades".

Figure 5.10: Japan's nominal exchange rate and interest rate, 1980–2012



Source: Bank of Japan.

To stimulate the economic growth, the Zero Interest Rate Policy (ZIRP) was initially introduced in February 1999. The official interest rate was effectively set at zero (see Figure 5.10). But in August 2000, the BoJ raised interest rate to 0.25 per cent from zero due to concerns on side-effect of keeping zero interest rate for too long period (Ito, 2004). It was argued that such interest rate increasing was ill-timed because Japan's economy was still stagnant although economic growth in Japan recorded the positive figure in 2000 (Obstfeld, 2009). But the inflation was still about zero or even less, implying the weakness of economic growth. One year later, the BoJ cut down interest rate again with clarification of positive inflation target (Kuroda, 2004). Furthermore, unconventional monetary policy, called quantitative easing policy, was firstly employed in 2001 (Jinushi *et al.*, 2000). The period of deflation in Japan lasted until 2006 when economy began to grow. But when the global financial crisis hit the world economy in 2008, the yen, regarded as a safe-haven currency, appreciated significantly. However, it is widely believed that the value of the yen deviated from Japan's economic fundamentals. Such yen overvaluation made Japan's economy gloomy. Since Abe administration in 2012, a set of monetary policies was introduced. Inflation target was explicitly set at 2 per cent. To achieve this goal, easing monetary and expansionary fiscal policies were carried out. The yen has depreciated dramatically by more than 20

per cent by the end of 2012. Japan's economy appeared to grow in the first half of 2013, although not rapidly.

5.3.4 Lessons learnt from Japan's experience

After the World War II, the fixed exchange rate regime by pegging the yen to the US dollar, significantly contributed to the take-off of Japanese economy. Unsurprisingly, there was strong resistance to the yen revaluation in Japan when Japanese authorities faced mounting pressure to decouple the yen from the US dollar in August 1971. They tried to postpone yen revaluation as late as they could. It is the exactly same situation as that in China now. There are two opinions to how to revalue the RMB. On the one hand, some suggest that the one-off appreciation, for instance 10-30 per cent of a sharp appreciation of the RMB, could decrease the costs brought by the expectation of RMB appreciation. On the other hand, others from both academia and industry in China disagree that the RMB should be revaluated sharply. They argue that China isn't prepared to reform current exchange rate regime for many reasons, such as sharp appreciation would destroy China's export industry, China's financial system is still vulnerable, and so on. China would fall into the long-term recession as Japan experienced in the 1990s if the RMB is revaluated sharply. However, along with China's economic growth, China has attempted to take more important role in the global financial system and increase the weight of the RMB use in the international transactions and foreign reserves held by other central banks. To do so, a more flexible exchange rate regime is clearly needed. One of lessons learnt from Japanese experience is that the active approach is better than the passive one. Japan was pushed to reform its exchange rate regime by external pressures and internal demands. Passive attitude and lagged countermeasures to respond to the yen appreciation and external economic situation negatively affected the effectiveness of policies from the Japanese authorities. It might be too slow to respond to the rapid changes in the financial and economic system. Therefore, for China, the less impacts of RMB revaluation on its economy there are, the earlier actions and more active approach are adopted.

After the Nixon Shock, Japan excessively intervened in foreign exchange markets to avoid the sharp yen appreciation. It was natural and correct response so as to reduce the possible effect on Japan's economic growth and leave time for the domestic enterprises to make adjustments on the yen appreciation. But Japanese authorities soon gave up controlling the pace of yen revaluation, and allowed the yen to freely flow to some extent. It is understandable that Japan had to allow its currency to be revaluated according to the Plaza Accord. But the yen exchange rate rose too fast in some years, which exceeded Japan's commitment in the Plaza Accord. Japanese authorities failed in illustrating its decisiveness on avoiding excessive volatility in the yen exchange rate to market speculators. It is true that Japan might not be able to fight tremendous market speculation in the 70s and the 80s. But Japan should have announced to adopt a managed float exchange rate or crawling exchange rate policy to signal that Japan would only allow the yen to appreciate gradually. It could help Japan avoid excessive and sudden fluctuation of the yen exchange rate which had negative impacts on Japan's foreign trade and investment.

Given the heavy reliance on the US in the 1970s, both economically and militarily, it was hard for Japan to say “No” to the US on its requirement of yen revaluation. Therefore Japanese authorities sought to employ monetary and fiscal policies to defer or reduce the possible impact of yen appreciation. Reviewing these policies in a viewpoint of three decades later, some of policies were necessary and reasonable. Japanese authorities introduced a series of monetary and fiscal policies to cope with yen appreciation. These policies boosted the public spending, encouraged Japanese companies to invest abroad, started transferring the model of economic growth from export-driven to domestic demand-driven and so forth. However, the timing and scale of the BoJ’s monetary policy are controversial (Ahearn *et al.* 2002 and Ito 2004). For example, after the Plaza Accord signed, Japanese authorities cut the discount rate for four times in 1986. The Discount rate was further decreased to 2.5 from 5 per cent aimed at reducing the impacts of yen appreciation on Japan’s exports (Kuroda, 2004). This is the lowest discount rate in modern economy of Japan. Such “cushioning” policies might be too excessive and intensive when we reviewed them now. Furthermore, the exit strategy of easing monetary policy was applied in 1989 when Japanese authorities found that excessive easing monetary and fiscal policies accumulated the bubble in property and stock markets. Combined with other policies, the BoJ successively raised the discount rate for four times to 6 from 2.5 per cent. Such drastic adjustments in monetary policy not only destroyed confidence in market, but also burst the bubble in the stock and property markets. As Kanamori and Zhao (2006) point out that the bubble size would be smaller and consequence of bubble bursting would not too severe if Japanese authorities tightened monetary policy earlier. Therefore, although the relevant monetary and fiscal policies are needed, the timing and scale of policy are equally important.

The Long-term effect of currency revaluation needs to be considered by monetary authorities in advance. The exchange rate regime reform could change country’s economic structure. The yen appreciation pushed Japanese enterprises to invest overseas, thereby resulting into an industrial structure adjustment. Japanese enterprises went abroad to seek market access and cheap labor when the yen appreciated considerably. Such massive industry transfer was regarded as the main reason of Japan’s industry “hollowing-out”. Recently, China’s outward FDI increased considerably from US\$ 2.7 billion in 2002 to US\$ 74.65 billion in 2011²⁸. Unlike Japan’s outward FDI which mainly went to the East Asian countries for cheap labor and the US for the market access, China’s outward FDI mainly flowed to the natural resource-rich areas. But if the RMB were revaluated to a certain level, Chinese firms have to go abroad in order to cope with increasing costs caused by the RMB appreciation like what Japanese firms had done in the 1980s. In addition, the labor-intensive and low-value-added product still accounts for a large part of China’s exports. So the RMB revaluation will significantly impact on these industries which are sensitive to the exchange rate. Therefore, Chinese authorities need to recognize the importance of industry upgrading and industrial structure adjustment when the RMB is being revaluated.

5.4 Review of Korea’s Exchange Rate Policy Reform

²⁸ See 2011 Statistical Bulletin of China’s Outward Foreign Direct Investment from Ministry of Commerce of People’s Republic of China.

5.4.1 Background

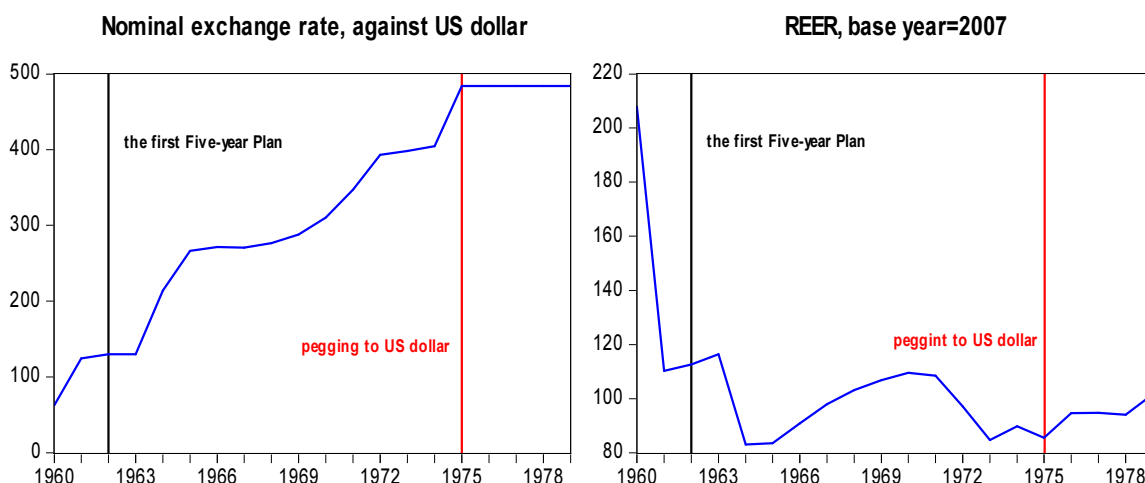
Korea has achieved remarkable economic growth since the 1960s. This process of rapid-growth was disrupted by the Asian Financial Crisis of 1997 and the recent global financial crisis. But Korean economy has illustrated outstanding resilience and flexibility to accustom itself to the changes of external economic environment. By implementing the first Five-year Plan in 1962 and outward-looking trade strategy, Korea's economy began to grow which is referred as the "Miracle of on Han River" by economic historians. There were three periods of major economic reforms that have shaped today's Korean economy: financial and price reforms period (1962-1965), stabilization and liberalization period (1980-1983) and comprehensive financial and corporate restructuring period (1998-2000) (Cho, 2011). As an export-oriented economy, the exchange rate policy took a core role in the development of Korean economy. The process of Korea's exchange rate regime reform is a good example to study for China. According to the exchange rate policy applied in each of the periods, we define the process of Korea's exchange rate regime reform into three periods.

5.4.2 Depreciation and US Dollar pegging period (1962-1979)

The year of 1962, when Korean currency, the won was re-introduced, was regarded as the starting point of Korean modern economy²⁹. Meanwhile, the first Five-year Plan was launched in 1962. The won exchange rate before 1961 was extremely overvalued at 65 won per dollar in December 1960 because of high inflation, together with the attempt of keeping the purchasing power on import goods when its foreign currency reserves was very little in this period (see Figure 5.11). In 1962, the won exchange rate was artificially depreciated at 125 from 65 won against the US dollar. The financial system and price reforms, mainly involved the interest rate policy reform, coupled with the exchange rate stabilization policy, helped Korean authorities to maintain inflation stable and increase the domestic savings (Kim, 2007). Also, how to stimulate exports to drive economic growth was the main concern at that moment. The won exchange rate was devaluated further to 255 won per dollar in May 1964, compared to the rate of 130 won per dollar in April 1964 (see Figure 5.11). It marked that Korean authorities used the exchange rate policy as an instrument to drive its outward-looking economy to grow.

Figure 5.11: The won's nominal exchange rate and REER, 1960–1979

²⁹ The Bank of Korea, the new central bank, was established on June 12, 1950. The currency issued was called the hwan.



Source: CEIC database and BIS.

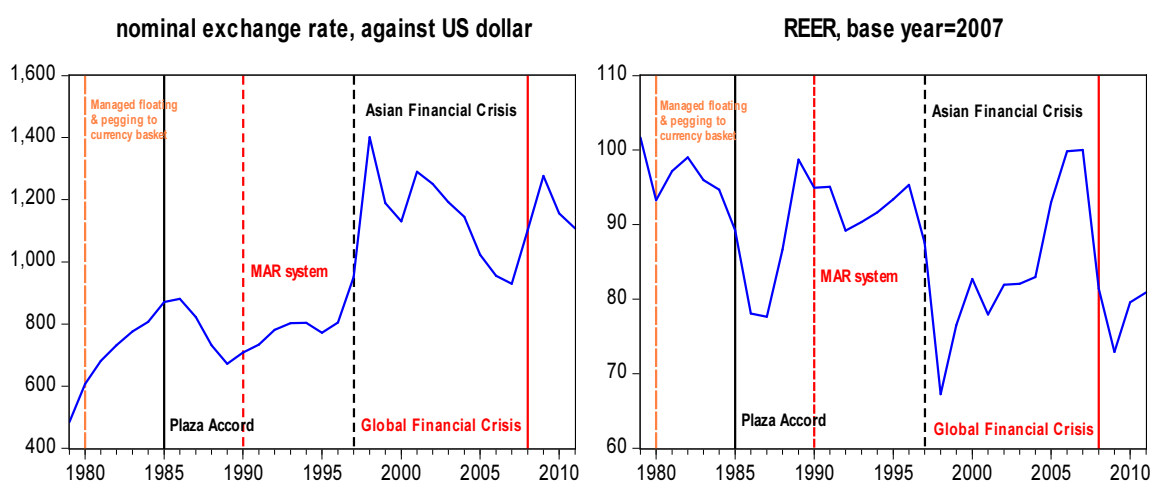
As a small and vulnerable economy at that time, Korea's exchange rate policy experienced drastic adjustments during this period. The won depreciated considerably by more than 470 per cent from 130 in 1962 to 404 won per dollar in 1974. Such devaluation significantly promoted Korea's exports and contributed to Korea's economic growth. Since 1975, the won started to be pegged to the US dollar until the early of 1980 (see Figure 5.11). Pegging to the US dollar assisted Korean authorities to keep stability of financial market and economic growth. This peg regime was interrupted by the second Oil Crisis in 1979. Korea's economy suffered the severe deterioration of balance of payment, recorded the first negative real GDP growth at -3.7 per cent in 1980 over the postwar period (Kim, 1995). To cope with the economic downturn, along with some import liberalization policies, the won exchange rate then sharply plunged to 580 in January 1980 from 484 won per dollar in the end of 1979 (see Figure 5.11). One striking feature is that the REER of the won remained relatively stable during this period. The stable REER of the won helped keep not only Korea's international competitiveness, but also the stability of financial market.

5.4.3 Transition period (1980-1997)

Between 1980 and 1985, the US dollar had appreciated by about 50 per cent against the other major currencies: the Japanese yen, the Deutsche Mark and the British pound. Korea had to abandon the US dollar peg exchange rate regime to avoid excessive won appreciation. Meanwhile, Korean authorities expanded trade liberalization at the beginning of 1980s (Cho, 2002). A new exchange rate regime was needed in order to adapt to the changes in the global economy. On February 27, 1980, Korean authorities officially adopted a managed floating exchange rate policy, which was a currency basket peg regime, to instead the single currency peg regime. After that, the won exchange rate in nominal term continued to depreciate until 1985 (see Figure 5.12). Since Japanese yen and other major currencies appreciated considerably after the Plaza Record in 1985, the won also began to appreciate against the US dollar until 1989. During this period, in the contrary, the won's REER declined until the mid-1986, followed by an increase of the REER until 1989, then dropped again (see Figure 5.12). Since the REER was

regarded as the better indicator to measure one country's international competitiveness than the normal exchange rate, adjustment of the won's REER in accordance to the domestic economic situation helped Korean authorities to remain its competitiveness in the global market.

Figure 5.12: The won's nominal exchange rate and REER, 1979–2011



Source: CEIC database and BIS.

With the efforts to adopt a free floating exchange rate regime, in March 1990, Korean authorities announced a new exchange rate system known as the “Market Average Rate (MAR)” system in which the won exchange rate is determined in the interbank market based on a weighted average rates of Korean won against the US dollar in the previous trading day (Chung *et al.* 2000 and Nam and Kim 1999). Under this system, the daily movement of won exchange rate was limited in order to avoid excessive exchange rate fluctuation. The initial daily movement band of won exchange rate against the US dollar was ± 0.4 per cent in March 1990. Then it was expanded to ± 0.6 per cent in September 1991, ± 0.8 per cent in July 1992, ± 1.0 per cent in October 1993, ± 1.5 per cent in December 1994, ± 2.25 per cent in December 1995 sequentially (Nam and Kim, 1999). Because Korea's economy was relatively small and vulnerable at that moment, the currency basket peg regime with a daily trading band was necessary for Korea to transit from the fixed exchange rate regime to the free floating exchange rate regime. By doing so, Korean authorities gradually increased the flexibility of won exchange rate and prepared for the further reform.

The MAR system which indeed is a managed floating exchange rate regime was abolished in 1997 when Korean economy was seriously hit by the Asian Financial Crisis of 1997. After Thailand decided to float the Thai baht in July 1997, Korea widened the exchange rate trading band from ± 2.25 to ± 10 per cent in November 1997 (Nam and Kim, 1999). But they soon gave up. On December 24, 1997, after signing the Letter of Intent with the IMF, Korea officially allowed the won to float freely to exchange the

financial supports³⁰. Indeed, the Asian Financial Crisis of 1997 accelerated the process of Korea's exchange rate regime reform and financial liberalization.

5.4.4 Free float exchange rate regime period (1997 to now)

The won finally became a freely floating currency since December 1997. To end the turmoil in its financial markets, Korean authorities allowed its currency to float freely by targeting a band of inflation (the IMF's Classification of Exchange rate Arrangements and Monetary Frameworks and Eichengreen 2004). But soon after, the won depreciated sharply to almost half of its value when the market lost confidence on it. The won exchange rate in both nominal and real terms fell significantly in 1998 (See Figure 5.12). Helped by a series of financial market reforms and assistance from the IMF, Korea authorities quickly restored the order of financial markets (Chung *et al.* 2000). Korean economy began to grow again. The won nominal exchange rate recovered to 1189 from 1401 won per dollar, while the REER of the won increased to 76.5 from 67.2 in 1999, then kept relatively stable until 2008 (see Figure 5.12). The recent global financial crisis also struck the Korean economy, but not severely as the Asian Financial Crisis of 1997 did. The won exchange rate fluctuated more seriously during the period of crisis because of speculative capital inflow.

5.4.5 Lessons learnt from Korea's experience

Firstly, from Korea's experience we could conclude that the major economies have to adopt a floating exchange rate regime sooner or later. The reason is that the major economies' exchange rate policies significantly influence the interest of their trading partners. When one country's economy grew, its fixed exchange rate policy will be challenged by its trading partners, like Japan in the 1980s and Korea in the 1990s who suffered the pressure from the US when their current account surplus rose rapidly. Now China is facing the increasing pressure to lift the flexibility of the RMB exchange rate from the rest of world, particularly from the US. Secondly, major economies have to take more important roles in the global monetary system. It requires higher flexibility of exchange rate regime. If a fast growing economy such as China, cannot avoid reforming its exchange rate regime, the more positive exchange rate reform could be the better than the passive one.

Secondly, Korea's exchange rate regime reform also illustrated that one country should reform its exchange rate regime when its currency is strong and external environment is stable. The timing to start the exchange rate regime reform also is crucial. Korea had to allow the won to float freely in 1997 to exchange the financial aids from the IMF. It caused severe fluctuation in won exchange rate in both nominal and real terms and turmoil in its financial markets in 1997 and 1998. Therefore, Chinese authorities should positively conduct the exchange rate regime reform when internal and external economic circumstances are stable and the RMB is relatively strong.

³⁰ According to Letter of Intent, Korea would "abolish daily exchange rate band since December 16, 1997" and "limit foreign exchange intervention to smoothing operations".

Thirdly, contrasted to Japan, Korea's exchange rate regime reform is more ambitious and profound. It is because that financial crisis frequently impacts on Korea and Korea intended to be an international player in the world economy. Thus, Korean authorities reformed its financial system more thoroughly after the Asian Financial Crisis of 1997. The won exchange rate regime reform was associated with other financial regulatory and institution reforms (Cho, 2011). This integrated systematic reform rather than only the exchange rate regime reform made Korea's economy more resilient and flexible to the external economic shocks. As evidence to that, although Korean economy was struck by the recent financial crisis as other economies, it recovered quickly. Therefore, the exchange rate regime should be coordinated with other financial reforms rather than alone.

Fourthly, during the transitional period from a fixed exchange rate regime to a free floating exchange rate regime from 1980 to 1997, Korean authorities employed the currency basket peg regime instead of the single currency (the US dollar) peg regime. In addition, the daily trading band on the won exchange rate was set up to avoid excessive volatility of exchange rate. Bank of Korea (the BoK) adjusted this trading band according to the internal and external economic circumstances. One of the purposes of this measure was to conduct the exchange rate regime reform smoothly. Korea's transitional period of exchange rate reform lasted seventeen years from 1980 to 1997. From Korea's experience, pegging to a currency basket instead of a single currency is a good measure during the transitional period. China's central bank, the PBoC, announced to adopt similar policy in July 1995. It helped strengthen the effectiveness of market forces in the RMB exchange rate formation mechanism (Chen, 2009). More importantly, the RMB currency basket should be regularly adjusted in according to the changes of China's trading partners. What's more, Korean authorities imposed the exchange rate trading band when the managed floating exchange rate regime was introduced in 1990. This trading band was widened gradually, thereby increasing the flexibility of the won exchange rate. China also imposed trading band in interbank foreign exchange market since 2005. The trading band was widened to +/- 0.5 per cent in 2008, +/- 1.0 per cent in 2012 and +/- 2 per cent in 2014. Such a currency basket peg regime with a widening trading band would be helpful in directing the RMB toward a freely floating exchange rate regime.

5.5 Review of Taiwan's Exchange Rate Regime Reform

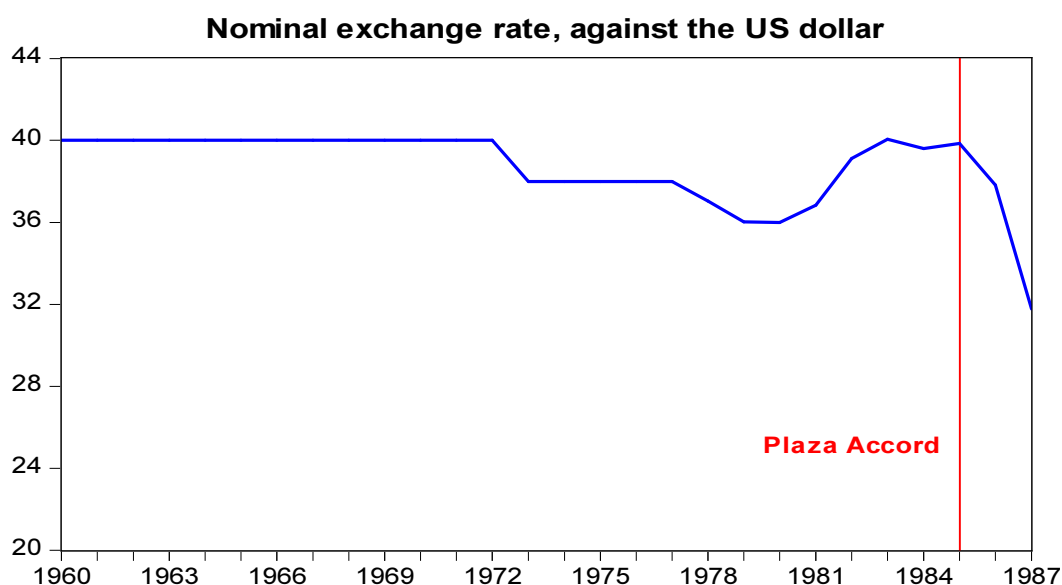
5.5.1 Background

As a small and open economy in the East Asia, Taiwan has successfully developed an outward-looking economy since the 1960s. Its exchange rate regime also experienced dramatic adjustment from the fixed to the free floating exchange rate regime. There are many factors which contribute to the "Taiwan Economic Miracle", such as land reform, industrial structure adjustment and so on (Ash and Greene 2007 and Xu 2007). But the success in the exchange rate regime reform should not be neglected. Very few papers study the process of the exchange rate regime reform in Taiwan. We attempt to fill the gap in this study. We set the year of 1987 as the turning point of Taiwan's exchange rate regime reform.

5.5.2 Pre-1987

Before 1985, the Taiwan dollar was moderately pegged to the US dollar under *de jure* managed floating exchange rate regime. Unlike Japan in the 50s-70s, the Taiwan dollar did not rigidly peg to the US dollar (Xu, 2007). It exhibited relatively high flexibility to some extent in accordance to Taiwan's economic development (see Figure 5.13). The exchange rate stability significantly contributed to Taiwan's economic growth which was mainly driven by exports. Taiwan's manufacturing sectors grew rapidly during this period. In particular, the small and medium enterprises (SMEs) were active and dynamic during the period from the 60s to the 80s.

Figure 5.13: The Taiwan dollar's nominal exchange rate, 1960–1987



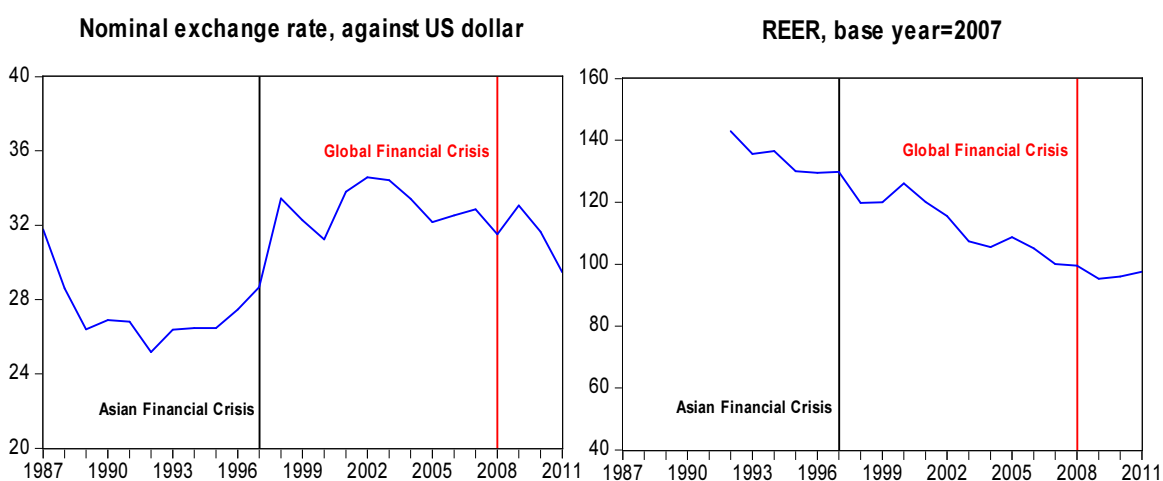
Source: Central Bank of Republic of China (Taiwan).

The Plaza Accord in 1985 significantly influenced the global economic system. All major economies revaluated their currencies against the US dollar. In 1986, the yen appreciated by more than 40 per cent, and Deutsche mark appreciated by about 36 per cent. As an economy which held trade surplus and accumulated a large deal of foreign reserves, Taiwan was under increasing pressure to revalue its currency like other currencies. At that time, Taiwanese authorities were reluctant to allow the Taiwan dollar to appreciate sharply due to concerns on its export industries. They have intensively intervened the Taiwan dollar exchange rate in foreign exchange markets by using its foreign exchange reserves. The Taiwan dollar nominal exchange rate against the US dollar appreciated by 5.1 per cent from 39.85 in 1985 to 37.82 Taiwan dollar per the US dollar in 1986 (Xu, 2007), but was much smaller than other major countries did. However, the market speculated the Taiwan dollar was undervalued and should appreciate further (Xu, 2007). Soon after, Taiwanese monetary authorities could not control the market and the Taiwan dollar appreciated sharply by 16 per cent in 1987, followed by 10 per cent in 1988, 7.7 per cent in 1989 and 6.14 per cent in 1992 (see Figure 5.14).

5.5.3 Post-1987

The drastic revaluation of the Taiwan dollar in 1986 and 1987 considerably impacted on its export industries. In the short term, Taiwan's exports growth dropped from 34 per cent to 13 per cent in 1988, 9.3 per cent in 1989 and 1.5 per cent in 1990 (Xu, 2007). Firms began to move out from Taiwan and relocated in some low-cost areas. Most of them moved to the East Asian countries, especially the mainland of China. To avoid the hollowing-out of industry, Taiwanese authorities introduced a series of policies to upgrade its industry from labor-intensive and low-skill manufacturing industry to capital-intensive and technological-sophisticated industry (Ash and Greene 2007). Electronic component and personal computer sector developed gradually and became the most important pole of Taiwan's economy. Remarkable industry structural adjustment in Taiwan also changed the structure of export production and promoted the productivity. The share of service sector to total GDP increased to more than 50 per cent since 2004 (Xu 2007 and Report by Industry Securities 2011).

Figure 5.14: The Taiwan dollar's nominal exchange rate and REER, 1987–2011



Source: The Central Bank of Republic of China (Taiwan) and BIS.

The exchange rate of Taiwan dollar maintained relatively stable until 1997 when the Asian Financial Crisis in 1997 severely hit the East Asian countries. The Taiwan dollar lost its value by 16.69 per cent from 28.66 in 1997 to 33.45 Taiwan dollar per the US dollar in 1998 (see Figure 5.14). Like other East Asian countries, Taiwanese authorities intensively intervened in foreign exchange markets to maintain the Taiwan dollar exchange rate stable. Thanking for the flexible SMEs and relatively strict control on financial sector, Taiwan's economy was not hit severely as Korea and Thailand experienced (Xu, 2007). A lesson Taiwan learnt from it was that the foreign reserves was critical for a small and open economy to stabilize its currency and financial markets during the period of crisis. Consequently, Taiwanese authorities kept a great deal of foreign reserves which ranked at No. 4 in the world in 2011. More recently, the Taiwan dollar has appreciated by 4.26 per cent in 2010 and by 6.88 per cent in 2011, respectively (see Figure 5.14). It is mainly because that Taiwan's economy remained

relatively resilient compared to other economies during the period of financial crisis.

5.5.4 Lessons learnt from Taiwan's experience

Currency revaluation is a double-edge sword. On the one hand, the sharp and drastic currency appreciation could cause industry "hollowing-out" that means the industries which are sensitive to the costs would move to other countries for cheaper labor and lower costs. It happened in Taiwan as well as Japan when their currencies were sharply revaluated. It resulted into a rapid decline of exports and economic growth in the short run, although this phenomenon may lag for a few years. On the other hand, currency appreciation could stimulate economic structural adjustments and industry upgrading in the countries where the traditional manufacturing sector is impacted negatively by currency appreciation. In order to keep international competitive advantage in the global market, firms have to move upward in the global supply chains to reduce the possible impact of currency appreciation on its competitiveness. Therefore, the government needs to direct domestic firms to upgrade their industrial capacity by introducing incentive policies. In the meantime, from the macroeconomic point of view, the government needs gradually adjust domestic industry structure. Taiwanese authorities performed well in it when the Taiwan dollar appreciated rapidly and Taiwanese firms relocated in other countries. By introducing a series of incentive policies, the capital and skill-intensive industry replaced traditional manufacturing industry in Taiwan since the 1980s. Taiwan's microelectronic industry and personal computer industry, as one example, is very competitive in the world. Also, the service sector in Taiwan has developed remarkably.

5.6 Chapter Conclusions and Policy Implications

(1) Gradualism VS. One-off

The exchange rate regime reform from the fixed or peg regime to the free floating regime may be inevitable for a large economy. But it will not happen automatically and smoothly. Japan and other European countries were pressed by the US when world's economic power significantly changed in the 70s. Korea was relatively more positive but was pushed by the IMF when it sought financial aids to restore its financial markets hit by the financial crisis in 1997. In addition to external pressure in the late of 80s, Taiwan was forced by the market forces when other major currencies appreciated against the US dollar considerably. China now is facing the similar pressure when it accumulated a great deal of current account surplus and foreign reserves while the US experienced long-lasting trade and fiscal deficits. But currency appreciation does not necessarily imply that the current account surplus will decline immediately. The sharp yen revaluation after the Smithsonian Agreement in 1971 and the Plaza Accord in 1985 did not immediately reduce its trade surplus, but continued to increase until 1987. In contrast, the US's current account deficit kept increasing until 1988 (see Figure 5.6 and 5.7). Thus the one-off RMB revaluation may not help to rebalance the world economy immediately. On the contrary, too drastic revaluation may cause chaos in economic system and financial markets. Japan's experience in the 80s may be an example.

Chinese authorities started its exchange rate regime reform from 2005 and are continuing to reform with aim at achieving a free floating exchange rate regime and RMB internationalization. It seemed that China intend to allow the RMB to be revaluated. The remaining question is how fast Chinese authorities should do it. China insisted to revalue the RMB gradually under the principle of “Proactive, Controllable and Gradualist”³¹. Current pace of RMB revaluation which is annual rate of 3-4 per cent seemed to be tolerable for China’s export industries. Given relatively immature financial markets, absent regulatory and laws as well as underdeveloped risk management capacity, the gradualism is the optimal strategy for China to revalue the RMB. A smooth and orderly currency revaluation will provide Chinese authorities with the time and policy space to minimize the possible impact of RMB revaluation on its real economy, particularly on its exports. Ambitious strategy on reforming the RMB exchange rate regime may damage the momentum of China’s economic growth. Consequently, the world may loss one of the most important growth engines. Therefore, allowing the RMB to approach its equilibrium level at an appropriate pace is an important contribution China could make for rebalancing the global economy.

Generally speaking, China has conducted the RMB exchange rate regime reform smoothly and successfully, particularly since 2005. No evidence shows that RMB revaluation hurt China’s exports. Therefore China should continue the process of the exchange rate regime reform at an appropriate pace. However, it does not suggest that the better is the approach, the slower pace of RMB revaluation should be. A positive and well-planned strategy in RMB revaluation is better than the passive and hasty one. Japan passively allowed the yen to be revaluated without a clear schedule of exchange rate regime reform. Also, the yen exchange rate would not fluctuate dramatically if the BoJ established a clear trading band and strictly insisted it. In contrast, Korea’s economy was not severely affected by won appreciation because it adopted a relatively positive and well-planned strategy on the exchange rate regime reform. One question could be raised that if China could resist the gradualism approach in the process of RMB revaluation. Given the large economic size and sufficient foreign reserves, China is more capable of managing the process of RMB revaluation than Japan and Korea then. In addition, from the view of political economics, unlike Japan, Korea and Taiwan who heavily relied on the US economically and militarily in the 70s-90s, China could independently conduct the RMB exchange rate regime reform with the principle of gradualism. But at the same time, Chinese authorities should continue to widen the trading band with accordance to the internal and external economic environments.

(2) Follow-up monetary and fiscal policies are needed, but the timing and scale of policy are equally crucial

In all three economies’ cases, currency appreciation caused immediate decline in exports and economic growth in the short run, although it lagged for few years in the case of Japan. Currency appreciation could deteriorate country’s international competitiveness in the global market, thereby impairing its exports and economic

³¹ See Zhou Xiaochuan, “Thoughts on Reforming the International Monetary System”, March 23, 2009 (in Chinese).

growth. It is particularly important for the export and investment-driven economies, like Japan in the 80s, Korea and Taiwan in the 90s and China now. Therefore, the follow-up easing monetary and expansionary fiscal policies are needed to reduce the possible impact of currency revaluation on exports and economic growth. However, the timing and scale of related policies are equally important.

Japanese authorities employed a series of monetary and fiscal policies aimed at keeping economic growth when the yen was sharply revaluated in the 80s. These policies are important and necessary. However, the timing and intensity of policies from the BoJ were controversial. For example, Japanese authorities cut the discount rate to the lowest rate in modern economic history of Japan in 1987. But such “cushion” policies may be too excessive when we reviewed them now. In 1989 when Japanese authorities realized that the excessive easing monetary and fiscal policies accumulated bubble in property and stock markets, the reversal policies were applied immediately. Combined with other policies, the BoJ successively raised the discount rate for four times from 2.5 to 6 per cent. But it might be too late to exit the easing monetary policy. As Kanamori and Zhao (2005) and Ishida (2006) point out, the size of bubble would be smaller and consequence of bubble bursting would not too severe if Japanese authorities tightened monetary policy earlier. Also, such drastic adjustments of monetary policy not only caused the market confidence losing, but also burst the bubble in the stock and property markets.

China needs to learn lessons from Japan’s experience. It is essential for China to apply the timely and moderate monetary and fiscal policies to maintain its economic growth when the RMB is being revaluated. However, Chinese authorities should be aware that excessive easing monetary policy and expansionary fiscal policy may create the excessive liquidity which would overheat the economy. Japan’s bubble economy was fostered by the BoJ’s excessively easing monetary and fiscal policies. Equally importantly, the exit strategy of monetary and fiscal policies needs to be prepared by Chinese authorities when economy recovers from the impact of currency appreciation.

(3) Exchange rate regime reform should be seen as an integral component of broad financial system reform, and integrated financial market reform is a pre-condition

Compared with Japan in the 70s-80s and Korea and Taiwan in the 80s-90s, China is facing a more complicated internal and external economic circumstance. The recent global financial crisis intensified the complexity of the RMB exchange rate regime reform. China’s exchange rate regime reform should be seen as an integral component of the broad financial system reform. The exchange rate policy interacts with other economic and financial policies and significantly affects the real economy. Therefore, the RMB exchange rate regime reform should be a part of China’s financial system reform rather than be alone. Currently, China is committed in doing a series of financial system reforms, such as the market-based interest rate formation mechanism reform, RMB internationalization and capital account liberalization. All these reforms should be put into a systematic and well-sequenced schedule to be considered.

One of condition to smoothly reform the RMB exchange rate regime is China's capital account liberalization. Impact of excessive capital flow to the economy under a floating exchange rate regime could be fierce during the period of financial crisis. The Asian Financial Crisis of 1997 is a good example. The amount of global capital transaction was relatively small when Japan moved away from the US dollar peg regime in 1970s. While the global capital flows grew dramatically since 1990 when Korea launched the exchange rate regime reform. It is one of reasons why Korea was struck seriously by the crisis in 1997. Historical experiences from Japan and Korea indicates that the countries which adopt a floating exchange rate regime but without having a well-designed strategy on capital account liberalization are vulnerable in the period of financial crisis. Therefore, China should open its capital account gradually by liberalizing the medium- and long-term RMB assets before the short-term RMB assets (Ito 2012 and Yu 2012). Capital account liberalization, however, is the most challenging task for China to reform its financial system. It is because that capital account openness not only tightly links with other parts of China's financial system reform, like the exchange rate regime reform, interest rate liberalization and RMB internationalization, but is also closely related to adjustment of China's economic development model. This is why Chinese authorities repeatedly emphasized that capital account liberalization would be a long-term and gradual process. Given the current global economic situation and China's domestic financial system as well as other countries' experiences, China's capital account liberalization should be pursued gradually and cautiously, implying that the RMB exchange rate regime reform should be a parallel process with China's capital account liberalization.

In addition, from Japan and Korea's experiences, whether China could smoothly reform its exchange rate regime or not is heavily dependent on an integrated and effective financial market reform. A deep and effective financial market promotes the effectiveness and efficiency of financial policy transmission, thereby improving the capacity of authority to respond to the challenges caused by currency revaluation (Ito, 2004). China's financial markets are still shallow and less sophisticated compared to those in developed countries like Japan and Korea. Currently, there is no mature RMB forward and futures market in China but the China Foreign Exchange Trade System (CFETS) in Shanghai and offshore RMB Non-Deliverable Forward (NDF) market in Hong Kong SAR. A deep and liquid forward currency market will enhance market forces in RMB exchange rate formation mechanism (Ito, 2011). Therefore, China should accelerate to establish a more sophisticated and in-depth financial market, including onshore RMB forward market and RMB futures market. Ongoing global financial system reform under G20 triggered by the recent financial crisis not only highlighted the importance of a deep, liquid and effective financial market, but also offered China a good time-window to achieve this goal.

(4) Policies for the long-term economic structure adjustments and industry upgrading need to be prepared

Currency appreciation could weaken one country's competitive advantage in the global market, especially for the low-cost and labor-intensive industry which is more sensitive to the volatility of exchange rate. From Japan and Taiwan's experiences,

currency revaluation caused “hollowing-out” of traditional manufacturing sectors. When currency appreciated, firms from the traditional manufacturing sector in Japan and Taiwan started shifting toward relatively underdeveloped countries, such as the mainland of China and some ASEAN countries where the costs were lower. Japan and Taiwan faced the challenges of industry “hollowing-out” mainly caused by currency revaluation. Therefore, the exchange rate regime reform could lead to the dramatic change of economic structure in the country where its currency is revaluated. Since the RMB gradually appreciated, China’s manufacturing sectors which used to be very competitive in the global market is facing the similar challenges. The recent data shows that China’s FDI outflows increased considerably from US\$ 2.7 billion in 2002 to US\$ 74.65 billion in 2011. It reflects the fact that Chinese firms are seeking cheaper labor and lower costs in other countries to counteract the impact of RMB appreciation. Thus Chinese authorities need a package of incentive policies to adjust domestic economic structure transferring from the labor-intensive and low-cost manufacturing industry to the capital-intensive and high-tech industry. Meanwhile, excess capacity in some sectors and unreasonable industry structure are the prolonged problems for China. It is partly because excess investment and inefficient resources distribution by the government. Chinese authorities could take advantage of RMB revaluation to direct these firms to upgrade their uncompetitive industry and improve the efficiency of production factors distribution.

Recently, China’s made efforts to change its economic growth model from the trade and investment-driven toward the domestic demand-driven model. It is also important for China’s exchange rate regime reform. A pattern of domestic consumption-driven economic development enables Chinese authorities to be a better position to cope with the challenges caused by the RMB exchange rate regime reform and RMB appreciation. It will help to reduce heavy dependence on exports which is sensitive to the RMB exchange rate. Therefore, adjustments of economic structure and industry upgrading should be coordinated to the adjustment of economic growth model in the process of China’s exchange rate regime reform.

Chapter 6: RMB Internationalization³²

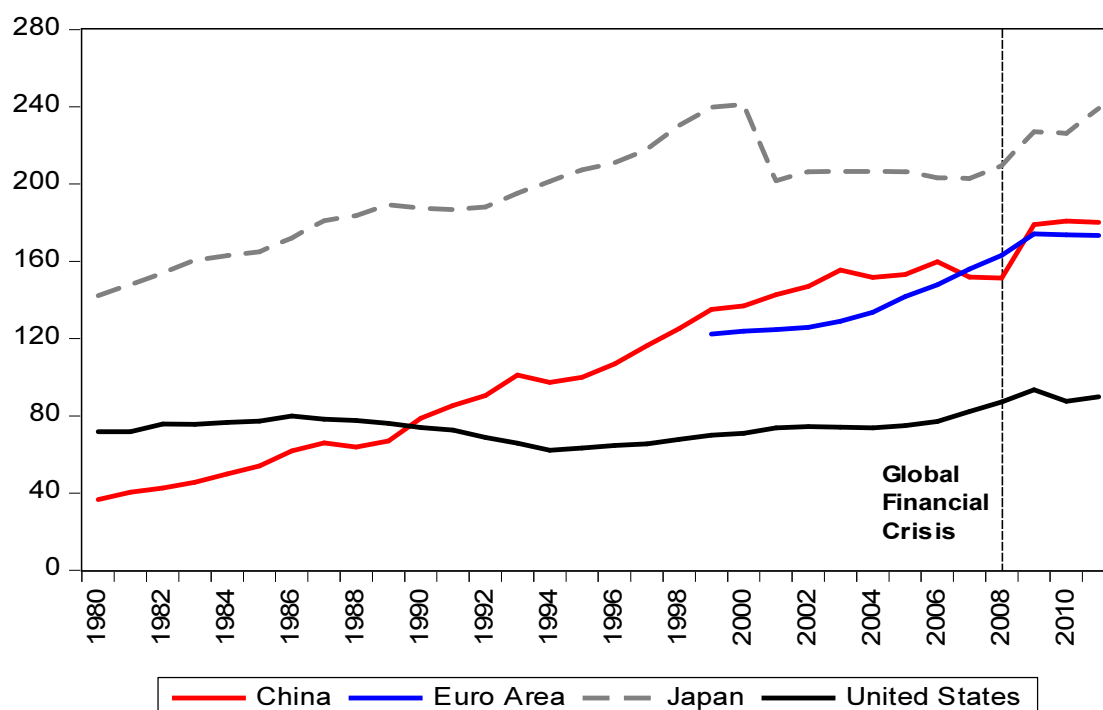
6.1 Background

China became the largest exporting country in 2009 and overtook Japan to become the world's second largest economy in 2010. Of more interest, China became the second largest currency issuer by surpassing the whole Euro Area since 2010. Figure 6.1 shows that in 2011, China's money and quasi money (M2) to GDP ratio reached 180.09 per cent, which was higher than Euro Area's 173.34 and the US's 89.84 per cent. Chinese RMB, however, has not achieved the status as an international currency to match China's position in the global economic and financial system. Before 2009, the internationalization of the RMB was not regarded as a policy priority by the government or as research priority topic by scholars. One of considerations in this assessment was that China would not be able to control capital flows and the exchange rate if the RMB become an international currency. However, the Global Financial Crisis of 2007-2008 when the US dollar depreciated considerably and the US adopted its so-called quantitative easing policy (Known as QE1, QE2 and QE3), which posed the great threat of excessive short-term capital inflows and possible losses of foreign reserves, dramatically changed China's attitude to RMB internationalization. China realized that the benefits of an international RMB could outweigh the costs of internationalization. Also, the financial crisis has provided China an opportunity to promote the RMB's status as a regional or international currency, with the weakening US dollar's domination in the global financial system and the euro not fully recovered from the euro crisis. Therefore, Chinese authorities began the process of RMB internationalization in 2009 as a part of its ongoing financial system reform³³.

Figure 6.1: The ratio of Money and quasi money (M2) to GDP, 1980–2011

³² Parts of this chapter: "New Evidence of Asian Economic Integration: Trilateral FTA between China, Japan and South Korea" and "The Internationalization of the RMB: Where does the RMB Currently Stand in the Process of Internationalization", were published in *Perspective of Federalism*, Vol.5, Issue 1, pp. 58-78 and *Asian-Pacific Economic Literature*, Vol. 27, Issue 2, pp.68-85.

³³ Financial system reform was included into China's 12th Five-Year Plan (2011-2015) as a policy priority. For RMB internationalization, the Plan said: "expanding the RMB use in cross-border trade".



Source: WDI of World Bank.

In contrast with other international currencies such as the US dollar, the euro and the Japanese yen, the internationalization of the RMB is being pushed forward under the background of deepening economic and financial integration in East Asia. As a trade policy instrument, Free Trade Agreements (FTAs) which spread across the region since the 1990s significantly strengthened economic interdependence and deepened regional economic integration in East Asia. In the meantime, the impact of Asian Financial Crisis of 1997 on East Asia's economic growth and financial system stability motivated East Asian countries to establish an Asian financial safety net against the possible financial crisis. The deepening economic and financial integration in East Asia demands more strong and stable East Asian currencies to play critical roles in the process of regional integration. Currently, only Japanese yen could be regarded as a semi-international currency in East Asia. It does not march East Asia's status in the global economic and trade system. The RMB is expected to become another regional currency in decade, if not an international currency, to promote the East Asian regional integration.

From the global perspective, it appears that the global monetary system is moving toward a multiple international currency system without a prominent leader (Cohen 2008 and Eichengreen 2010). The US dollar has been the dominant international currency in the global monetary system for more than half a century since the US dollar overtook the British pound sterling as the leading international currency. However, emergence of the euro in 1999 seriously challenged the status of the US dollar. Some asked if the euro would eventually surpass the US dollar as the next leading international currency (Chinn and Frankel, 2005). However, recently, the euro fell into the European sovereign debt crisis and the euro crisis caused by the global financial crisis. In the meantime, the status of the US dollar was also considerably undermined by

the global financial crisis. The RMB, on the other hand, has emerged as a plausible new international currency along with China's remarkable economic success. The similar question arises: will the RMB surpass the euro and the US dollar to become the next leading international currency? If so, when will this occur?

RMB internationalization has attracted extensively discussion since 2009 when Chinese authorities accelerated the process of RMB internationalization. The RMB has shown great potential as an international currency (Chen and Peng, 2007). However, a possible roadmap for RMB internationalization remains unclear because of the complexity of China's financial system reform and the current global economic environment, although a few attempts at a roadmap can be seen in recent studies (Ito 2011, Vallee 2012 and Yu 2012). Also, analysis of RMB internationalization from the perspective of deepening East Asian regional integration has not been relatively well studied. We attempt to fill this gap in this Chapter. Additionally, the role of international reserve currency is the most fundamental role for an international currency (Yu, 2012). Due to strict constraints on the capital account by Chinese authorities, however, it may be too early to talk about the RMB's role as an international currency. Given China's rapid economic growth and remarkable progress made in the process of RMB internationalization, now it is interesting to estimate the potential of the RMB as an international reserve currency in the coming decades.

In this chapter, we firstly assess where the RMB is currently standing in its journey towards internationalization after reviewing the progress made and analyzing the challenges faced. A possible roadmap for internationalizing the RMB which China's authority could follow is drawn from two perspectives: the functions of the RMB as an international currency and the scope of RMB use in the global financial system. What's more, after reviewing the current situation of East Asian regional integration in economic and financial aspects, we analyze the significance of RMB internationalization to East Asian regional integration and the strategy on RMB internationalization China can adopt under the background of deepening economic and financial integration in East Asia. After that, we forecast the share of the RMB as an international reserve currency in the global reserve holding in the coming decades, if the RMB become a fully convertible currency and controls on China's capital account were removed.

The reminder of this chapter is organized as follows. Section 2 is literature review. We then briefly explain what an international currency is in Section 3. This is followed by Section 4 that why the RMB could become an international currency. In section 5, the progress Chinese authorities have made in RMB internationalization is reviewed. We analyze what challenges China is facing in order to further promote RMB internationalization in section 6. A possible roadmap for internationalizing the RMB is provided in section 7. In section 8, we discuss the significance of RMB internationalization to the ongoing regional integration in East Asia. Also, the strategy on RMB internationalization to create a win-win situation between China and East Asian countries in the process of East Asian regional integration is discussed. In Section 9, we then analyze the determining factors of international currency and project the share of the RMB as an international reserve currency in the coming decades by

applying Chinn and Frankel (2005)'s model. Section 10 concludes the chapter.

6.2 Literature Review

There is increasing literature on RMB internationalization from suggesting the possible roadmap of RMB internationalization to forecasting the status of the RMB in the next decades (Gao and Yu 2008, Ito 2011, Yu 2012, Chong and Hui 2012 and Lee 2013). The most of them are from China's perspective. Gao and Yu (2008) analyze the benefits and costs of RMB internationalization. They argue that the success of RMB internationalization heavily relies on market forces, well designed routes and strategic thinking. In the short run, China should continue to expand RMB use in cross-border trade and financial transactions. In the medium and long run, Chinese authorities should expand RMB regionalization in order to internationalize the RMB. In addition to economic consideration, political consideration is equally important for RMB internationalization. In Ito 2011, he also suggests a carefully sequencing of internal and external liberalization is important for promoting the RMB as an international currency. Given the current status of the RMB and China's financial markets, the RMB exchange rate regime should be more flexible, followed by a deeper and efficient domestic financial markets build-up in order to achieve the goal of RMB internationalization. Frankel (2011) considers RMB internationalization in light of those historical precedents: the US dollar, the Deutsch mark and the Japanese yen. He concludes that it would take long time for the RMB to overtake the US dollar because China is not ready to open its domestic financial markets and further revalue the RMB. More recently, Vallee (2012) argues that challenges of RMB internationalization are manageable, although there exist plenty of challenges as previous studies identified. The potential of the RMB becoming an international currency comparable to the yen, British pound or Swiss franc is considerable. But deeply structural reforms are needed if the RMB reaches the status in the global financial market like the euro or the US dollar dose today. Yu (2012) reviews the progress and problems in RMB internationalization. He argues that RMB internationalization should be a natural course of economic development and capital account liberalization which should be pursued cautiously. He also stresses that the sequence of China's financial system reform is important for internationalizing the RMB. Deep and liquid financial markets, flexible exchange rate and interest rate regimes are the preconditions for achieving this goal.

There is no specific literature studying RMB internationalization from the view of East Asian integration except for Park (2010). He suggests that China could adopt a regional approach rather than a global approach for internationalizing the RMB. He argues that China should build up an ASEAN+3 currency bloc in East Asia to promote RMB internationalization. But Park (2010) does not systematically analyze RMB internationalization from the perspective of economic and financial integration which is happening in East Asia. Yu (2012) also implicitly mentions that participation in the financial cooperation in East Asia and the global monetary system reform are a way to push forward RMB internationalization but without explicit elaboration.

Inspired by strong emergence of the euro in 1999, Chinn and Frankel (2005) empirically examine the determinants of a national currency becoming an international

currency in the global monetary system. Based on previous literature, they summarize that determinants of international currency include the patterns of output and trade, financial markets, confidence in the value of the currency and network externalities. Variables that are believed to play some role in the determining of a national currency becoming an international currency are included in their model: the size of the home country measured by the ratio of home country's GDP to the world's total GDP; inflation differential measured by the differential between the home country's inflation rate and the average inflation rate of all sample countries; long depreciation trend measured by the 20-year average change of the exchange rate against the SDR; exchange rate volatility calculated by the standard deviation of SDR; the size of the financial market of the home country measured by the turnover of foreign exchange markets; the net international debt position which is accumulative in the current account; and network externalities measured by a lagged reserve currency share. They find that the first four factors are significant in determining the reserve currency share held by other central banks, while the net international debt position plays no role in determining if other central banks hold this currency in their foreign exchange reserves. In addition, they find that the network externalities illustrate a tipping phenomenon. Based on their findings, they argue that the euro would overtake the US dollar as a leading international currency by 2022 if other member nations of Economic and Monetary Union (EMU) including the UK adopt the euro by 2020 or the US dollar continues to depreciate at the pace of 2002-2004. Chinn and Frankel (2008) re-examine whether the euro would rival the US dollar by using the same model and updated data. They predict that the euro could overtake the US dollar by as early as 2015, which is faster than the estimation of Chinn and Frankel (2005).

Since 2007 when the Chinese authorities accelerated the progress of RMB internationalization, the RMB has received increasing attention as a potential international currency. Based on Chinn and Frankel (2005)'s model, Chen and Peng (2007) find that only the GDP share, the stock market capitalization and the lagged reserve currency share are significant in the linear model, while the stock market capitalization in the nonlinear model is not significant. They then use their estimation results and Chinn and Frankel's (2005) findings to forecast the possible share of the RMB as a reserve currency in the global monetary system. Their results show that the RMB's share in the world's total reserve holdings would be 5 per cent in the linear model and 3 per cent in the nonlinear model if the RMB becomes a fully convertible currency, which is similar to the status of the Japanese yen and British pound in 2007. While based on Chinn and Frankel's (2005) estimation results, the RMB's share is 12.7 and 4.4 per cent in the linear and nonlinear models, respectively.

Chong and Hui (2011) also apply Chinn and Frankel's (2005) model on estimating the share of the RMB as an international reserve currency in the world by 2020. They find that the share of the RMB as an international reserve currency in the global reserve holdings could reach the status of the euro by 2020, which are 21.5 per cent for the euro and 20.24 per cent for the RMB. They also argue that the tripolar international monetary system, comprised of the US dollar, the euro and the RMB, would be more resilient than the current US dollar--euro bipolar system, and would thereby strengthen the stability of the global monetary system. Similar estimation has been done by Lee (2013). The

explanatory variables he uses include the GDP share, inflation difference, foreign exchange turnover, capital account openness and the lagged reserve currency share. Also, he specifies two estimations: with and without China. His results show that the economic size (GDP share) and the network externalities (lagged reserve currency share) are significant in all estimations. Based on the projection, he predicts that the RMB would account for 3-12 per cent of global reserve holdings by 2035, if the convertibility of the RMB is significantly improved.

6.3 What Is an International Currency?

How to classify a currency as an international currency has been relatively well studied (for example, Kenen 1983, Chinn and Frankel 2005, Gao and Yu 2009, Ito 2011 and Yu 2012). Kenen (2009:1)³⁴ says that '*An international currency is one that is used instead of the national currencies of the parties directly involved in an international transaction, whether the transaction in question involves a purchase of goods, services or financial assets*'. Based on Kenen (1983)'s theoretical framework, Chinn and Frankel (2005), Gao and Yu (2009), Ito (2011) and Yu (2012) give a summary of functions played by an international currency. According to their studies, an international currency plays three functions: store of value, medium of exchange and unit of account. What's more, all three functions could be split into two dimensions: public (government) and private. For the public sector, an international currency could be an international reserve currency (store of value), a vehicle currency for foreign exchange intervention (medium of exchange), and an anchor for local currency pegging (unit of account). For the private sector, an international currency could be used in currency substitution and investment (store of value), invoicing and settlement for international trade and financial transactions (medium of exchange), and denominating international trade and financial transactions (unit of account).

Generally speaking, in the current global financial system, only the US dollar is an unquestionably international currency. It meets all standards in each of the functions. The euro was once regarded as a potential competitor to the US dollar as another international currency (Chinn and Frankel, 2008). But the euro crisis has dramatically weakened this expectation, although the value of the euro has not weakened over the crisis period. However, the euro will only survive if European governments can keep the sovereign debt crisis under control. In the mid-1980s, Japanese authorities tried to promote yen internationalization but failed (see Takagi 2009 and Ito *et al.* 2010). These experience show that there is no a common path to internationalizing a currency. To some extent, the internationalization that occurred was an unplanned side effect of economic growth and financial expansion (Frankel, 2011). The country issuing an international currency can enjoy benefits such as reducing exchange rate risks and costs, boosting foreign trade, gaining seigniorage and so on. But it has to strike a balance between national and global monetary policy, which is called Triffin dilemma.

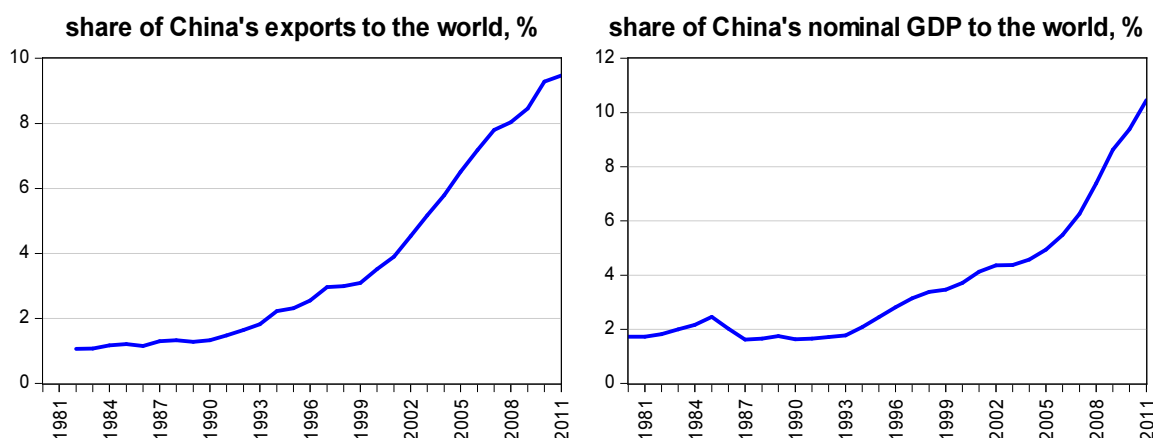
³⁴ He also writes: 'an international currency is one that is used and held beyond the borders of the issuing country, not merely for transactions with that country's residents, but also, and importantly, for transactions between non-residents'. See Kenen (2009).

6.4 Why the RMB could be an International Currency?

6.4.1 Domestic demands

Historical experience indicates that the currencies of economically large countries with large trade volumes are likely to become an international currency. However, economic size and trade volume is only one of conditions for currency internationalization. Frankel (2011) points out that there are three fundamental factors determining whether a currency could become an international currency: size of home economy, confidence in the value of the currency, and the development of its financial markets. Take Switzerland for example. The Swiss franc cannot become an international currency like the US dollar and the euro mainly because Swiss economy is relatively small, although the Swiss economy is open and the Swiss franc is stable. In contrast, in 2011, China's GDP accounted for 10.46 per cent of the world's total GDP, and its global export share was 9.47 per cent (see Figure 6.2). China's grow and its trade volume not only requires more trade settlement and financial transactions to be conducted in the RMB, but also provide China a solid foundation for RMB internationalization.

Figure 6.2: Shares of China's exports and nominal GDP to the world's total exports and nominal GDP, %, 1980–2011



Source: WDI of World Bank.

According to statistics of the PBoC, China's foreign reserves reached US\$ 3.31 trillion in 2012. It is estimated that more than 70 per cent of China's foreign reserves is US dollar-denominated assets, although the PBoC has never published information on the composition of its foreign reserves. During the period of global financial crisis, in 2007, the US dollar was devaluated significantly because of quantitative easing policy, which threatened the value of China's US dollar-denominated assets. Although the dollar has recovered gradually since the end of 2008, China and other emerging economies that hold a large volume of US dollar assets as their foreign reserves remain deeply concerned about the risk. Therefore, China has attempted to diversify its foreign reserves, especially its foreign exchange reserves. Obviously, an internationalized RMB

would help China reduce the potential for losses on its foreign reserves. It is one of reasons for China beginning to internationalize the RMB since 2009.

6.4.2 External factors

Because of the Global Financial Crisis 2007-2008, the world became more aware of the vulnerability of a global unipolar monetary system dominated by the US dollar. One of the objectives of G20 is restructuring the global monetary system which was exposed many shortcomings and systematic risks during the period of financial crisis. As the second largest economy, China is now expected to take more responsibilities in reforming the global financial system within the G20 framework. China could take advantage of this opportunity to improve the RMB's status in the global financial system. Also, Special Drawing Rights (SDRs) as super-sovereignty currency are expected to complement the US dollar and play a more important role as an international reserve currency. Other major currencies should be included into the SDR's currency basket (Zhou, 2008). The possibility of including the RMB in the SDR currency basket has been widely discussed at G20 level³⁵, although it could take years to achieve this goal (more detailed discussion on the RMB to be a component currency in the SDR currency basket is in Section 6.5). Therefore, the current global economic environment and ongoing global financial system reform provide China a golden time window to internationalize the RMB.

6.5 Benefits and Costs of RMB Internationalization

There is a large body of literature on the potential benefits and costs of currency internationalization for an international currency issuing country. Some of them shed light on RMB internationalization. Chinn and Frankel (2005) and Frankel (2011) list four benefits to the country which issues an international currency: convenience of the country's residents, more business for the country's banks and other financial institutions, gaining seignorage and political power and prestige. Kenen (2009) identifies the benefits in two dimensions: the public sector and the private sector. For the private sector, the possible merits include controlling exchange rate risks, accessing international financial markets at a lower rate and expanding its private financial institutes. While the benefits for the public sector and for the public, government could finance its budget deficit by issuing debt denominated in own currency and balance its current account deficit without spending its official reserves. Furthermore, from the view of politics, an international currency issuing country could enhance its political or economic influence. Nakamura, Ueda and Matsui (2012) conclude that the international currency issuing country could benefit from reducing exchange rate risks, enhancing international competitiveness of financial institutions, and developing domestic financial and capital markets.

Yu and Gao (2007) analyze the potential benefits of RMB internationalization for China. China could reduce exchange rate risks, improve efficiency of financial

³⁵ Currently, there are four currencies in the SDR's currency basket: the US dollar (41.9 per cent), the euro (37.4 per cent), British pound (11.3 per cent) and Japanese yen (9.4 per cent).

institution, boost cross-border transactions, collect seigniorage, and preserve the value of its foreign exchange reserves, if the RMB become an international currency. Ito (2011) has similar arguments. He points out that the potential benefits of RMB internationalization include reducing exchange rate risks, deepening domestic bond market, lowering borrowing costs, minimizing losses of foreign reserves which used to be dominated by US dollar assets, and gaining seigniorage. In addition, some political economy benefits could be obtained through internationalizing the RMB. In Yu (2012), he explains that China could reduce exchange rate risks, transaction costs in trade, reducing seigniorage paid to the US, and capital losses on foreign exchange reserves. More importantly, China's financial institution could improve efficiency and return of financing once the RMB were used internationally.

On the other hand, there are costs associated with currency internationalization. Chinn and Frankel (2005) argue that currency internationalization could create excessive fluctuation of exchange rate. What's more, currency appreciation which driven by capital inflows when the currency is used internationally, may dampen country's international export competitiveness. Chen and Peng (2007) stress that the risks of RMB internationalization are driven by the external demand for RMB assets which could fluctuate dramatically. It would cause the formulation and implementation of domestic monetary policy more complicated. According to Kenen (2009), there are three potential costs associated with currency internationalization. The country, which issues an international currency, could not pursue a fixed exchange rate regime oriented monetary policy domestically. Furthermore, currency internationalization could cause a large fluctuation of exchange rate. Lastly, currency internationalization may cause risks to the domestic financial system and higher volatility of exchange rate due to issuing foreign debts in domestic financial markets.

In addition, an international currency issuing country has to burden some responsibility which could be regarded as the costs of currency internationalization. According to Triffin dilemma, the country which issues an international currency has to make balance between national and global monetary policy. An international currency always serves as international reserve currency. So it is impossible for an international currency issuing country to achieve goal of keeping currency stable and providing liquidity for the world simultaneously without current account deficit. This is clearly shown by the dilemma which the US struggled to overcome during the period of the recent financial crisis. China would have to make a balance between keeping domestic monetary policy stability and providing the RMB for international use. However, He (2012) has argued differently. He points out that an international currency issuing country could provide its currency for international use not only from its current account, but also from its capital account.³⁶

6.5.1 Benefits and costs of RMB internationalization to China

The benefits and costs associated with RMB internationalization need to be carefully assessed. Germany in the 1970s and Japan in the 1980s adopted different strategy of

³⁶ See He (2012): Renminbi Internationalization: A Premier.

currency internationalization when their economies grew rapidly and their currencies were expected to be internationalized. The pace of RMB internationalization is largely dependent on the assessment of benefits and costs by Chinese authorities. If the RMB become an international currency and is used internationally, in addition to some political benefits China could achieve, there are many economic merits that Chinese firms and people could enjoy. The most obvious benefit is that Chinese residents could do international businesses more conveniently. Additionally, RMB internationalization could reduce exchange rate risks if China's foreign trade is settled in the RMB rather than foreign currencies.

As pointed out in previous studies, China can gain seignorage if the RMB become an international currency, like dose the US today. The seignorage is the benefits from issuing an international currency. It is the difference between the face value of currency and the costs of currency producing and distribution.³⁷ If narrowly defined, the seignorage is the benefit of relatively high capital return from a low interest rate paying for other central banks when they hold some this currency denominated assets as a part of their foreign reserves (Chinn and Frankel, 2005). According to Chen *et al.* (2005), the US has collected US\$ 953 billion of seignorage from the US dollar internationalization by 2002. China could gain around yuan 750 billion of seignorage by 2020 if China regionalized the RMB in Asia in 2010. However, this is only a rough estimation. It is very complicated to calculate the potential seignorage China could gain through RMB internationalization. Also, it is unrealistic to discuss the seignorage when the RMB still is in its very early stage of internationalization. For China, at least at the current stage, more important benefits of RMB internationalization is its impacts on Chinese firms and China's foreign reserves.

RMB internationalization also can promote China's international trade and enhance China's international influence in the global trade system. The exchange rate risk is one of factors affecting China's exports, in particular, during the period of RMB appreciation. China's manufacturing sector could enjoy less risk of exchange rate once the RMB becomes an international currency. Also, the costs of foreign exchange transactions for Chinese export firms will decline if the RMB is used as a settlement currency in China's foreign trade. Therefore, Chinese export firms will benefit from RMB internationalization.

In addition, the process of RMB internationalization could contribute to the globalization of China's banks and financial institutions. China's financial institutions are not developed internationally but grew rapidly. An internationally used RMB will create more RMB businesses outside of China. So increasing financial services in the RMB will be executed through Chinese financial institutions. Chinese banks and other financial institutions could take advantage of RMB internationalization to develop globally. Equally importantly, China could reduce the risk of foreign reserves losses, especially for its foreign exchange reserves. Once the RMB becomes an international currency, China will not have to allocate a large proportion of its foreign reserves into

³⁷ There are various interpretations on term of "seignorage" in literature. See Neumann (1992), "Seignorage in the United States: How Much Does the US Government Make from Money Production?"

US dollar assets. During the period of financial crisis, the US dollar significantly depreciated against other major currencies. It posed great threat to China's foreign reserves which are mainly US dollar denominated assets. China realized the importance of diversifying its foreign reserves. An internationalized RMB would facilitate China to achieve this goal.

As mentioned early, currency internationalization will bring not only the benefits, but also the costs to the international currency issuing country. The internationalization of the RMB would not be an exception. In addition to the Triffin dilemma China could face, China should take some responsibilities to stabilize the world economy when the financial crisis hits, if the RMB is an international currency. In other words, China needs to consider other economies' situation when it makes monetary policy. This is one of reasons that Germany and Japan were reluctant to internationalize their currencies in the 70s and the 80s. The main risks of RMB internationalization for China, however, are how to maintain exchange rate fluctuation and domestic financial system stability. Once the RMB is used globally, the fluctuation of the global markets will significantly impact on China's domestic financial system. It will be more challenging for Chinese authorities to implement monetary policy and exchange rate policy.

6.5.2 Benefits of RMB internationalization to East Asian countries

Some could question why other countries accept and use the RMB as a new international currency. It seems that transaction costs in global payment system would rise if more currencies are used as settlement currencies. However, historical experience tells us that the status of currency would inevitably improve when a country's economic influence improves no matter if this country deliberately promotes currency internationalization or not. The rest of the world will accept and use the new international currency when the benefits outweigh the costs of using this new currency. Table 6.1 shows that the amount of Deutsche mark in the 1970s and the Japanese yen in the 1980s as international reserve currencies expanded dramatically when German and Japanese economy were booming. The rest of the world, in particular Germany and Japan's trading partners, exhibited enthusiasm in using and holding the mark and the yen as their official foreign exchange reserves. This implies that the transaction costs associated with a new international currency do not affect the acceptance of new international currency by the rest of the world.

Table 6.1: The US dollar, Deutsche mark and Japanese yen as official holding of foreign exchanges, %, 1965–2013

	1965	1973	1977	1982	1987	1992	1997	2003	2013
US dollar	65.1	64.5	79.2	57.9	53.9	48.9	59.1	63.8	54.6
Deutsche mark	0.1	5.5	9.3	11.6	13.8	14.0	13.7	-	-
Japanese yen	0.0	0.1	2.2	4.1	6.8	7.4	5.1	4.8	2.1
the euro	-	-	-	-	-	-	-	19.7	12.9

Source: Chinn and Frankel (2005), updated based on IMF's Official Foreign Exchange Reserves (Coffer) database.

As mentioned early, the other countries could benefit from RMB internationalization. However, RMB internationalization is more significantly important for the East Asian countries which are China's important regional trading partners. An international RMB could promote East Asian countries' bilateral trade with China and intra-regional trade in East Asia, thereby deepening regional economic integration. China became the largest trading nation in 2011, in particular, the largest trading partner for the most of East Asian economies such as Taiwan, Korea, Japan and the most of ASEAN countries. Trade settlement in local currencies would reduce exchange rate risks and costs, thereby simulating bilateral trade between China and its trading partners. Therefore, RMB internationalization will provide a new regional currency using as a settlement currency in intra-regional trade in East Asia, thereby promoting regional trade and enhancing interdependence among East Asian countries.

Similar to what China is doing, many emerging economies are trying to diversify their foreign reserves which are still dominated by the US dollar. In the long run, the US dollar could be in track of devaluation. The euro has not fully recovered from the euro crisis. Some countries including East Asian countries took some bold measures to include more non-US dollar assets into their foreign reserves. An internationalized RMB will provide East Asia countries with a new option to diversity their foreign reserves. It is reported that some central banks have already held some RMB assets in their balance sheets, although the exact amount still remained unclear. It is foreseeable that the RMB will play a more important role in the global foreign reserves along with deepening of RMB internationalization. We will discuss it further by conducting empirical analysis in section 6.9.

Intraregional exchange rate policy coordination in East Asia has attracted extensively discussion since Asian Financial Crisis of 1997. Exchange rate policy coordination is very important for East Asian because the most of East Asian countries are foreign trade oriented economies. The recent global financial crisis highlighted the importance of exchange rate policy coordination and avoiding the "currency war". RMB internationalization will enable China to take a more important role in regional exchange rate policy coordination. We will discuss more about it in latter section on the relationship of RMB internationalization and intraregional exchange rate policy coordination.

6.6 Recent Progress Has Been Made in RMB Internationalization

In line with efforts to internationalize the RMB, measures have been introduced by Chinese authorities to promote the RMB's regional and international status (see Table 6.2). We review these measures so as to evaluate how far the RMB has moved toward being an international currency.

Table 6.2: Measures by Chinese authorities for RMB internationalization

Date	Policy	Purpose
April, 2009	Pilot Program of renminbi (RMB) Settlement of Cross-Border Trade	To increase RMB use in cross-border trade settlement

Transactions		
July, 2007	The first Dim Sum bond issued in Hong Kong SAR by China Development Bank (CDB)	To expand RMB use in trade settlement and financial transactions
January, 2011	Administrative Rules for the Pilot Program of Settlement for RMB-denominated Outward Direct Investment (ODI)	To expand RMB usage and support the pilot program of RMB settlement of cross-border trade transactions
October, 2011	Administrative Rules on Settlement of RMB-denominated Foreign Direct Investment (FDI)	To widen RMB recycling channel and further expand the use of RMB in cross-border trade and investment
December, 2011	RMB Qualified Foreign Institutional Investor (RQFII)	To widen investment channel for offshore RMB recycling
since 2008	Bilateral currency swap agreements	To strengthen financial cooperation and boost bilateral trade and investment between two sides

Source: Author's summary.

6.6.1 Cross-border trade settlement in the RMB

China began the process of RMB internationalization through promoting RMB use in trade settlement since 2009. The Pilot Program of RMB Settlement of Cross-Border Trade Transactions was introduced by China's State Council on April 8, 2009 and has been officially in effect since July 1, 2009. According to this pilot scheme, the PBoC joined by the Ministry of Finance, Ministry of Commerce, General Administration of Taxation, and China Banking Regulatory Commission are responsible for verifying the list of participating firms, which are recommended by provincial governments. Initially, this pilot scheme covered five mainland cities: Shanghai, Guangzhou, Shenzhen, Dongguan, and Zhuhai, which are foreign trade-concentrated cities. There are two paths for settling cross-border trade in the RMB. First, participating firms can do RMB cross-border trade settlement and clearing through clearing banks in Hong Kong, China (hereafter, Hong Kong Special Administrative Region (SAR)) and Macao, China (hereafter, Macao SAR). Currently, Bank of China (Hong Kong) and Bank of China (Macao) are designated as RMB settlement and clearing banks in Hong Kong SAR and Macao SAR. A second path for participating firms is to settle their cross-border trade in the RMB through domestic commercial banks as agencies of overseas commercial banks.

Table 6.3: The Pilot Program of RMB Settlement of Cross-Border Trade Transactions

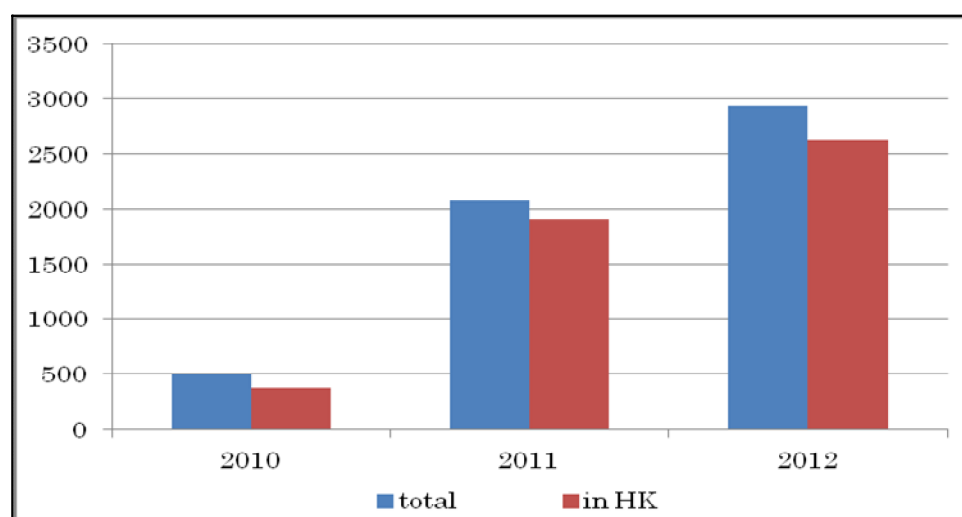
Date	Scope		Coverage
	Mainland	overseas	

Jul. 1st, 2009	Five cities: Shanghai, Guangzhou, Shenzhen, Dongguan and Zhuhai	Hong Kong SAR, Macao SAR and ASEAN	365 firms
Jun. 22th, 2010	20 provinces and regions: Beijing, Tianjin, Inner Mongolia, Liaoning, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Hubei, Guangdong, Guangxi, Hainan, Chongqing, Sichuan, Yunnan, Jilin, Heilongjiang, Tibet, Xinjiang	Global	67,724 firms
Oct. 24th, 2011	All regions	Global	All firms

Source: The PBoC.

According to the PBoC, this pilot scheme worked smoothly, and demand for the cross-border trade settlement in the RMB was increasing. Therefore, in June 2010, Chinese authorities expanded the scheme to 20 provinces and regions, and the number of participating firms increased considerably to 67,724 firms from 365 firms (see Table 6.3). One year later, the scheme was expanded to cover all China's regions and firms. According to the PBoC and Hong Kong Monetary Authority (HKMA), RMB settlement in cross-border trade increased more than five times, reaching yuan 2,940 billion in 2012, from yuan 500 billion in 2010 (see Figure 6.3). About ninety per cent of total RMB settlement in cross-border trade was conducted in Hong Kong SAR in 2012, indicating that Hong Kong SAR as a premier offshore RMB center plays a crucial role in RMB internationalization.

Figure 6.3: Amount of RMB settlement in cross-border trade, total and in Hong Kong, yuan billions, 2010–2012

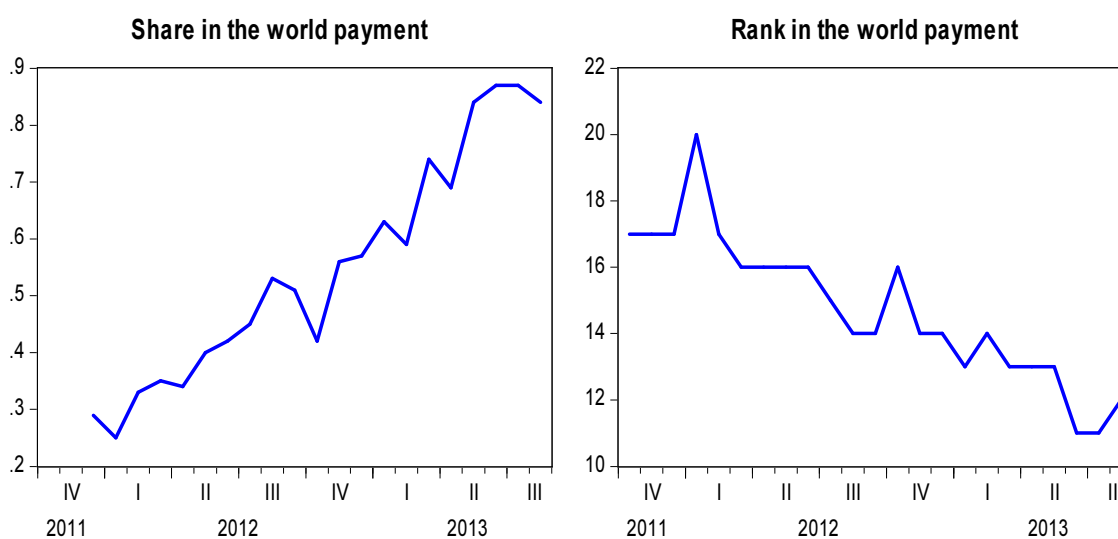


Source: The PBoC and the HKMA.

With rapid growth of RMB use in cross-border trade settlement, the status of the

RMB as a major payment currency in the global financial system improved gradually. In Figure 6.4, data from Society of Worldwide Interbank Financial Telecommunication (SWIFT) shows that the share of the MRB in the world payment increased steadily from 0.25 per cent in January 2012 to 0.84 per cent in August 2013. The RMB ranked the 12th among major currencies in August 2013 compared with 20th in January 2012 (see Figure 4).

Figure 6.4: The RMB's share and rank in the world payment system, from November 2011 to August 2013

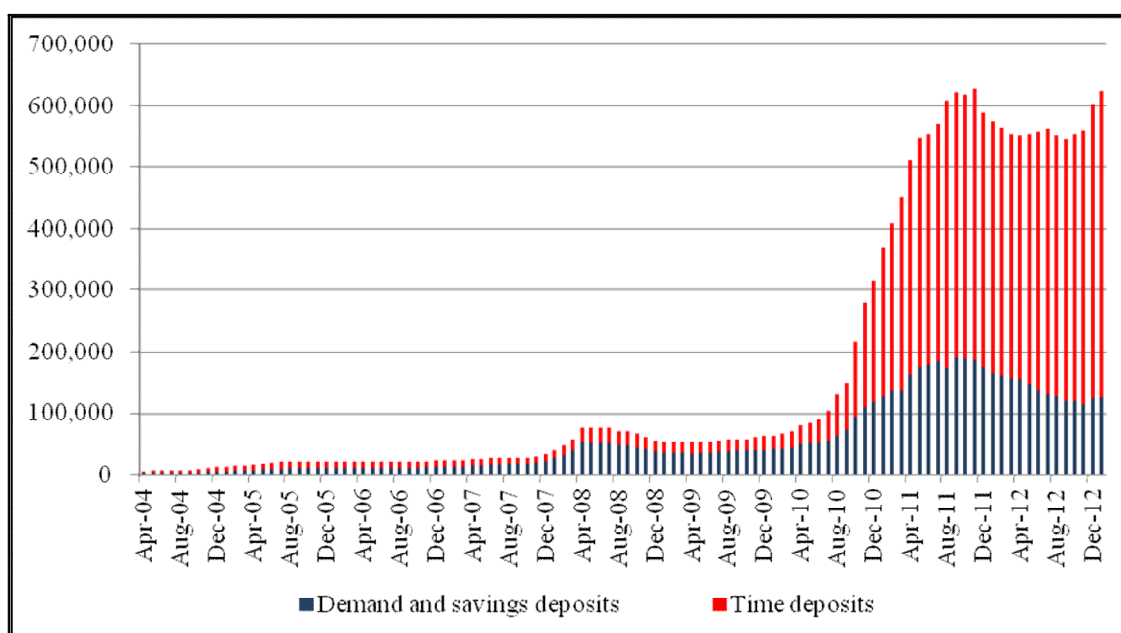


Source: RMB Tracker of SWIFT.

China's central government initially gave preference to Hong Kong SAR as a global hub of offshore RMB businesses. Indeed, Chinese authorities have launched RMB businesses including deposits, remittances, exchange, and credit card in Hong Kong SAR since 2004.³⁸ However, RMB businesses in Hong Kong SAR were very limited in the early period. Taking RMB deposits in Hong Kong SAR as an example, it was about yuan 2,506 million of demand and savings deposits, and yuan 3,040 million deposits in April 2004 (see Figure 6.5). After the Pilot Scheme of Cross-Border Trade Settlement in the RMB was introduced in 2009, in particular, after this scheme was expanded in 2010, RMB deposits in Hong Kong SAR sharply surged. In January 2013, according to statistics of HKMA, RMB demand and savings deposits increased to yuan 125,478 million, more than ten times higher than in April 2004, while RMB time deposits increased even more rapidly to yuan 498,500 million.

Figure 6.5: The RMB deposits in Hong Kong SAR, yuan millions, from April 2004 to January 2013

³⁸ Policy announced by the HKMA, various years.



Source: The HKMA.

From Figure 6.5, it can be seen that RMB deposits in Hong Kong SAR have fallen since December 2011. The reasons behind this decline are: first, expectations of RMB appreciation have weakened since the end of 2011. After appreciating moderately from 2005, the RMB exchange rate increased considerably in both nominal and real terms. It was believed that the RMB exchange rate approached to its equilibrium level at the end of 2011. Thus, the motivation for holding RMB in Hong Kong SAR for exchange rate arbitration was not as strong as before. Since July 2012, the RMB has accelerated its appreciation against the US dollar. Expectations of RMB appreciation strengthened, and thus RMB deposits in Hong Kong SAR rebounded. Second, the development of Dim Sum bonds (bonds issued in Hong Kong SAR and denominated in the RMB) and the introduction of the RMB Qualified Foreign Institutional Investor (RQFII) in December 2011 widened investment channels for the use of offshore RMB in Hong Kong SAR. Some RMB deposits were used in purchasing Dim Sum bonds or investing in mainland stock markets through RQFII scheme. Lastly, some RMB funds might have flowed towards other offshore RMB centers like Singapore and London, where offshore RMB businesses have also gradually expanded.

6.6.2 Assets denominated in the RMB

To further expand RMB use in trade settlement and financial transactions overseas, the RMB-denominated bonds as another instrument to promote RMB internationalization was introduced in 2007. Hong Kong SAR is the center of Dim Sum bonds issuance. As Table 6.4 shows, diversified institutions were allowed to issue and invest in Dim Sum bonds in Hong Kong SAR. Dim Sum bonds issued in Hong Kong SAR have grown rapidly since the first Dim Sum bond was issued by China Development Bank (CDB) in July 2007. Since the first foreign issuer, McDonald's,

issued yuan 200 million in October 2010 and yuan 1 billion in November 2010, followed by HSBC, Volkswagen, and other foreign firms. In the same year, China's Ministry of Finance of China issued the first sovereign Dim Sum bond. In addition to Hong Kong SAR, HSBC also issued the first non-Hong Kong RMB-denominated bond in London in April 2012, followed by China Construction Bank (CCB), which in November 2012 became the first Chinese bank to issue RMB-denominated bonds in London.

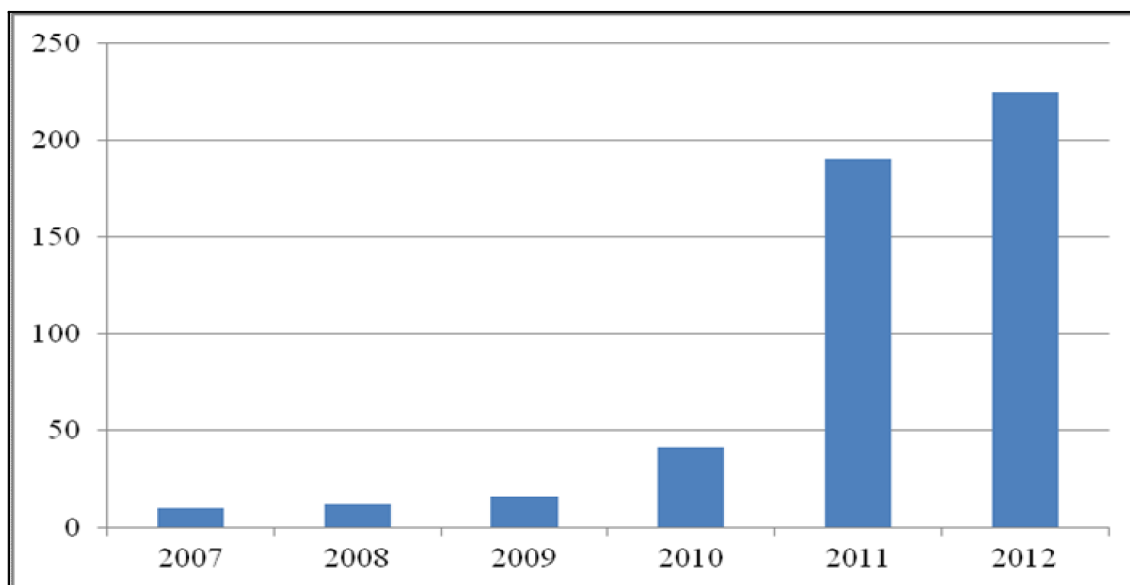
Table 6.4: Issuers and investors of Dim Sum bonds in Hong Kong SAR

Issuers	<ul style="list-style-type: none"> • Ministry of Finance of China • Financial institutions or companies in Mainland China (subject to approval by the relevant authorities in Mainland China) (e.g. China Development Bank, Baosteel) • International financial institutions (e.g. Asian Development Bank, the World Bank) • Financial institutions or companies incorporated outside Mainland China (e.g. Hopewell, McDonald's, Volkswagen, Fonterra, Axiata and Emirates NBD)
Investor base	<ul style="list-style-type: none"> • Commercial and private banks, insurance companies, investment funds and corporate from Hong Kong and overseas • Offering and marketing activities are subject to existing requirements under applicable laws in Hong Kong

Source: The HKMA.

Total amount of Dim Sum bonds issuance increased considerably, especially from 2011. There were mere yuan 12, 14 and 16 billion of Dim Sum bonds issued in Hong Kong SAR from 2007 to 2009, respectively. After China expanded the eligibility of issuers from Mainland financial institutions to multinational corporations and international financial institutions based in Hong Kong SAR in 2010, and to Mainland non-financial corporations in 2011, Dim Sum bonds issuance in terms of volume and amount has increased sharply (see Figure 6.6). More than yuan 200 billion of Dim Sum bonds were issued in 2012, reflecting the fact that the interest of international institutions in using and investing in the RMB is increasing. For the issuers of Dim Sum bonds, the expectations of RMB appreciation and an increasing yield spread between the Mainland and Hong Kong SAR have motivated domestic and international institutions to issue Dim Sum bonds in Hong Kong SAR. As well, expectations of RMB appreciation and restrictions on foreign investors' direct investment in RMB financial products in the Mainland have encourage investors to purchase Dim Sum bonds as a channel for indirectly investing in the Mainland's financial markets.

Figure 6.6: Dim Sum bonds issuance in Hong Kong SAR, yuan billion, 2007–2012



Source: The HKMA and Nomura Research Institute (NRI).

Note: 2012 upon end of September.

6.6.3 RMB Qualified Foreign Institutional Investor (RQFII)

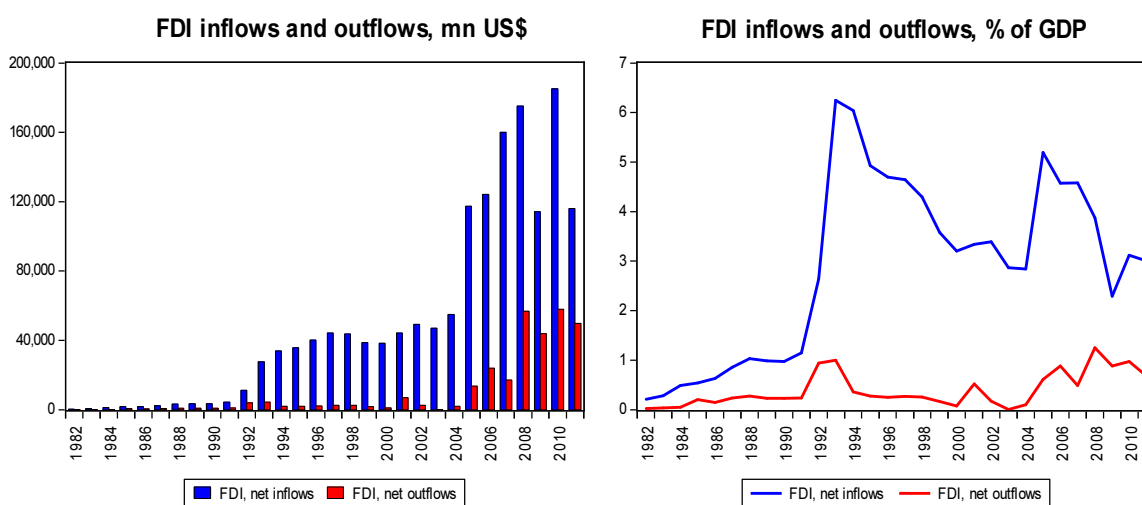
To deepen China's securities market and diversify the types of investors, Chinese authorities launched the Qualified Foreign Institutional Investor (QFII) program in 2002. Under this program, foreign investors approved by China Securities Regulatory Commission (CSRC) can access China's stock markets. Each of QFII is granted a quota by China's State Administration of Foreign Exchange (SAFE). In December 2011, the CSRC announced new RMB program which is called the RMB QFII (RQFII), which allow QFIIs to invest Mainland securities markets within a certain quota using RMB funds raised in Hong Kong SAR. Additionally, the RQFII can invest in China's inter-bank bond market, which was a significant step forward in widening investment channels for offshore RMB. The initial total investment quota was yuan 20 billion. Less than half year later, in April 2012, the CSRC increased the quota to yuan 70 billion. What's more, the CSRC stated that RQFII could be increased in accordance with the needs of China's financial market openness and RMB internationalization. It is wildly believed that widening investment channels for offshore RMB recycling to the Mainland is critical for boosting RMB use in trade settlement and financial transactions. Thus, the RQFII program is an important measure to facilitate RMB internationalization.

6.6.4 China's RMB-denominated ODI and FDI

In order to facilitate the Pilot Scheme of Cross-Border Trade Settlement in the RMB, the PBoC published the Administrative Rules for the Pilot Program of Settlement for RMB-denominated Outward Direct Investment (ODI) on January 6, 2011. China has been the largest foreign direct investment (FDI) recipient country for decades until 2010.

But recently, China's ODI increased considerably to US\$ 74.65 billion in 2011 from US\$ 2.7 billion in 2002.³⁹ As Figure 6.7 demonstrates, China's ODI sharply surged since 2005, in 2010 becoming the fifth largest overseas direct investment country in the world. Although there are no statistics showing how much China's ODI is in the RMB, China's RMB ODI will increase steadily along with growth of China's overseas investment. What's more, in October of the same year, the Administrative Rule on Settlement of RMB-Denominated Foreign Direct Investment was launched, with aim of further widening RMB recycling channel. These two rules clearly signal that China is intended to expand RMB use in trade and investment gradually, thereby promoting RMB internationalization.

Figure 6.7: China's FDI inflows and outflows, 1982–2011



Source: Ministry of Commerce of China and World Bank, WDI.

6.6.5 Bilateral currency swap agreements

In addition to participating in the Chiang Mai Initiative (CMI) in 2000 and the Chiang Mai Initiative Multilateralization (CMIM) in 2010, up until March 2013, China had signed 19 bilateral currency swap agreements (BCSAs) with other economies (see Table 6.5). The main purpose of signing BCSAs is to strengthen financial cooperation and boosting bilateral trade and investment. However, since China accelerated its push on RMB internationalization, BCSAs has been regarded as a channel for providing foreign central banks the RMB liquidity to facilitate bilateral trade settled in the RMB and promote RMB-denominated investment. The BCSA between the PBoC and the HKMA, however, may be an exception. In January 2009, the PBoC signed a bilateral currency wrap agreement totaling yuan 200 billion (HK\$ 227 billion) with the HKMA, with the main purpose of cultivating Hong Kong SAR as a premier center for offshore RMB. It is foreseeable that more BCSAs will be signed between the PBoC and other

³⁹ See 2011 Statistical Bulletin of China's Outward Foreign Direct Investment from Ministry of Commerce of People's Republic of China.

central banks if China continues to promote RMB internationalization.

Table 6.5: China's bilateral currency swap agreements, 2008–2013

Date	Counterparty	Size (yuan billions)	Maturity
22/06/2013	The UK	200	3 years
26/03/2013	Brazil	190	3 years
26/06/2012	Ukraine	15	3 years
22/03/2012	Australia	200	3 years
20/03/2012	Mongolia	10	3 years
21/02/2012	Turkey	10	3 years
08/02/2012	Malaysia	180	3 years
17/01/2012	the UAE	35	3 years
23/12/2011	Pakistan	10	3 years
22/12/2011	Thailand	70	3 years
13/06/2011	Kazakhstan	7	3 years
19/04/2011	Uzbekistan	0.7	3 years
18/04/2011	New Zealand	25	3 years
23/07/2010	Singapore	150	3 years
09/06/2010	Iceland	3.5	3 years
02/04/2009	Argentina	70	3 years
23/03/2009	Indonesia	100	3 years
11/03/2009	Belarus	20	3 years
20/01/2009	Hong Kong	200	3 years
12/12/2008	South Korean	180	3 years

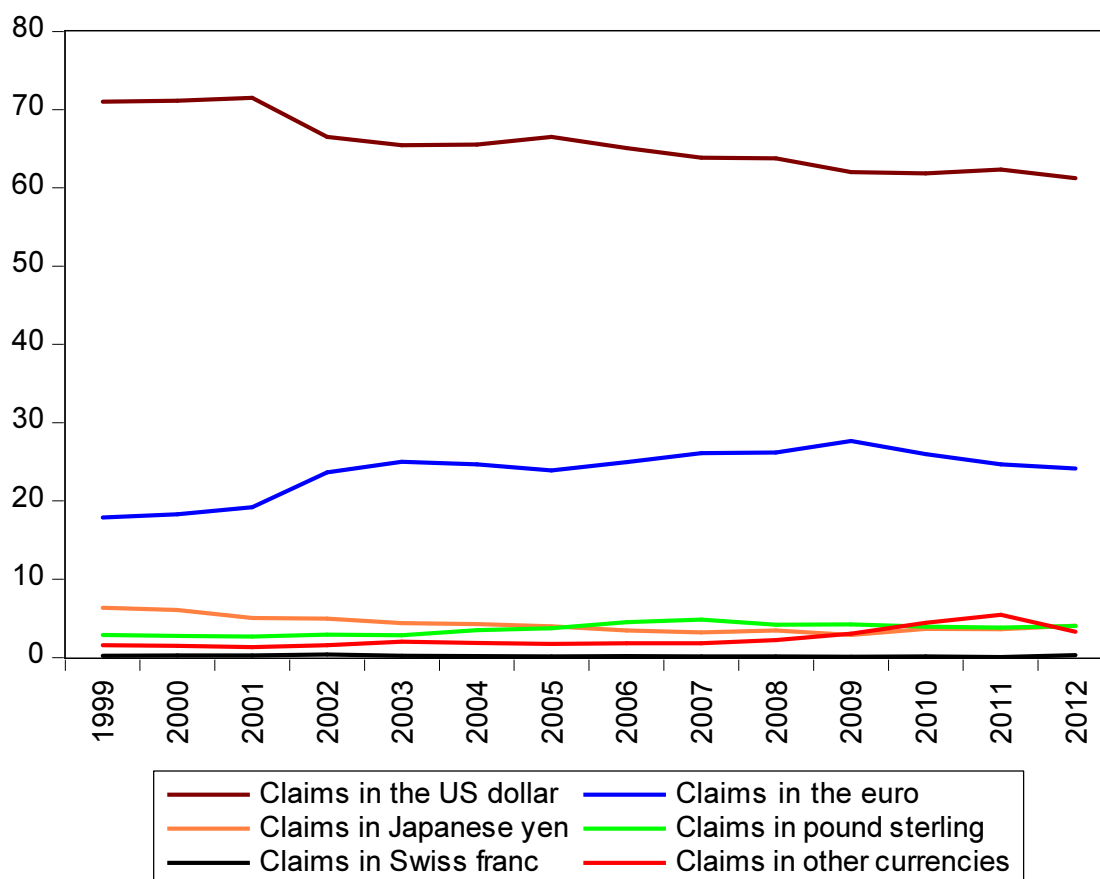
Source: the PBoC.

Note: 2013 is upon March.

6.6.6 Official foreign reserves in the RMB

To be used as an international reserve currency is one of the most important functions of an international currency. According to the IMF, there are five major currencies widely used as international reserve currencies in the global reserves pool: US dollar, euro, Japanese yen, British pound and Swiss franc. As Figure 6.8 shows, the US dollar is the most important international reserve currency, accounting for 60-70 per cent of total global foreign exchange reserves during the period of 1995 to 2011. The euro accounts for 20-30 per cent, followed by Japanese yen, British pound and Swiss franc. The share of the US dollar and the euro together is about 90 per cent over the period. This suggests that other currencies are far behind the US dollar and the euro as international reserve currencies. It appears that it will take many years, if not many decades, for the RMB to emerge as an international reserve currency.

Figure 6.8: Official foreign exchange rate reserves by currencies, %, 1995–2012



Source: Currency Composition of Official Foreign Exchange Reserves (COFER) of the IMF.

Note: Percentage of each currency is in allocated foreign exchange reserves. Since 2005, the IMF reported the data of global foreign exchange reserves in two categories: allocated and unallocated reserves. The foreign exchange reserves from the countries which don't report the composition of their reserves are classified as unallocated foreign exchange reserves.

Currently, the RMB held by other central banks as foreign exchange reserves are extremely limited, although it is reported that more central banks have begun to hold RMB assets as a part of their foreign reserves. The Austrian central bank signed agreements for investing in China's inter-bank bond market⁴⁰ with the PBoC in November 2011, followed by the World Bank in April 2012, and the Indonesian central bank in July 2012. Besides Nigeria, which announced that it would hold 5 to 10 per cent of its foreign reserves in RMB assets⁴¹, Chile, Brazil, and some Asian countries were reported to be storing RMB assets, although the amount of RMB assets held remains

⁴⁰ Financial products in inter-bank bond market of China includes government bonds, policy banks bonds, central bank bills, commercial banks sub-bonds, short-term bond, cooperate bonds and asset-backed securities and so on.

⁴¹ In September 2011, Nigerian central bank announced to include the RMB into its foreign reserves in order to diversify its foreign reserves which were dominated by the US dollar, the euro and British pound. Further, the governor of Nigerian central bank said that RMB assets in Nigeria's foreign reserves would accounts for 5-10 per cent during his visiting China in September 2011.

unclear. More recently, Japan was granted US\$ 10.3 billion (yen 855 billion) quota to purchase China's government bonds in March 2012. These evidences indicate that other countries' demands for holding RMB assets as foreign reserves has increased and shows the efforts of Chinese authorities to gradually liberalize its financial account.

Recently, at G20 level, the topic of when the RMB should be included into the currency basket of the SDR was discussed. China expressed its willingness for further discussion of the topic. Obviously, becoming a currency in the SDR's currency basket would significantly improve the RMB's international status. Obstacles to the RMB being included in the SDR's currency basket are that the RMB is not a freely convertible currency and that the RMB exchange rate is not a freely floating regime. From China's side, some think that China should not be in any hurry to allow the RMB to join the SDR's currency basket because China needs to take time to prepare for it.⁴² The IMF's Executive Board reviews the SDR's currency basket every five years. It is likely that China will show more interest in including the RMB into the SDR's currency basket in the next SDR valuation review in 2015. It would be a significant step for RMB internationalization if the RMB become a component currency of the SDR's currency basket.

6.7 Challenges to RMB Internationalization

From the above review, we see that China has achieved significant progress in RMB internationalization since 2009. Some argue that the RMB could overtake the US dollar to become the leading international currency within a decade, at least in some aspects of the global monetary system. But historical experience and reality tell us that the process of RMB internationalization would not be a smooth journey. The British pound lost its status as the most important international currency after World War I. But it still accounted for around 8 per cent in the global payment system in 2010. Japanese yen in the 1980s and the euro in the 2000s were widely predicted to be rivals to the US dollar. But there is now no discussion of the yen being the next major international currency, while the euro has not fully recovered from the euro crisis. These evidences suggest that it would be a long process for the "new" currency overtaking the "old" one as a leading international currency. Naturally, it is applicable for the RMB.

6.7.1 Asymmetry of RMB outflows and inflows

Since 2009, China deliberately motivated the RMB to be used beyond the border by introducing several concrete measures such as the Pilot Program of RMB Settlement of Cross-Border Trade Transactions and issuing Dim Sum bonds in Hong Kong SAR. Expansion of RMB use in cross-border trade settlement and the increase of RMB deposits in Hong Kong SAR proved that there is strong overseas demand for the RMB. However, a great deal of the RMB has been accumulated outside the Mainland, especially in Hong Kong SAR, because of limited investment channels for offshore

⁴² Zhou Xiaochuan, the governor of the PBoC, stated publicly that 'China welcome suggestions on including the RMB into SDR's basket. But China is patient and in no hurry'.

RMB recycling to the Mainland. To broaden investment channels for offshore RMB to flow back to the Mainland, China took measures such as the RMB-denominated FDI and ODI, the RQFII, and allowing foreign central banks to invest in China's inter-bank bond market. As a result of these actions, in January 2013, fifteen Hong Kong banks provided yuan 2 billion to fifteen Chinese firms registered in Qianhai of Shenzhen.⁴³ It signals that China launched cross-border RMB loans aimed at facilitating offshore RMB recycling to the Mainland.

However, while these measures are helpful in widening investment channels for offshore RMB returning to the Mainland, there still exists asymmetry between RMB outflows and inflows. It is foreseeable that strong demand for the RMB in trade and financial transactions will continue in the short and medium terms because of expectations of RMB appreciation and expansion of RMB use in cross-border trade settlements. Therefore, China needs to further broaden investment channels for offshore RMB recycling to the Mainland. Only when offshore RMB can freely return to the Mainland for investment will the use of the RMB dramatically increase. It will not be an easy task because China's capital account is still strictly controlled. But China could increase the quota and expand the scope of RQFII to allow more offshore RMB to invest in the Mainland while keeping the capital account controlled. China could also increase the number of foreign institutional investors who can participate in China's inter-bank bond market. These measures would help to balance RMB inflows and outflows.

6.7.2 Development of deep and liquid financial markets

According to Frankel (2011), a deep, liquid and open financial market is a primer condition for a national currency becoming an international currency. China has made striking progress in establishing relatively structured financial markets, including stock markets, bond markets, money markets and so on. But China's financial markets are still small and shallow compared with those in developed countries and even with those in some emerging economies. China needs to allow more foreign institutional investors to participate in domestic financial markets to improve their efficiency and effectiveness. Equally importantly, establishment of financial risk management mechanisms and strengthening the rule of law are crucial for China regulating its relatively immature financial markets effectively.

Additionally, participation in China's financial markets needs to be diversified (Ito, 2011). Currently, the majority of investors in China's bond markets are domestic institutions. Individuals and foreign institutional investors are excluded or constrained by investment quota. Diversity of investors will improve efficiency and liquidity of financial markets. Thus, Chinese authorities need to remove gradually the constraints on participants in its financial markets. In addition, along with expansion of RMB use

⁴³ Qianhai is a district of Shenzhen city, Guangdong province. Under the Overall Development Plan of Qianhai as Shenzhen and Hong Kong Modern Service Area approved by China's State Council, one of aims is promoting the internationalization of the RMB by establishing closer linkage in RMB businesses between Shenzhen and Hong Kong.

beyond the border, for other investors who hold RMB assets, hedging RMB exchange rate risks is necessary to facilitate RMB internationalization. In September 2012, the first offshore RMB currency futures product was launched in the Hong Kong Exchanges and Clearing Limited (HKEx). Based on Hong Kong's experience, onshore RMB currency futures markets need to be established in order to deepen China's financial markets. This would attract significantly more domestic and foreign firms to settle trade and conduct financial transactions in the RMB.

6.7.3 Flexibility of RMB exchange rate

An international currency is always with a freely floating exchange rate such as the US dollar and other international currencies.⁴⁴ In turn, a flexible and market-driven RMB exchange rate regime would provide foreign investors transparency and confidence in holding and using the RMB, thereby raising its status in the global financial markets. China began its exchange rate regime reform in 1995 and reaffirmed it in 2010, with the aim of achieving a freely floating exchange rate regime. The RMB has been appreciated considerably in nominal and real terms since 2005 when the PBoC lifted controls on the RMB exchange rate (see Figure 2.2). This revaluation process was interrupted by the Global Financial Crisis 2007-2008 until the mid-2010. In the nominal term, the RMB has appreciated at 3-4 per cent annually since 2005. Meanwhile, the real effective exchange rate (REER) of the RMB has also increased considerably, by 29 per cent up to 2012, although it declined in 2009 (see Figure 2.2). What's more, the PBoC has imposed a trading band in the inter-bank foreign exchange market since 2005. This trading band was widened to +/- 0.5 in 2008, +/- 1.0 per cent in 2012 and +/- 2.0 per cent in 2014, when Chinese authorities sought to loosen further the controls on the exchange rate.

The IMF regularly reports on member countries' exchange rate arrangements on the basis of the degree of flexibility of arrangement and formal or informal commitments to a given exchange rate path.⁴⁵ This assessment is based on member countries' *de facto* arrangement rather than officially announced arrangement. Thus, this classification system provides a relatively objective reference for assessing a country's exchange rate regime. According to the IMF's latest report in 2009, however, RMB exchange rate regime was placed in the category of 'Crawling peg' as compared the 2004 categorization of 'Other conventional fixed peg arrangement', which means that the RMB exchange rate regime is still far away from being a freely floating regime.

⁴⁴ The US dollar became a dominant international currency under Bretton Woods System in which the US dollar pegged to the gold and other currencies pegged to the US dollar. This is a special fixed exchange rate regime in order to stabilize the world economy after WWII. However, it is widely believed that an international currency should have high flexibility in its exchange rate regime.

⁴⁵ Since 1999, the IMF introduced renewed categories of exchange rate arrangement that including: Exchange arrangement with no separate legal tender, Currency board arrange, Other conventional fixed peg arrangement, Pegged exchange rate within horizontal bands, Crawling peg, Crawling band, Managed floating with no pre-determined path for the exchange rate and Independently floating in its Classification of Exchange Rate Arrangements and Monetary Frameworks. This classification helps to assess the implications of the choice of exchange rate arrangement for the degree of independence of monetary policy.

Without RMB exchange rate liberalization, the RMB will not become an international currency like the US dollar today.

6.7.4 Convertibility of the RMB

Full convertibility of the RMB is another problem for China to internationalize the RMB, although it is convertible under the current account. The next step is gradually moving to full RMB convertibility in the capital account. The recent growth in use of the RMB in cross-border trade settlements has created greater demand for full convertibility under China's capital account because holders of offshore RMB assets are looking for investment opportunities in the Mainland. It would be more convenient for them to invest in Mainland China if the RMB were fully convertible under both current account and capital account.

Full RMB convertibility cannot be achieved in the short term. The PBoC has stated that it will gradually meet the target of full RMB convertibility under the capital account. However, the PBoC has employed other tools to assist foreign investors to obtain RMB assets, while the RMB is not fully convertible under the capital account. In July 2012, direct transactions between the RMB and the Japanese yen began simultaneously in Shanghai and Tokyo. This measure will reduce exchange rate risks and transaction costs and encourage use of the RMB in bilateral trade and financial transactions between China and Japan. But in the medium or long term, the RMB should be fully convertible in order to become an international currency.

6.7.5 Capital account liberalization

To be an international currency, openness of capital account is one of preconditions. Heavy controls on capital flows across borders impair the functions an international currency plays. Capital account liberalization, however, is the most challenging task for China in reforming its financial system and RMB internationalization. Capital account opening not only tightly links with other parts of China's financial system reform, like RMB exchange rate regime reform, interest rate liberalization, and RMB internationalization, but is also closely related to the adjustment of China's economic development model. This is why China has repeatedly emphasized that capital account liberalization would be a long-term and gradual process. Given current global economic situation and China's domestic financial system, China's capital account liberalization should be pursued gradually and cautiously.

It should be noted that capital account liberalization does not necessarily mean complete capital account openness. China could liberalize its capital account step by step while maintaining controls on short-term capital flow. Excessive fluctuations in short-term capital flows could undermine the country's financial system stability. Historical experience such as the Asian Financial crisis of 1997 indicates that countries that do not have well-designed capital account liberalization strategy are vulnerable in period of financial crisis. Following the Global Financial Crisis 2007-2008, the IMF sharply adjusted its long-time enthusiasm for liberalizing the capital account, stating

that ‘(capital account) liberalization needs to be well planned, timed, and sequenced in order to ensure that its benefits outweigh the costs. Countries with extensive and long-standing measures to limit capital flows are likely to benefit from further liberalization in an orderly manner. There is no, however, presumption that full liberalization is an appropriate goal for all countries at all times’.⁴⁶ Therefore, China should open its capital account gradually by liberalizing the medium and long-term RMB assets before short-term RMB assets (Ito 2011 and Yu 2012). RMB internationalization should be a parallel process along with China’s capital account liberalization (Yu, 2012).

6.8 Roadmap of RMB Internationalization

Historical experiences indicate that there is no precedent of currency internationalization that could guide China. As Frankel (2011) points out, China could pursue an unorthodox strategy in the process of RMB internationalization because there is no good precedent for China to refer to. Moreover, it appears that an active currency strategy in currency internationalization might not be able to create an international currency, as Japanese strategy in yen internationalization in the 1980s. But this does not necessarily suggest that RMB internationalization does not need a well-designed roadmap. Such a well-designed roadmap could provide Chinese policymakers with a long-term framework to direct the RMB towards becoming an international currency. Naturally, this roadmap should be adjusted in accordance with changes in domestic and international economic circumstances.

As far as a roadmap is concerned, it seems that the PBoC is insisting on following the principle of ‘proactive, gradualism and controllable’, as they did in China’s capital account liberalization.⁴⁷ From a broad perspective, the internationalization of the RMB should be an integral part of China’s financial system reform, which should be systematic and long-term task covering capital account liberalization, exchange rate regime reform, and financial markets reform. Based on review of progress China has made and analysis of challenges to RMB internationalization, various roadmaps from different perspectives for RMB internationalization have been drawn (Gao and Yu 2009, Ito 2011, Vallee 2012 and Yu 2012). In particular, a report from the Renmin University of China came up with the strategy of “Two Three-step” of RMB internationalization.⁴⁸ Based on previous studies and our analysis, a long-term roadmap for RMB internationalization from two perspectives can be summarized as: the functions of the RMB as an international currency and the scope of RMB usage in the global financial system (see Table 6.6).

Table 6.6: Roadmap of RMB internationalization

⁴⁶ See the IMF, “The Liberalization and Management of Capital Flows: an Institutional View”, November 14, 2012.

⁴⁷ See Xiaochuan Zhou (2009), “Thoughts on Reforming the International Monetary System”.

⁴⁸ “Toward the Core Country: The Great Finance’ Strategy and Development Path of China” (in Chinese), in May 2013. (See: http://news.xinhuanet.com/fortune/2013-05/26/c_115910944.htm)

Roadmap for the RMB becoming an international currency	From the perspective of functions of the RMB as an international currency	From the perspective of scope of RMB usage in global financial system
Stage One	The RMB as a settlement currency in trade and financial transactions	RMB usage in cross-border trade and financial transactions
Stage Two	The RMB as a denomination currency in trade and financial transactions	RMB regionalization
Stage Three	The RMB as an international reserve currency	RMB globalization

Source: Author's summary based on our analysis and previous studies.

6.8.1 From the perspective of functions of the RMB as an international currency

Stage One: the RMB as a settlement currency in trade and financial transactions

Making the RMB a settlement currency in trade and financial transactions is what Chinese authorities have been mainly working on. The RMB is fully convertible in the current account. So expansion of RMB use as a settlement currency in trade is the easiest way for China to begin RMB internationalization. RMB use in financial transactions has increased because of rapid development of offshore RMB markets such as Hong Kong SAR. This stage should take only a few years if the current trend in RMB use in cross-border trade and financial transactions persists.

Stage Two: the RMB as a denomination currency in trade and financial transactions

Next stage is directing the RMB to become a denomination currency in trade and financial transactions. According to Yu (2012), for an international currency, its role as an invoicing currency is more fundamental than that of a settlement currency. Moreover, denomination in financial transactions for an international currency is more critical than invoicing in trade because the value of financial transactions is much greater than the value of foreign trade (Park, 2010). Currently, most of China's cross-border trade settled in the RMB is still invoiced in US dollars or euros. RMB-denominated financial transactions are very limited. For the RMB to become an international currency, China needs to motivate more foreign trade to be invoiced in the RMB and widen investment channels for foreign investors to invest the RMB-denominated assets. Therefore, China needs to further deepen and open domestic financial markets to foreign investors and widen RMB recycling channels. The length of this stage will largely depend on the process of China's financial system reform, especially China's financial account liberalization.

Stage Three: the RMB as an international reserve currency

Its role of as an international reserve currency is the most fundamental role for an

international currency (Yu, 2012). The ultimate goal of RMB internationalization is that the RMB becomes an international reserve currency, like the US dollar and the euro today. Although some central banks have included RMB assets in their foreign reserves, the share of RMB in the global foreign exchange reserves is extremely limited (see Figure 6.8). Therefore, it may take decades for China to transform the RMB into an international reserve currency, even if China's economy continues to grow and its financial system reform moves ahead.

6.8.2 From the perspective of scope of RMB use in the global financial system

Stage One: RMB use in cross-border trade and financial transactions

China has achieved significant progress in increasing RMB use in cross-border trade settlement since 2009. According to the PBoC, in 2012, the amount of cross-border trade settlement in the RMB climbed to yuan 2.94 trillion, accounting for 8.4 per cent of China's total trade. However, China needs to create more incentives for domestic and international firms to use the RMB in cross-border trade in the next several years. This is a necessary and important step for internationalizing the RMB, when China's capital account is not fully open and the RMB is not a fully convertible currency. Furthermore, although Chinese authorities have taken some measures to promote offshore RMB recycling such as the RMB-denominated FDI and the ODI as well as the RQFII, RMB use in financial transactions is very limited compared with RMB use in trade settlement. Only when the RMB becomes a major settlement and invoicing currency in China's foreign trade and financial transactions could it become a regional currency like the Japanese yen in Asia today. Additionally, China should gradually open its domestic financial markets to foreign financial institutions to improve their efficiency and depth. Meanwhile, at this stage, China should encourage Chinese financial institutions to go abroad to provide RMB business services overseas.

Stage Two: RMB regionalization

The next stage for RMB internationalization is regionalizing the RMB within Asia. The PBoC has stressed that RMB internationalization will be determined by domestic reforms and market forces. But strategically, regional cooperation with Asian countries, in particular with Japan, Korea, and the ASEAN countries, would facilitate the regionalization of the RMB in the early stage of RMB internationalization. With tightening ties with East Asian countries through supply chains and intra-regional trade and investment, China's RMB has become a dominant reference currency in East Asia (Subramanlan and Kessler, 2012), but more needs to be done in order to regionalize the RMB at this stage.

China has reached 23 bilateral currency swap agreements with other economies (see Table 6.5). However, more currency swap agreements with Asian countries are needed to promote RMB regionalization. This would assist other Asian central banks in obtaining the RMB to finance local firms to do business in the RMB with China. The PBoC signed the New Bilateral Local Currency Settlement Agreement with the Central Bank of Russian Federation in June 2011. Under this agreement, bilateral trade between

the two countries can be settled in a freely convertible currency, the RMB, or the Russian ruble. China has discussed RMB use as a settlement currency with ASEAN and other countries. ASEAN countries and other East Asian countries are China's main trading partners. Obviously, using local currencies in bilateral trade with more Asian countries would be helpful in promoting RMB use in Asia, thereby raising the RMB's status as a regional currency. In addition, China has been active in Asian FTA development, signing 12 free trade agreements (FTAs) with other economies. China could encourage use of local currencies including the RMB in bilateral trade in future FTA negotiations, such as China-Japan-Korea trilateral FTA negotiation. Thus, FTAs could be used as a vehicle to promote RMB regionalization, thereby pushing forward RMB internationalization.

In addition to measures promoting RMB use with Asian countries, China should develop more offshore RMB markets to promote RMB internationalization in this stage. Currently, Hong Kong SAR is the premier offshore RMB market. Other Asian cities have shown interest in doing RMB businesses, such as Singapore, Taipei, and Tokyo. In the long term, more offshore RMB markets in Asia would improve the convenience of RMB use, thereby attracting more foreign investors to do trade and financial transactions in the RMB. At this stage, the RMB could complement use of the US dollar, the euro and Japanese yen in Asia, such as being a settlement and denomination currency in trade and financial transactions, as an anchor currency for Asian currencies to peg, and as a regional reserve currency.

Stage Three: RMB globalization

After completing RMB regionalization, the RMB will be in the stage of globalization. The aim in this stage would be to gain international status like the US dollar and the euro today. But it will likely take many years to achieve this goal, even if Chinese authorities could push forward RMB internationalization smoothly. Whether China can reach this stage depends not only on China's will to do so, but also on the global economic and financial situation. In addition, it should be noted that becoming an international currency does not mean that the RMB will replace the US dollar or the euro as the dominant international currency. In the future, a multipolar international financial system including the RMB, the US dollar, and the euro could develop.

6.9 Relationship between RMB Internationalization and East Asian Regional Integration

6.9.1 Review of East Asian economic and financial integration

Compared with European regional integration in both political and economic aspects, East Asian regionalization mainly focuses on economic and financial integration. After the Asian Financial Crisis of 1997 which hit East Asian economy severely, Asian countries, in particular East Asian countries, have achieved remarkable progress in deepening regional economic and financial integration. FTAs proliferation across East Asian area significantly enhanced regional interdependence and deepened regional

economic integration. In the meantime, numerous initiatives of financial and monetary policy cooperation also strengthened East Asian financial safety net and promoted regional financial integration.

(1) East Asian economic integration

The East Asian economy, mainly driven by foreign trade and foreign direct investment (FDI), has achieved remarkable economic growth over the past several decades. FTAs played a unique role in boosting Asian countries' exports and motivating Asian economic integration, especially for East Asian countries, which are also called the "*world factory*". Along with innovation and technological progress, and removing tangible and intangible foreign trade barriers through bilateral and multilateral FTAs has significantly improved East Asian intra-regional and international trade with the rest of the world. It appears that the past success in economic growth has encouraged Asian policymakers to deepen regional economic integration by adopting cooperative and mutually beneficial economic policies. FTA, regarded as a powerful trade policy instrument, has played an increasingly important role in promoting Asian countries' participation in the global supply chains and production networks (Kawai and Wignaraja, 2010).

The creation of the EU Single Market in 1957 and the North American Free Trade Agreement (NAFTA) in 1994 also positively motivated East Asian countries to adopt FTAs as trade policy instruments to expand their trade shares, thereby improving their international competitiveness in the global market. Asian FTAs initially began with the Asia-Pacific Trade Agreement (APTA)⁴⁹ in 1975. The ASEAN Free Trade Area (AFTA), regarded as a cornerstone of Asian FTA expansion, was signed by the member nations of the Association of Southeast Asian Nations (ASEAN) in Singapore in 1992. The Asian financial crisis of 1997 appeared to accelerate the process of creating a more deeply integrated Asia when Asian countries realized that economic integration and policy cooperation were critical for Asian economies which are relatively vulnerable to the fluctuation of global economy. The recent financial crisis, followed by the European debt crisis and the euro crisis, which significantly reduced the demand for Asia's products, reinforced Asia's commitment to strengthening its economic integration. By January 2012, there were 99 FTAs signed and in effect and 27 FTAs signed but not yet in effect in Asia (see Table 6.7). 64 FTAs are still being negotiated by Asian countries. In addition, the number of proposed FTAs has increased rapidly since 2003: additional 60 FTAs have been proposed or studied in Asia. From Table 6.7, we can see that the number of Asian FTAs has dramatically increased, from 2 FTAs in 1980 to more than 100 FTAs in effect in 2011. This indicates the increasing importance of FTAs for Asian countries to maintain economic growth, particularly for those outward-oriented economies such as China, Japan, Korea, Taiwan and ASEAN countries. FTAs have become an important vehicle to promote East Asian integration.

⁴⁹ APTA, which came into effect in 1976, is the first preferential trade agreement between developing countries in the Asia-Pacific region. Today, member countries include Bangladesh, China, India, South Korea, the Lao People's Democratic Republic (Laos), Sri Lanka, Nepal, and the Philippines. (See: <http://www.emeap.org/>)

Table 6.7: Asian countries' FTAs by status (cumulative), 1975-2012

Year	Proposed ¹	Under Negotiation		Concluded		Total
		Framework Agreement Signed/Under Negotiation ^{2a}	Under Negotiation ^{2b}	Signed but not yet In Effect ^{3a}	Signed and In Effect ^{3b}	
1975	0	0	0	1	0	1
1976	0	0	0	0	1	1
1980	0	0	0	1	1	2
1981	0	0	0	0	2	2
1982	0	0	0	1	2	3
1983	0	0	0	1	3	4
1989	1	0	0	1	3	5
1991	1	0	0	2	5	8
1992	1	0	0	6	5	12
1993	1	0	0	5	9	15
1994	1	0	0	8	11	20
1995	1	0	0	15	14	30
1996	1	0	0	18	19	38
1997	2	0	0	20	20	42
1998	2	0	0	19	23	44
1999	4	0	1	19	24	48
2000	3	0	6	19	25	53
2001	2	0	8	18	28	56
2002	8	2	8	19	31	68
2003	18	4	9	25	36	92
2004	32	14	15	27	43	131
2005	44	18	28	27	51	168
2006	49	18	37	23	64	191
2007	47	18	42	26	70	203
2008	47	16	42	25	80	210
2009	54	16	45	25	86	226
2010	57	17	48	26	92	240
2011	60	17	48	26	99	250
2012	60	16	48	27	99	250

Source: Asia Regional Integration Center, Asian Development Bank, until January 2012.

Notes: See <http://aric.adb.org/fta-country>.

1. Proposed - parties are considering a free trade agreement, establishing joint study groups or joint task force, and conducting feasibility studies to determine the desirability of entering into an FTA.

2a. Framework Agreement Signed/Under Negotiation—parties initially negotiate the contents of a framework agreement (FA), which serves as a framework for future negotiations.

2b. Under Negotiation - parties begin negotiations without a framework agreement (FA).

3a. Signed but not yet In Effect - parties sign the agreement after negotiations have been completed. Some FTAs would require legislative or executive ratification.

3b. Signed and In Effect - when the provisions of an FTA become effective, e.g., when tariff cuts begin.

The rapid increase of FTAs in Asia, however, also raises question which is called Noodle Bowl Effects (or “Spaghetti Bowl effects”, by Bhagwati, 1995). Different FTAs contain different the Rules of Origin (ROOs),⁵⁰ a fact which results in increasing complexity and costly use of FTAs. Crisscrossing FTAs among Asian countries have not only increased the administrative costs of managing FTAs and transaction costs for enterprises, but they also impair the effectiveness of FTAs. Therefore, having too many bilateral FTAs in Asia poses challenges to overall Asian trade liberalization. The majority of existing FTAs in Asia are bilateral or small-scale FTAs, from which less developed Asian countries, are believed to be excluded. Thus, Asian countries need

⁵⁰ Rules of origin (ROOs) describe the criteria needed to determine the national source of a product for the purposes of international trade.

wider and region-wide FTAs rather than excessively overlapping bilateral and plurilateral FTAs. On the other hand, analyzing the enterprise-level data from five Asian countries in Kawai and Wignaraja (2009) find that the noodle bowl effects of overlapping FTAs in Asia are not severely harmful to Asian countries' business activities. But they also point out that cooperative policies are needed to address the increasing complexity of noodle bowl effects, given the fact that more of the proposed FTAs (incl. those under negotiation) in Asia are bilateral and prurilateral rather than region-wide. Although there are some challenges to the development of Asian FTAs, the successful past experience proves that FTAs, as a trade policy instrument, do make significant contributions to Asia's economic growth. Undoubtedly, from a pragmatic perspective, Asian countries still need FTAs to strengthen their international competitiveness and promote their shares in the global trade system.

(2) East Asian financial integration

In the aftermath of Asian Financial Crisis of 1997, East Asian countries recognized the vulnerability of East Asian financial system and necessity of cooperation in financial and monetary policy across the region. Emerging East Asian economies confronted serious challenges in keeping financial market stability when financial crisis struck. ASEAN Swap Arrangement (ASA) was proved that it is inadequate and inefficient for member countries to restore their financial stability. To improve the ability of handling financial crisis, numerous initiatives of regional financial cooperation were introduced so as to establish an East Asian financial safety net against financial crisis.

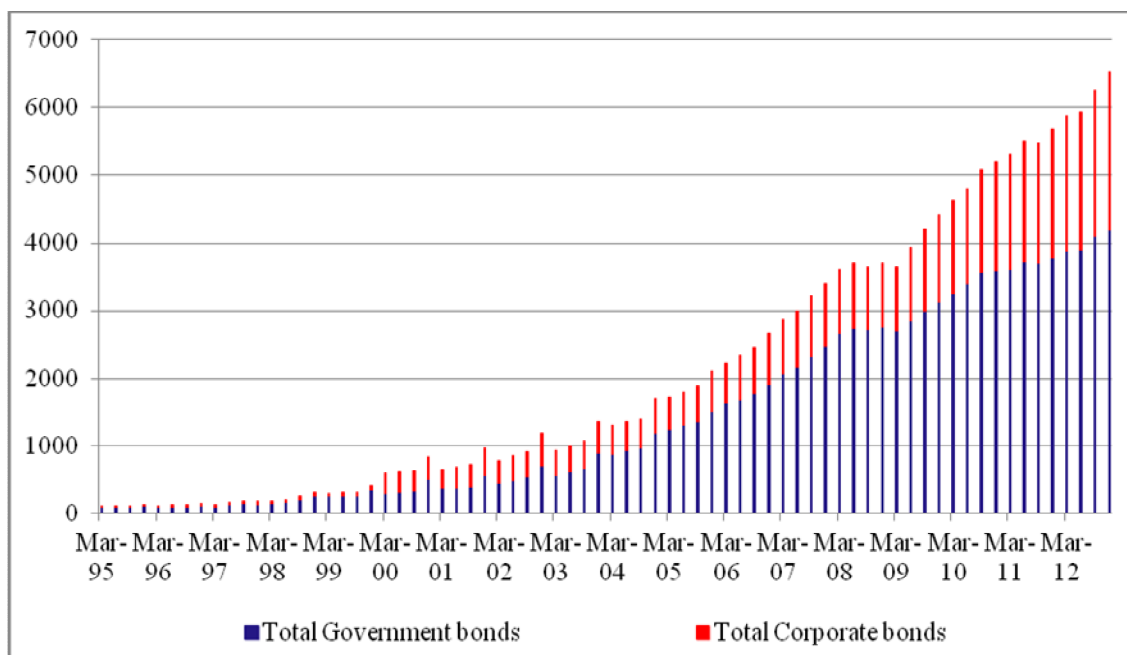
One of lessons learnt from the Asian Financial Crisis of 1997 is that sudden shortage of liquidity caused by financial crisis would lead to a drastic fluctuation in financial markets. In order to strengthen self-help and support mechanisms in East Asia, under the ASEAN+3 framework,⁵¹ Chiang Mai Initiative (CMI) was established at the ASEAN+3 Finance Ministers' Meeting in May 2000 with aim at providing emergency liquidity to support member countries at the time of financial crisis. The total amount was set at US\$ 90 billion. Further, in May 2007, the CMI was multilateralized (CMIM) and fund pool of the CMIM was increased to US\$ 120 billion, which was doubled to US\$ 240 billion in 2012. Under the CMIM, rules on financial contribution, purchasing multiple and voting power of each countries were regulated.

Another lesson learnt from the Asian Financial Crisis of 1997 is double mismatches problem in East Asian financial system: financial currency and maturity mismatches, which caused higher risks and costs for East Asian borrowers. In addition, East Asia owns relatively high saving rate and a large deal of foreign reserves compared with other regions. To develop liquid and efficient bond markets in which East Asian savings could be invested, the Asian Bond Market Initiative (ABMI) was initiated at ASEAN+3 Finance Ministers' meeting in August 2003. Since then, foreign currency-denominated (mainly in the US dollar) and local currency-denominated bond markets across East Asia have developed rapidly. Figure 6.9 shows us that both local currency government bonds and corporate bonds grew considerably since 2000, especially the local currency

⁵¹ ASEAN+3 include 10 ASEAN countries: Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, Vietnam, and China, Japan, Korea.

government bonds, which increased from US\$ 1,418 billion in 2000 to US\$ 16,077 billion in 2012.

Figure 6.9: Historical growth of local currency bond markets in East Asia (excluding Japan), US\$ bn, 1995-2012



Source: AsianBondsOnline, ADB.

The Asian Bond Fund (ABF) was established in June 2003 in order to broaden and deepen East Asian bond markets. The fund of ABF is from foreign reserves of EMEAP countries with approximate size of US\$ 1 billion and invested in domestic bond markets of the major Asia-pacific economies (excluding Australia, Japan and New Zealand).⁵² In its first stage (ABF1), the ABF was invested in a basket of US dollar-denominated bonds, followed by ABF2 which was extended to invest in the local currency bond markets in December 2004. To further develop Asian bond markets, the new Asian Bond Markets Initiative (NABMI) was introduced in ASEAN+3 Finance Ministers' meeting in May 2008. The NABMI encouraged member countries to further develop their own local currency-denominated bond markets. In addition, East Asian countries are seeking to establish a regional bond market which is more accessible for bond issuers and investors.

Rapid development of East Asian economic integration motivated regional monetary integration so as to reduce possible impacts of exchange rate volatility on economic growth and financial market stability in East Asia. Exchange rate policy coordination in

⁵² EMEAP, the Executives' Meeting of East Asia-Pacific Central Banks, is a cooperative organization of central banks and monetary authorities. It includes Reserve Bank of Australia, People's Bank of China, Hong Kong Monetary Authority, Bank Indonesia, Bank of Japan, The Bank of Korea, Bank Negara Malaysia, Reserve Bank of New Zealand, Bangko Sentral ng Pilipinas, Monetary Authority of Singapore and Bank of Thailand. (See: <http://www.ememap.org/>)

East Asia has been extensively discussed, especially in the aftermath of Global Financial Crisis of 2007-2008. For East Asian countries which are mostly export-oriented economies, exchange rate stability is crucial. Coordination in exchange rate policy could help East Asian countries avoid competitive devaluation of their currencies and keep international competitiveness. Currently, exchange rate regimes in East Asia vary from the currency board (Hong Kong SAR) to the free floating exchange rate regime (Japan and Korea). It is very difficult to adopt a free floating regime for some emerging East Asian countries like China in the short term. However, a single currency peg or a common currency basket peg regime could be a transitional measure for East Asian countries to achieve intra-regional exchange rate stability. The SDR is believed to be a good “*bancor*” to refer for East Asian currencies (Zhou, 2008). The Asian Currency Unit (ACU) which is a currency basket of ASEAN+3’s currencies could be another reference currency to peg. However, current discussion on exchange rate policy coordination in East Asia is still in the early stage and far behind the development of financial integration such as multilateral currency swap (CMIM) and East Asian bond markets (ABMI) in the region.

To further illustrate the recent rapid development of East Asian regional integration, we will introduce the ongoing trilateral FTAs talk between China, Japan and Korea in the next section.

6.9.2 New Evidence of East Asian Integration: trilateral FTA between China, Japan and Korea

6.9.2.1 Background

On May 15, 2012, the three largest economies in East Asia, China, Japan and Korea, officially agreed to launch negotiations for a FTA by the end of that year. The emerging FTA talks between China, Japan and Korea (hereafter, CJK-FTA) highlights the rapid development of economic integration mainly driven by FTAs in Asia. Given the economic size of the three countries and their respective shares in the global trade system, it implies that there will be a significant impact across the world. In particular, the recent sluggish recovery of the US economy and the spreading of the crisis throughout Europe underline the significance of the forthcoming CJK-FTA for the global economy.

Undoubtedly, the CJK-FTA will significantly impact on the economic development and trade volume of the three countries. But exactly how much the CJK-FTA is to impact on the three countries’ output and trade volume once the CJK-FTA is in effect needs to be empirically assessed. Lee *et al.* (2005), applying the computable general equilibrium (CGE) model, find that the macroeconomic effects of the CJK-FTA would be 5.15 per cent of GDP growth for Korea, 1.54 per cent for China and 1.21 per cent for Japan. A similar model is employed by Yoon *et al.* (2009). They find that the corresponding effects on GDP growth would be 2.53 per cent for Korea, 0.99 per cent for Japan and 0.60 per cent for China. Considering increasingly different performance in economic development and fluctuations of trade volume in the three countries as well as the uncertain global economy of the last few years, it is meaningful to analyze the

prospects and challenges of the CJK-FTA for the three countries. In this section, we are not interested in assessing the potential macroeconomic impact of the CJK-FTA on the GDP or trade volume of the three countries, which has already been done quite well by the official feasibility studies of the three governments and other scholars. Instead, here we discuss the recent FTA developments in East Asia as well as the prospects for and challenges of the CJK-FTA negotiation. Such an analysis could provide us with a profound understanding of the forthcoming CJK-FTA as a new evidence of deepening East Asian economic integration.

6.9.2.2 Background of the forthcoming trilateral FTA between China, Japan and Korea

By signing the Trilateral Agreement for the Promotion, Facilitation and Protection of Investment at the Fifth Trilateral Summit Meeting on May 15, 2012, the three economic giants in East Asia – China, Japan and Korea – have displayed their efforts in the area of economic cooperation to achieve a sustainable economic growth against the background of the uncertainty of the global economy. The leaders of the three countries also agreed to officially launch the CJK-FTA negotiation by 2012, after a decade of discussions and preparations. This provides new evidence showing that East Asian countries are seeking to deepen their economic integration by applying FTAs as a trade policy tool. The population of the three countries, as a whole, accounts for 21.82 per cent of the world's total population (see Table 6.8). The total GDP of the three countries, which was US\$ 14.3 trillion in 2011, accounted for 20.43 per cent of the world's total GDP. In addition, and even more strikingly, the share of goods exported and imported by the three countries in the world's total exports and imports were 18.20 and 43.62 per cent, respectively, in 2011. These indicate the tremendous potential of the CJK-FTA to further improve their shares in the global economic and trade system.

Table 6.8: The general information on China, Japan and Korea

	Population			GDP			Goods exported			Goods imported		
	CJK	World	% of world	CJK	World	% of world	CJK	World	% of world	CJK	World	% of world
1982	1166,4	4606,8	25,32	1396,2	67,5	12,47	178,4	1817,2	9,82	379,5	1797,2	21,12
1983	1182,5	4688,8	25,22	1531,1	71,9	13,38	188,2	1772,7	10,62	388,1	1758,4	22,07
1984	1197,2	4770,4	25,10	1645,3	70,3	13,85	218,4	1891,0	11,55	427,5	1874,5	22,81
1985	1212,6	4853,9	24,98	1787,8	75,4	14,33	225,8	1901,7	11,87	427,1	1891,4	22,58
1986	1229,5	4940,2	24,89	2460,2	89,3	16,67	265,6	2076,4	12,79	449,8	2062,7	21,81
1987	1247,7	5028,7	24,81	2895,6	89,9	17,27	306,8	2450,5	12,52	562,9	2419,7	23,26
1988	1266,2	5117,9	24,74	3512,4	90,1	18,73	362,0	2813,4	12,87	702,7	2766,7	25,40
1989	1284,1	5206,6	24,66	3591,5	99,2	18,25	375,8	3032,8	12,39	815,1	3003,5	27,14
1990	1301,6	5296,2	24,58	3724,4	116,7	16,95	397,9	3471,2	11,46	917,4	3424,5	26,79
1991	1318,0	5383,0	24,48	4224,5	124,1	18,32	438,3	3559,3	12,31	1037,4	3520,9	29,47
1992	1332,9	5465,6	24,39	4605,3	130,3	18,68	480,1	3808,9	12,60	1053,8	3745,9	28,13
1993	1347,0	5548,9	24,28	5217,6	128,9	20,87	512,3	3774,2	13,57	1099,9	3682,3	29,87
1994	1361,2	5631,1	24,17	5833,0	135,2	21,73	583,5	4273,5	13,65	1317,7	4149,9	31,75
1995	1375,4	5714,7	24,07	6579,1	147,4	22,09	682,0	5154,9	13,23	1701,2	4992,0	34,08
1996	1388,8	5796,2	23,96	6119,9	167,0	20,14	681,3	5410,9	12,59	1900,3	5272,4	36,04
1997	1402,1	5878,0	23,85	5793,2	193,4	19,12	730,4	5621,6	12,99	1865,1	5470,5	34,09
1998	1414,6	5959,0	23,74	5279,5	205,4	17,48	691,7	5523,9	12,52	1295,4	5425,9	23,87
1999	1426,0	6038,6	23,61	5961,3	219,1	19,03	743,4	5721,0	12,99	1609,0	5663,8	28,41
2000	1436,5	6118,1	23,48	6463,1	220,5	19,99	886,8	6443,5	13,76	2151,6	6435,5	33,43
2001	1446,4	6195,7	23,34	5989,3	248,5	18,64	800,9	6178,6	12,96	1927,2	6163,8	31,27
2002	1455,5	6272,5	23,20	6010,6	289,0	18,00	885,4	6453,1	13,72	2073,2	6395,3	32,42
2003	1464,0	6349,2	23,06	6587,7	271,8	17,54	1087,1	7510,3	14,47	2493,3	7415,7	33,62
2004	1471,9	6426,1	22,90	7309,4	263,9	17,29	1392,6	9102,1	15,30	3146,9	9023,6	34,87

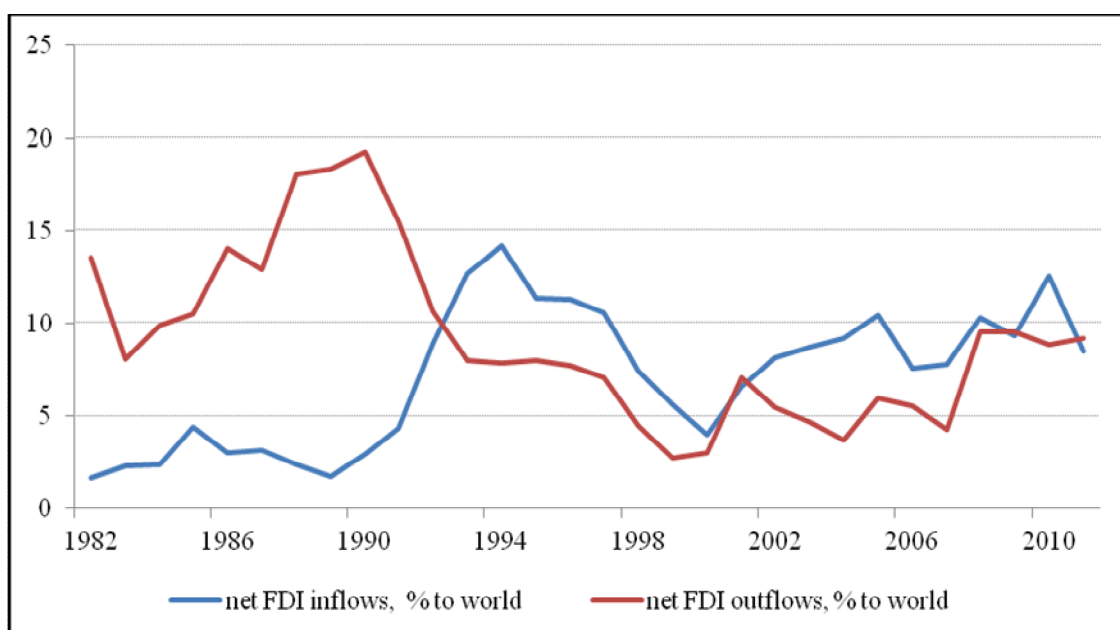
2005	1479,6	6503,2	22,75	7673,6	285,2	16,80	1619,9	10340,2	15,67	3672,4	10293,1	35,68
2006	1487,1	6580,5	22,60	8021,5	330,0	16,21	1922,1	11944,8	16,09	4337,2	11837,7	36,64
2007	1494,3	6658,5	22,44	8899,6	371,9	15,95	2287,8	13801,7	16,58	5002,1	13619,8	36,73
2008	1501,3	6737,2	22,28	10302,4	400,2	16,83	2615,9	15848,4	16,51	6077,6	15726,8	38,65
2009	1508,1	6815,8	22,13	10860,5	432,1	18,76	2107,3	12304,1	17,13	4659,5	12087,7	38,55
2010	1514,6	6904,6	21,94	12433,8	461,7	19,69	2773,0	14987,4	18,50	6180,4	14721,9	41,98
2011	1521,7	6973,7	21,82	14301,9	324,5	20,43	3243,6	17820,4	18,20	7684,3	17615,0	43,62

Source: World Bank and own calculations.

Note: CJK means China, Japan and Korea as a whole. The unit for population is million people; the unit for GDP and export & import is US\$ billion.

Foreign trade and FDI have significantly contributed to the “East Asian miracle” (World Bank, 1993). FDI has been complementary to, rather than substitute for, foreign trade expansion in East Asia over the past several decades (Kawai and Urata, 2002). Conversely, the expansion of intra-regional trade driven by FTAs has also stimulated intra-regional FDI, because the higher interdependence with foreign trade has promoted intra-regional FDI. In addition, some FTAs not only contain some terms of foreign trade, but also concern FDI liberalization.⁵³ Therefore the increasing FDI between China, Japan and Korea reflects their higher interdependence in economic growth. It requires more trade policies such as the CJK-FTA to improve intra-regional trade in East Asia.

Figure 6.10: Share of total FDI inflows and outflows in China, Japan and Korea to the world's total FDI inflows and outflows, %, 1982-2011



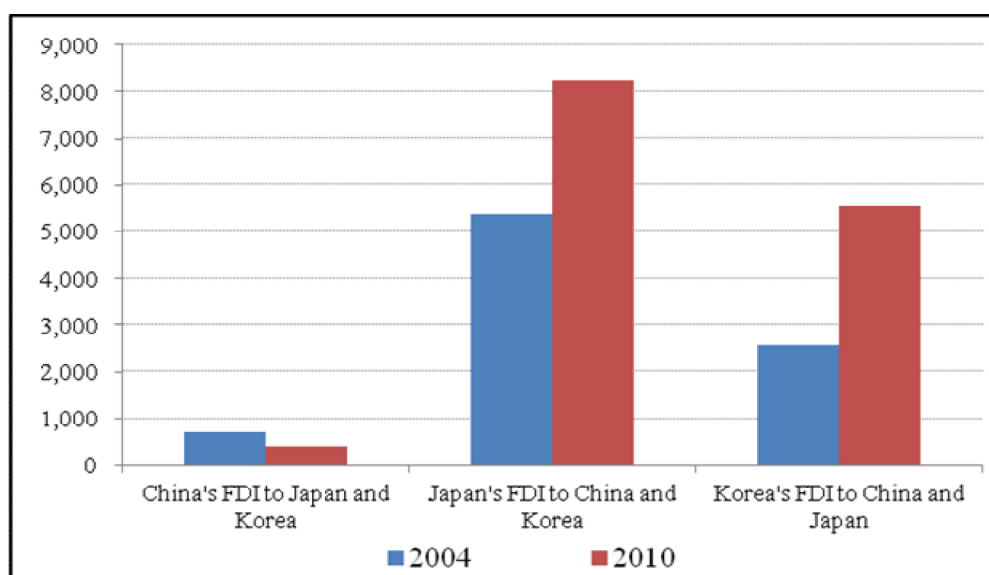
Source: World Bank and Ministry of Commerce of People's Republic of China.

China has been the largest FDI recipient country for decades until 2010. But more recently, China's outward FDI has also increased substantially, from US\$ 2.7 billion in

⁵³ Some free trade agreements are called Economic Partnership Agreements (EPAs) and include the deregulation of investments and immigration in addition to trade liberalization.

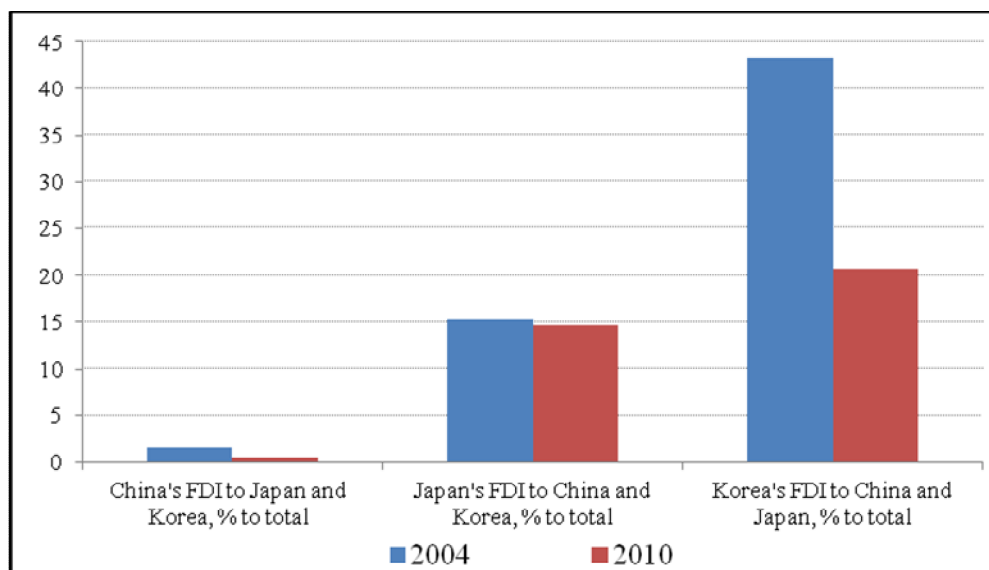
2002 to US\$ 74.65 billion in 2011.⁵⁴ Japan and Korea as the most developed economies in East Asia have been the main capital output countries. The share of total FDI inflows and outflows of the three countries to the world's total FDI has increased steadily since 2000, even though it declined in 1995-1999 (see Figure 6.10). In 2011, their shares in the world's total inward and outward FDI represented 8.5 and 9.2 per cent, respectively. Intra-regional FDI among China, Japan and Korea has also increased dramatically, except for China (see Figure 6.11). Korea's FDI in China and Japan nearly doubled between 2004 and 2010. Similarly, Japan's FDI in China and Korea grew considerably, from US\$ 5,378.80 million in 2004 to US\$ 8,226.93 million in 2010. By contrast, China's FDI in Japan and Korea declined from US\$ 704.52 million in 2004 to US\$ 418.16 million in 2010. Moreover, the share of Japan's FDI in China and Korea of its total outward FDI remained almost the same, at about 15 percent between 2004 and 2010, while Korea's share of FDI in China and Japan accounting for its total outward FDI dropped sharply, from 43.25 to 20.75 per cent, during the period of 2004 to 2010. Finally, the percentage of China's FDI in Japan and Korea of its total outward FDI also dropped, from 1.57 to 0.55 per cent, during the same period. It is notable that the share of Korea's inward and outward FDI in the other two countries was much higher than the comparable figures for Japan and China. This reflects that China has been Japan's and Korea's main investment target country over the past decade. But the majority of China's investment went to South America, Africa and Australia, which are natural resources-rich regions, rather than to Japan and Korea. FDI inflows from Japan and Korea have significantly contributed to China's economic growth through promoting China's FDI-induced exports and improving the productivity over the past several decades. Meanwhile, the Japanese and Korean economies also benefited considerably from China's huge market and economic growth.

Figure 6.11: Intra-regional FDI of China, Japan and Korea, in 2004 and 2010
Amount of intra-regional FDI, in US\$ million



⁵⁴ See 2011 Statistical Bulletin of China's Outward Foreign Direct Investment from the Ministry of Commerce of the People's Republic of China.

Share of total outward FDI (in %)



Source: OECD and 2010 Statistical Bulletin of China's Outward Foreign Direct Investment, Ministry of Commerce of the People's Republic of China.

Intra-regional trade among China, Japan and Korea has grown considerably over the last decade. China has become both Japan's and Korea's biggest trading partner. China's exports to Japan and Korea reached US\$ 270.49 billion in 2011, up from US\$ 101.32 billion in 2004, which is more than double, although the share of China's exports to Japan and Korea from China's total exports dropped from 17.08 per cent in 2004 to 12.03 per cent in 2011 (see Table 6.9). This is mainly so because bilateral trade between China and the EU increased significantly during that period. The EU has become China's largest trading partner since 2004. By contrast, Japan's exports to China and Korea grew substantially, from US\$ 118.02 billion in 2004 to US\$ 227.33 billion in 2011. Its share also increased from 20.90 per cent in 2004 to 27.70 per cent in 2011. Exports from Korea to China and Japan jumped to US\$ 173.90 billion in 2011, compared to US\$ 84.26 billion in 2004. The share of Korea's exports to the other two countries remained stable, at about 26 per cent, between 2004 and 2011. In addition, we can see from Table 3 that, in terms of foreign trade, China, Japan and Korea are all important for each other. The dynamics of trade and FDI among the three countries over the past decade implies that the CJK-FTA negotiation is a crucial step for China, Japan and Korea to expand their intra-regional trade and to strengthen their competitiveness in the global market.

Table 6.9: Intra-regional trade between China, Japan and Korea in 2004 and 2011

	2004			2011		
	Japan & Korea	China & Korea	China & Japan	Japan & Korea	China & Korea	China & Japan

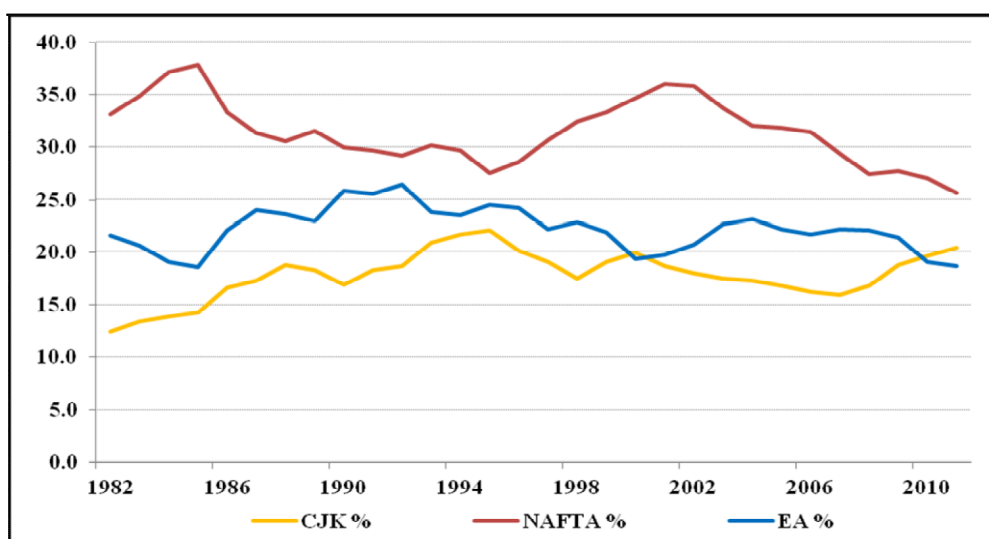
China's exports to	101.32 (17.08%)	-	-	270.49 (12.03%)	-	-
Japan's exports to	-	118.02 (20.90%)	-	-	227.33 (27.70%)	-
Korea's exports to	-	-	84.26 (26.83%)	-	-	173.90 (26.15%)

Source: Japan External Trade Organization, National Bureau of Statistics of China, Country Report of Ministry of Commerce of People's Republic of China, World Bank and own calculations.

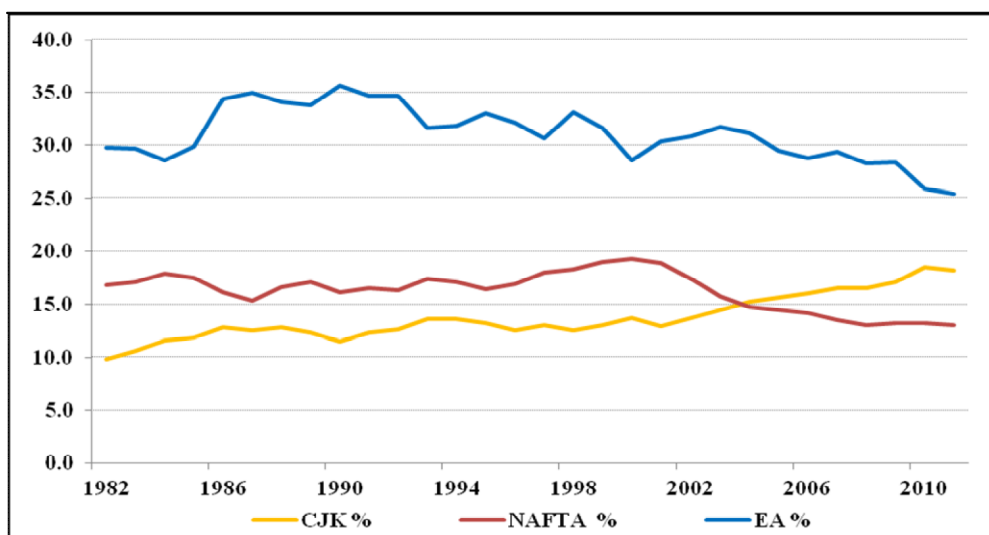
Notes: total value of each country's exports to other two countries, in billion US\$; percentage in brackets represents share of country's total exports.

Comparing with the Euro Area (EA) and North American Free Trade Area (NAFTA), two of the largest existing free trade areas in the world, the forthcoming CJK-FTA also illustrates the tremendous potential to become another large free trade area in the world. Figure 6.12 shows that the CJK-FTA is comparable to both the EA and NAFTA in terms of economic size and trade volume. The GDP of China, Japan and Korea together accounts for 20.43 per cent of the world's total output in 2011, which is less than the 25.70 per cent of NAFTA but higher than the EA's share, which is 18.68 per cent. What is more, the share of the EA's and NFATA's GDP of the world's total GDP has declined since 2003-2004. The CJK-FTA's total GDP share, however, has shown a strong upward trend since 2007. For exports, the share of the three countries' exports together from among the world's total exports continuously grew, from 1982 to 2011, in stark contrast with the decline of both the EA's and NAFTA's respective shares. In 2011, compared to the 12.99 per cent of NAFTA and the 25.45 per cent of the EA, the share of China's, Japan's and Korea's exports together accounted for 18.20 per cent of the world's total export volume. The above analysis clearly shows that the economic interdependence between China, Japan and Korea has been significantly enhanced through global production networks and the international trade system over the past several decades. The establishment of the CJK-FTA would thus significantly impact on the Asian and worldwide economy through further increasing intra-regional trade between China, Japan and Korea.

Figure 6.12: Comparison of CJK-FTA, EA and NAFTA
Share of (combined) GDP from the world's total GDP



Share of exports from the world's total exports



Source: World Bank and own calculations.

Note: The CJK represents China, Japan and Korea combined.

China, Japan and Korea, the three largest economies in East Asia, are still export-oriented economies. They are committed to expanding their share of foreign trade and enhancing their participation in global supply chains and production networks to sustain economic growth. FTAs, as a way to liberalize trade, are especially meaningful for these three countries. Over the past decades, these three countries have been the most active participants in the Asian FTA development. China has signed 12 FTAs with other countries up to September 2012 (see Table 6.10). Currently, there are six FTAs under negotiation. In addition, seven FTAs have been proposed to be discussed between China and other countries. Japan is also a very active FTA participant country; FTA studies were conducted much earlier than in other Asian countries. Until September 2012, Japan has implemented 13 FTAs (one FTA was signed but is not yet in force). Also, two FTAs are under negotiation and eight FTAs are proposed or being

studied. Korea has signed nine FTAs (one FTA was signed but is not yet in force). More strikingly, there are more FTAs that are being proposed or negotiated (seven FTAs are under negotiation and eight FTAs are proposed/under consultation and study). Finally, in Asia as a whole, more than 100 FTAs have been concluded and more and more FTAs are under negotiation or were proposed until September 2012. This shows us that FTAs are expanding rapidly in Asia.

Table 6.10: China, Japan and Korea's FTAs at different stage of development

	Proposed/Under Consultation and Study	Under Negotiation		Concluded		Total
		(FA) Signed/FTA under Negotiation	Under Negotiation	Signed but not yet In Effect	Signed and In Effect	
China	7	2	4	0	12	25
Japan	8	0	2	1	12	23
Korea	16	2	5	1	8	32
Asia	72	14	43	29	92	250

Source: Asia Regional Integration Center, Asia Development Bank, until September 2012.

Note: Asian FTAs are those FTAs engaged with by any of the 48 ADB member countries in the Asia-Pacific region with another country or economic bloc within or outside that region.

The three countries are both the key and most active participants in the process of Asian FTA development. China, the largest economy in Asia, has signed 12 FTAs until September 2012 (see Table 6.11). Besides the 'Closer Economic Partnership Arrangement' with Hong Kong and Macau (signed in 2004) and the 'Economic Cooperation Framework Agreement' with Taiwan (2010), China also signed FTAs with its most important trading partners, the ASEAN and some ASEAN member countries. In addition, China also signed non-Asian FTAs with Chile (2006), Costa Rica (2011), Peru (2010) and New Zealand (2008). Japan seems to put more attention on ASEAN member countries. Eight of Japan's 12 Economic Partnership Agreements (EPAs) or FTAs are with ASEAN and ASEAN member countries. Moreover, Japan implemented EPAs with Chile (2007), India (2011), Mexico (2005) and Switzerland (2009). Korea, which is the fourth largest economy in Asia, has signed only nine FTAs, less than other two countries. However, Korea has signed FTAs with the US and the EU, which are the largest economies in the world. The US and the EU, as the main importers, are crucial trading partners for Asian export countries such as China and Japan. We find that China, Japan and Korea have all adopted active FTAs strategies. Partly this is because the three countries have used FTAs as a strategic tool to strengthen their relationships with their trading partners, such as ASEAN member countries (Urata, 2004: 7-10). A bilateral FTA between any two of these three countries would force the third country to join because no country wishes to be excluded from the regional market.

Table 6.11: List of all bilateral and plurilateral FTAs with China, Japan and Korea

	Free Trade Agreements signed and in effect	Date of signed and in effect
China	China and Chile FTA	01 Oct., 2006
	China and Costa Rica FTA	01 Aug., 2011
	China and Hong Kong Closer Economic Partnership Arrangement	01 Jan., 2004
	China and Macau Closer Economic Partnership Arrangement	01 Jan., 2004
	China and Pakistan FTA	01 Jul., 2007
	China and Peru FTA	01 Mar. 2010
	China and Singapore FTA	01. Jan., 2009
	China and Taiwan Economic Cooperation Framework Agreement	12 Sep., 2010
	China and Thailand FTA	01 Oct., 2003
	Asia-Pacific Trade Agreement	17 Jun., 1976
	ASEAN and China Comprehensive Economic Cooperation Agreement	01 Jul., 2005
	New Zealand and China FTA	01 Oct., 2008
Japan	Japan and Brunei FTA	31 Jun., 2008
	Japan and Chile Economic Partnership Agreement	03 Sep., 2007
	Japan and India Comprehensive Economic Partnership Agreement	01 Aug., 2011
	Japan and Indonesia Economic Partnership Agreement	01 Jul., 2008
	Japan and Malaysia Economic Partnership Agreement	13 Jul., 2006
	Japan and Mexico Economic Partnership Agreement	01 Apr., 2005
	Japan and Philippines Economic Partnership Agreement	11 Dec., 2008
	Japan and Singapore Economic Agreement for a New-Age Partnership	30 Nov., 2002
	Japan and Switzerland Economic Partnership Agreement	02 Sep., 2009
	Japan and Thailand Economic Partnership Agreement	01 Nov., 2007
	Japan and Vietnam Economic Partnership Agreement	01 Oct., 2009
	ASEAN and Japan Comprehensive Economic Partnership	01 Dec., 2008
Korea	Korea and Chile FTA	01 Apr., 2004
	Korea and European Free Trade Association FTA	01 Sep., 2006
	Korea and European Union FTA	01 Jul., 2011
	Korea and Peru FTA	01 Aug., 2011
	Korea and Singapore FTA	02 Mar., 2006
	Asia-Pacific Trade Agreement	17 Jun., 1976
	ASEAN and Korea Comprehensive Economic Cooperation Agreement	01 Jun., 2007
	India and Korea Comprehensive Economic Partnership Agreement	01 Jan., 2010

Source: Asia Regional Integration Center, Asian Development Bank, until September 2012.

Note: Lists the Free Trade Agreements engaged into by China, Japan and Korea with another country or economic bloc within or outside the region.

6.9.2.3 Prospects for the CJK-FTA

China, Japan and Korea are still export-oriented economies which account for around 20 per cent of the world's total exports. The CJK-FTA would help the three countries to further enhance their competitiveness in the global market through improving trade volume and FDI, thereby maintaining economic growth. More particularly, China's economic growth benefited considerably from the trade liberalization after joining the World Trade Organization (WTO) in 2001. The CJK-FTA would allow China to expand its trade volume with other two countries, which are two

of China's largest trading partners. For Japan, FTAs are expected to work as a catalyst for economic growth because Japan has experienced a sluggish economy for decades. To maintain Japan's international competitiveness and stimulate economic growth, the Japanese government needs to undertake a structural reform of its economic system (Urata, 2005: 8). The CJK-FTA, applying external pressure, could contribute to such a reform. Korea's economy finally showed quite high a flexibility and resilience during the periods of both the 1997 Asia Financial Crisis and the 2008 Global Financial Crisis. Most studies on FTAs show that Korea benefits more from East Asian FTAs than China and Japan (Lee *et al.*, 2007: 37-43 and Abe, 2007: 13-21). After establishing FTAs with ASEAN, the EU and the US, to conclude FTAs with China and Japan, Korea's two very important neighbors and trading partners, is Korea's next strategic goal.

The empirical literature assesses the macroeconomic impact of FTAs on economic growth and trade volume by applying the CGE model, which is the most widely used model in FTA analysis. The Global Trade Analysis Project's (GTAP) various databases have been employed in CGE model studies related to FTA analysis. But the relatively new CJK-FTA has not been extensively studied. Table 6.12 lists recent studies of the CJK-FTA by applying the CGE model and GTAP's database. We can easily conclude that the Korean economy would gain the most from the CJK-FTA in terms of GDP growth. Meanwhile, the impact of the CJK-FTA on China's exports and imports seems to be bigger than that on Japanese and Korean trade. The effect of the CJK-FTA on Japan would also be smaller than for the other two countries in term of GDP growth and trade volume. In previous simulation studies on the CJK-FTA we also find that the CJK-FTA would expand the trade volume and increase economic growth in all three countries.

Table 6.12: Previous studies of the macroeconomic impact of the CJK-FTA, using the CGE model

Papers	Database used for analysis	Aggregation of regions and sectors	Findings (complete liberalization)
Lee, Choi and Park (2003)	GTAP database: version 5.0 (1997)	8 regions and 17 sectors	GDP, %: China: 2.31; Japan: 0.93 and Korea: 2.25 Welfare, %: China: 0.97; Japan: 0.48 and Korea: 3.55
Lee <i>et al.</i> (2005)	GTAP database: version 6.0 (2001)	-	GDP, %: China: 1.54; Japan: 1.21 and Korea: 5.15 Welfare, %: China: 0.69; Japan: 0.28 and Korea: 3.45 Exports, %: China: 12.18; Japan: 5.19 and Korea: 9.77 Imports, %: China: 16.28; Japan: 5.82 and Korea: 10.62
Abe (2007)	GTAP database: version 6.0 (2001)	24 regions and 25 sectors	Welfare, US\$ mn: China: 4,789; Japan: 5,398 and Korea: 14,163
Yoon, Gong and Yeo (2009)	GTAP database: version 6.0 (2001)	6 regions and 12 sectors	GDP percentage change: China: 0.60; Japan: 0.99 and Korea: 2.53 Exports, %: China: 5.98; Japan: 2.13 and Korea: 3.17 Imports, %: China: 8.37; Japan: 4.58 and Korea: 5.98

			Welfare (equivalent variation), US\$ mn: China: 3,595.32; Japan: 5,938.79 and Korea: 6,133.04 Terms of Trade, %: China: -0.24; Japan: 1.07 and Korea: 1.20
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Source: Author's summary.

Note: See Baldwin and Venables (1995) for the impacts on national welfare.

In addition to the macroeconomic impact of the CJK-FTA on the three countries, wider geopolitical factors need to be carefully considered, too. China, Japan and Korea are the most important economic and political powers in East Asia. Each of the three countries looks at FTAs as an important strategic tool to strengthen its influence in East Asia, which is one of the most important growth engines of world economy. The recent completion of bilateral FTA negotiations between ASEAN & China, ASEAN & Japan and ASEAN & Korea is evidence for this. For China, East Asia is not only a destination of its exports but also the supplier of energy and other natural resources. Japan and Korea do not provide China with natural resources. However, China imports a great deal of electronic components and other intermediate products from Japan and Korea. On the other hand, Japan and Korea, like China, also considers FTAs as a strategic tool to establish a stable market network to compete in the global market. Furthermore, in addition to being a powerful neighbor, China's huge market and economic potential are very attractive for Japan and Korea to promote exports to China. Therefore, the establishment of the CJK-FTA would meet the three countries' strategic goals both economically and politically.

6.9.2.4 Challenges to the CJK-FTA

However, the CJK-FTA negotiation is not a smooth process, but plastered with many economic and political obstacles. The three governments will encounter fierce opposition in their own countries. China's high-tech and manufacturing sectors, particularly the automobile industry, are relatively less developed and vulnerable compared to those in Japan and Korea. China's government would try to protect its automobile industry in the CJK-FTA negotiation. On the other hand, Japan's agricultural sector is always sensitive when Japan negotiates FTAs with other countries. Opposition from labor unions in Japan is another challenge for the Japanese government. Finally, Korea, in addition to having an agricultural sector that is less competitive than that of China, is also concerned by its excessive dependence on China's market and Japan's core components and technology. Nevertheless, Korea has showed more interest in a bilateral FTA with China, which is Korea's largest trading partner. Korea is reluctant to enter into a bilateral FTA with Japan because of the similarity in industrial structure and its own relative competitiveness advantage over Japan. Thus the CJK-FTA will be more difficult to be established than any bilateral FTA between two of the three countries.

The emerging Trans-Pacific Partnership (TPP), which involves nine countries from the Asia-Pacific area, has added further complications to the CJK-FTA negotiation. Japan and Korea expressed enthusiasm to join the US dominated TPP to strengthen ties with other Asia-Pacific countries, especially with the US. Korea has already signed FTAs with most of the TPP countries. So it will not be overly complicated for Korea to join the TPP talks. Japan also showed its willingness to participate in the TPP talks and became an observer in 2010. It seems that China is excluded from the TPP at the current

stage. China apparently showed only a passive attitude to joining the TPP talks. This is partly so because China regards the TPP as part of the US “Return to Asia” strategy to enhance its economic influence in East Asia. Instead, China was more actively involved in CJK-FTA and FTA+6⁵⁵ talks to counteract the effect of its exclusion from the TPP. But China also understands that it cannot remain an outsider to this trans-Pacific free trade area forever, especially not once the TPP comes into effect. On the other hand, none of TPP participant countries can ignore China’s huge market and economic potential. Each of the three countries has adopted a different strategy during the TPP and CJK-FTA preparation. Together, they could use the CJK-FTA negotiation to strengthen their bargaining power in the TPP talks. In the same way, the TPP talks may ultimately change the three countries’ strategies in the CJK-FTA negotiations. Thus the TPP talks render the CJK-FTA negotiations more complicated.

In reality, however, political economy considerations significantly affect the process of CJK-FTA negotiations. Recent territorial disputes between the three countries about islands in the East China Sea and the Sea of Japan underline the uncertainty and difficulties of FTA negotiations. Historical conflicts, political distrust and territorial disputes among China, Japan and Korea will always haunt the three countries in the foreseeable future. This inevitably hinders the process of CJK-FTA negotiation. In addition, differences as regards the political system are another factor which could impair the negotiation of the CJK-FTA. But, in the long term, the three countries need to enhance their economic cooperation to eventually achieve economic integration and political understanding. Europe’s successful experience as regards economic and political integration proves that economic integration improves mutual understanding and political cooperation. Thus the CJK-FTA could be expected to play a positive role in enhancing the economic and political ties in East Asia.

The emerging CJK-FTA provides new evidence that Asian countries are seeking to deepen their economic integration by applying FTAs as a policy tool to achieve sustainable economic growth. Empirical studies and policy analyses illustrate that the CJK-FTA would expand the intra-regional trade volume and stimulate economic growth in all the three countries. However, given the tremendous differences in economic structure and development stage among the three countries, as well as political economy considerations, the CJK-FTA negotiation will not be a smooth process. In order to identify winners and losers in each industry in each of the three countries, a sector-based assessment is needed. It is necessary and important for the three countries to adopt a more pragmatic and practical strategy in the CJK-FTA negotiations to create a win-win-win situation.

6.9.3 What Is Meaning of RMB Internationalization for East Asian Integration?

After rapid economic growth for decades, China’s economy has been tightly integrated into the world economy, especially into East Asian economy. From this

⁵⁵ Japan supports the ASEAN+6 FTA comprises the 10 ASEAN member nations and China, Japan, South Korea, Australia, New Zealand and India. While China proposed and strongly supports ASEAN+3 FTA (the ten ASEAN member nations and China, Japan and South Korea). But recently China presented more flexibility and showed more interest in the ASEAN+6 FTA and the CJK-FTA.

perspective, the internationalization of the RMB is not only China's efforts to promote RMB's status in the global financial system, but also an opportunity for the ongoing East Asian regional integration. RMB internationalization is being promoted under the background of deepening regional economic and financial integration in East Asia. Therefore, the significance of an international RMB for East Asian regional integration needs to be analyzed.

East Asian economic integration is mainly driven by market forces. Intra-regional trade and investment in East Asia has significantly strengthened economic interdependence among East Asian countries. Currently, the US dollar is still the dominant currency in East Asia's trade settlement and financial transactions, although the Japanese yen and the euro also are used. Trade settlement in local currencies would reduce exchange rate risks and transaction costs, thereby boosting bilateral trade between countries whose currencies are used as a settlement currency. There is great potential to use the major East Asian currencies to settle intra-regional trade in East Asia. In addition to the Japanese yen, the RMB is a relatively strong and stable currency, which could be used as a regional settlement and invoicing currency in intra-regional trade. In 2012, China is ASEAN's the largest trading partner, while ASEAN is China's the third largest trading partner. Moreover, China is both Japan and Korea's the biggest trading partner. China has made significant progress in promoting RMB use in China's cross-border trade. According to the PBoC and the HKMA, the amount of RMB settlement in cross-border trade increased more than five times, totaling yuan 2,940 billion in 2012 from about yuan 500 billion in 2010 (see Figure 6.2). It indicates that a widely-used RMB could help increase bilateral trade between China and other East Asian countries, thereby strengthening East Asia's position as the "world factory". Therefore, an international RMB could be a vehicle to deepen East Asian economic integration.

Compared with economic integration, financial integration in East Asia is a top-down process triggered by the Asian Financial Crisis of 1997 which exposed vulnerability of East Asian financial markets. The recent global financial crisis highlighted again that East Asian countries need tightly financial cooperation to against possible financial crisis and maintain financial system stability. China has deeply participated in the process of East Asian financial integration such as the CMIM and the ABMI. The internationalization of the RMB requires Chinese authorities to promote RMB's regional status in East Asia by adopting cooperative policy with other East Asian countries. Therefore, RMB internationalization could motivate China to participate in establishment of the East Asian financial safety net more deeply, thereby indirectly promoting regional financial integration.

An international RMB would play a more important role in the process of East Asian monetary integration. Currently, the most of East Asian countries unilaterally peg their currencies to the US dollar or various the US dollar-denominated currency baskets. Nevertheless, excessive fluctuation of exchange rate severely impacted on trade and economic growth of East Asian economies, especially in the period of financial crisis. Regional exchange rate policy coordination has been extensively discussed, although little progress has been made. It is widely believed that cooperative exchange rate policy is necessary and important for East Asian countries to keep their international

competitiveness and achieve sustainable economic growth, given the fact that the most of them are export-driven economies. Due to political and economic considerations, it may take long time to establish an exchange rate policy coordination mechanism in East Asia. However, an internationalized RMB could provide East Asia a regional currency to foster a common currency basket for East Asian currencies pegging. With expansion of RMB use in trade and investment in the region, the RMB has demonstrated great potential to become a regional currency like the Japanese yen in the short or medium term. Therefore, the internationalization of the RMB would positively influence the intra-regional exchange rate policy cooperation and promote regional monetary integration in East Asia.

China is committed to developing Shanghai to become an international financial center and RMB business center by 2020. The China (Shanghai) Pilot Free Trade Zone, which was launched in September 2013, entitled Shanghai to implement some special policies such as free floating exchange rate, full convertibility of the RMB and so on in the zone. The main purpose of the Zone is to promote RMB internationalization and status of Shanghai as an international financial center. However, RMB internationalization also provides some East Asian international financial cities such as Hong Kong SAR, Singapore, Tokyo and Taipei an opportunity to expand the scope of their financial services, thereby strengthening their international competitiveness as an international financial center in the world. Demands for RMB business services in trade and investments have been increasing considerably since Chinese authorities accelerated RMB internationalization. Due to special relationship with the Mainland, Hong Kong SAR has become the premier offshore RMB businesses center in the world, which accounted for around 80 per cent of RMB cross-border trade settlement and the most of Dim Sum bond issuances in 2013. RMB internationalization significantly enhanced Hong Kong SAR's position as the gate to the Mainland and an international financial center. In addition, China established an RMB clearing bank in Singapore in 2013, signaling that Singapore could be another offshore RMB hub in East Asia. In contrast to Hong Kong SAR, Singapore hosts many subsidiaries of Southeast Asian enterprises as their operation and settlement centers. Some of these enterprises have established extensive businesses and investments in the Mainland of China. Being offshore RMB center will attract more Southeast Asian enterprises to invest in Singapore for cheap RMB loans and doing the RMB related businesses conveniently. More importantly, in the long term, it would help enhance Singapore's status as a regional and global financial center. More recently, Bank of China, Taipei branch as the RMB clearing bank officially launched the RMB business services in February 2013. One of advantages of Taipei as an offshore RMB business center is that there is a great deal of Taiwanese investment in the Mainland. It would not only promote the bilateral trade and investments between two the sides, but also raise Taipei's status as a regional financial center. Other East Asian cities, like Tokyo and Seoul, also showed interest in providing RMB business services. Thus, RMB internationalization will create an opportunity for East Asian financial cities to enhance their international influence as international financial centers.

6.9.4 How to integrate RMB internationalization with East Asian economic and financial integration?

As discussed early, East Asia has achieved remarkable progress in regional integration since the end of 1990s. Under the ASEAN+3 framework, East Asian countries are committed to strengthening regional cooperation in the areas of trade and financial coordination to deepen regional economic and financial integration. Given China's increasing economic influence and expansion of RMB use in East Asian area, ongoing RMB internationalization could play as a new vehicle for East Asia deepening regional integration. In turn, a deeply integrated East Asia would provide a broad foundation for China to raise the RMB's status as an international currency, at least as a regional currency in East Asia. Therefore, RMB internationalization strategy and path should be coordinated with China's strategy in participating in East Asian regional integration. In this regard, there are couples of measures Chinese authorities could take to promote RMB regionalization.

(1) RMB regionalization and East Asian economic integration

In the process of East Asian regional economic integration, FTA as a trade policy instrument has played a unique role through boosting East Asian countries' exports and enhancing intra-regional trade. China is one of active participating countries in the process of East Asian FTAs development. Until September 2012, China has signed 12 FTAs, of which 8 FTAs are with East Asian economies. The emerging trilateral FTA negotiation between China, Japan and Korea (the CJK-FTA) is new evidence, showing that China is seeking to deepen its economic integration with other East Asian countries to achieve sustainable economic growth. East Asian countries including Japan, Korea and ASEAN countries are China's main trading partners. In 2012, ASEAN as a whole is China's the third largest trading partner with US\$ 400.09 billion of bilateral trade, which accounted for 10.3 per cent of China's total trade. Meanwhile, trade value of China-Japan and China-Korea reached US\$ 329.45 billion and US\$ 215.11 billion, which represented 8.5 and 5.5 per cent of China's total trade, respectively. A more integrated East Asia would provide China a large and solid economic base for regionalizing the RMB.

Rapidly growing FTAs with East Asian countries give China an important vehicle to promote RMB's status in the region. China should take advantage of FTA as a vehicle to expand RMB use in intra-regional trade in East Asia. To do that, China could adopt a more flexible strategy in FTAs negotiation. In FTAs negotiation, China may consider to bind agreement of using local currencies as invoicing and settlement currencies to FTAs. The ongoing CJK-FTA negotiation is an opportunity for China to promote RMB use in trade and investments with two of the most developed countries in East Asia. Additionally, China has experienced trade deficit with Korea and most of ASEAN countries for many years. With growth of RMB use in trade settlement between China and these countries, more and more RMB assets were accumulated in their balance sheets. China needs to widen investment channels for these offshore RMB recycling to the Mainland of China. Only could offshore RMB freely flow back to the Mainland through various investment channels, will the RMB be more acceptable for China's East Asian neighbors.

(2) RMB regionalization and East Asian financial integration

On the financial side, the CMIM and the ABMI were designed to prevent financial disability in the period of financial crisis. However, the recent financial crisis exposed several weaknesses in the current East Asian financial safety net. In addition to problems existing in institutional structure of the CMIM, it was proved that the CMIM is not adequate to provide liquidity for member countries when they need financial helps. For instance, Korea obtained liquidity supports by signing currency swap agreement with the US's Fed rather than from the CMIM, when Korea experienced liquidity shortage in 2008 (Kawai, 2010). In addition to some institutional reforms, fund of the CMIM should be expanded in order to provide enough emergency liquidity supports for its member countries during the period of financial crisis. Currently, both the RMB and the Japanese yen account for the largest shares in the CMIM, both are 32 per cent respectively. China's increasing economic weight in East Asian area enables China to take a leadership in promoting regional financial integration. China should proactively advocate enlarging the size of the CMIM. China overtook Japan as the largest Asian economy in 2010. It won't be surprised if China becomes the largest contributor to the CMIM in the near future.

By in-depth participating in the CMIM, which currently is the most well-established multilateral currency swap mechanism in East Asia, China could promote the importance of the RMB as a regional currency in East Asia. In addition to the CMIM, China has signed 19 bilateral currency swap agreements with other countries totaling about yuan 1,476 billion, which is much larger than yuan 112 billion of China's share in the CMIM. One of advantages of bilateral currency swap is that it does not link with the IMF's fund (Kawai, 2010). In addition, it is another channel for foreign central banks to receive the RMB which they need to provide their firms and financial institutions for trade and financial transactions in the RMB. Therefore, China should sign more currency swap agreements with East Asian countries so as to promote the RMB's regional status in East Asia.

According to the new ABMI (2008), the ASEAN+3 encourages its member countries to further develop their own local currency-denominated bond markets. In addition, in the long term, East Asia seeks to establish a regional bond market which is more accessible for bond issuers and investors. China should actively support and participate in development of the ABMI. It will significantly expand presence of the RMB in East Asia's capital markets. More RMB-denominated bonds issued in East Asia will significantly promote RMB regionalization, thereby facilitating RMB internationalization. Currently, China's domestic RMB-denominated bond markets are closed to the most of foreign investors. Diversified characteristics of investors will improve efficiency and effectiveness of China's bond markets (Ito, 2011). The ABMI could be used as a framework to integrate China's domestic bond markets with other East Asian bond markets.

Monetary integration for East Asia is an important aspect of financial integration. The exchange rate regimes adopted by East Asian countries are various. To a certain extent, most of the emerging East Asian economies pegged their currencies to the US dollar or a US dollar-dominated currency basket at different degrees. Due to lack of exchange rate policy cooperation, East Asian countries have experienced exchange rate fluctuation during the period of financial crisis. The recent financial crisis even evoked

concerns on the “Currency War” when countries competitively devaluated their currencies in order to maintain their export competitiveness. It highlighted the importance and necessity of exchange rate policy coordination between countries, especially between East Asian countries which are mostly export-oriented economies. Exchange rate policy coordination between East Asian countries will not hurt China and other East Asian countries’ export competitiveness because they are the major exporters to the US and the EU. Indeed, relative intra-regional exchange rate stability between East Asian countries is helpful to keep export price stability, thereby avoiding competitive currency devaluation in the region. But due to political reasons, monetary integration is not policy priority for East Asian countries so far.

A common currency basket for East Asian currencies pegging is believed to be a good measure to keep intra-regional exchange rate stability in East Asia (Kawai, 2010). With the growth of China’s foreign trade with East Asian countries, the RMB has become an important reference currency for most of the East Asian currencies. As Subramanian and Kessler (2012) argued, there is already a RMB bloc in East Asia. Although there are different suggestions on composition of such common currency basket, the RMB is always included in this currency basket along with the Japanese yen. Being a component currency in East Asian common currency basket is helpful for internationalizing the RMB because one of important roles for an international currency is being an anchor currency for other currencies. Therefore, China along with Japan should push forward East Asian countries to foster a common currency basket in order to keep intra-regional exchange rate stability in East Asia.

6.10 Projection of the RMB as an International Reserve Currency

6.10.1 Introduction

There is increasing literature on RMB internationalization from suggesting the possible roadmap of RMB internationalization to forecasting the status of the RMB in the next decades (Yu 2012, Chong and Hui 2012 and Lee 2013). In this section, by applying Chinn and Frankel’s (2005) model, we attempt to examine the status of the RMB as an international reserve currency in the future. To forecast the status of the RMB in the global monetary system, this analysis focuses on the role of an international currency as a reserve currency rather than other roles. This is mainly because the data of international reserve holdings by central banks is readily available from the IMF (Figure 6.8). To extend previous studies, this analysis considers a country’s international competitiveness as a factor for determining whether a national currency could be used internationally. Competitiveness is a complex concept which includes many factors from economic to political factors. In this research, we apply the Global Competitiveness Index (GCI) from the World Economic Forum (WEF)⁵⁶ as an

⁵⁶ The World Economic Forum (WEF) launched the annual Competitiveness Report in 1979. Since then, the concept of competitiveness in their report has changed considerably. Since 2005, the World Economic Forum reported the Global Competitiveness Index (GCI) which measures the microeconomic and macroeconomic foundation of national competitiveness based on its competitiveness analysis. They define competitiveness as “the set of institutions, policies, and factors that determine the level of productivity of a country”. They group the factors which affect

explanatory variable in Chinn and Frankel's (2005) model. This is the first attempt to include international competitiveness into empirical studies of currency internationalization.

The role of a currency as an international reserve currency is the most fundamental function for an international currency (Yu, 2012). It is also applicable to the RMB. The ultimate goal of RMB internationalization is that the RMB serves as an international reserve currency in the global monetary system. In the early stage, the RMB should become regional reserve currency in East Asian area. Currently, the US dollar and the euro are the leading regional and international reserve currencies, which together accounts for more than 80 per cent of world's total official foreign exchange reserves over the last decade (see Figure 6.8). However, in the aftermath of the global financial crisis, central banks are seeking alternative currencies to diversify their foreign reserves in order to minimize the possible loss caused by exchange rate volatility of the US dollar. Some East Asian countries, Australia, Nigeria were reported to hold the RMB as a part of their foreign reserves, although there is no accurate statistics data for it. Indeed, current share of the RMB as international reserve currency is very small, however, as Eichengreen (2005) states that the RMB could catch up as another international currency in 20 to 40 years. It won't be surprised if the RMB become another international reserve currency in the coming decades, if RMB internationalization goes smoothly.

6.10.2 Comparison of current international currency issuing countries and China

According to Chinn and Frankel (2005), sizes of output and trade, financial markets, confidence in the value of the currency and network externalities are the main factors which play roles in determining the status of a currency in the global monetary system. Currently, the US dollar and the euro are the two unquestionable currencies as international currencies, while the Japanese yen, British pound sterling and Swiss franc are also regarded as internationally used currencies⁵⁷. We compare China with these existing international currency issuing countries to assess the potential of the RMB as an international currency. In particular, we pay more attention on the comparison of the non-economic factor—international competitiveness among these countries.

Patterns of output and trade:

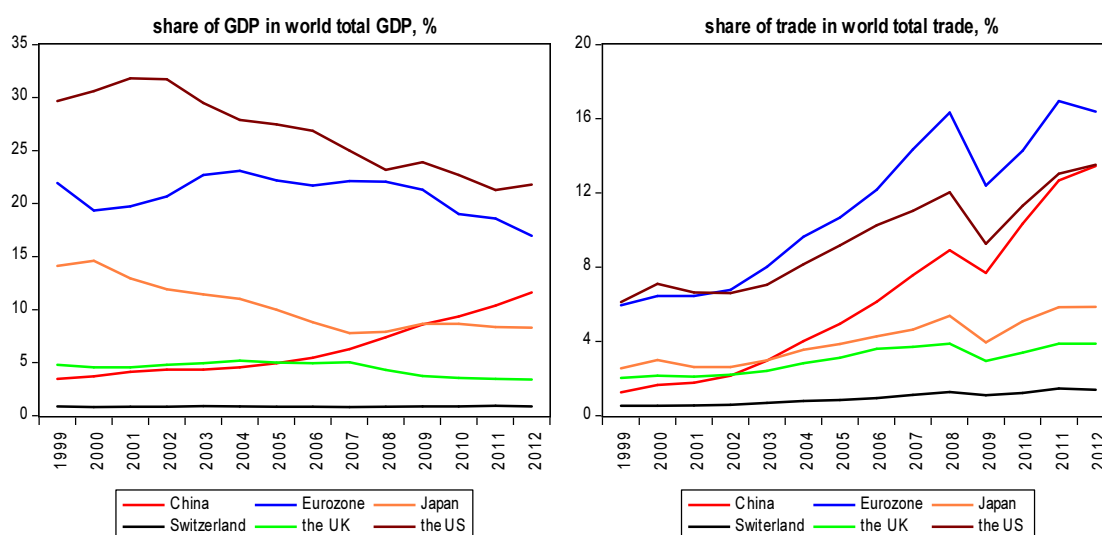
History tells us that international currency issuing countries are always dominant

competitiveness into 12 pillars: Institutions, Infrastructure, Macroeconomic environment, Health and primary education, Higher education and training, Good market efficiency, Labor Market Efficiency, Financial market development, Technological readiness, Market size, Business sophistication and Innovation. (See <http://www.weforum.org/issues/global-competitiveness>)

⁵⁷ The Australian dollar and Canadian dollar, which were used internationally in the last decade, emerged as new international currencies. The average daily turnover in foreign markets and reserve currency share in the global financial system of these two currencies are much higher than that of the RMB. But the data of reserve currency shares of Australian dollar and Canadian dollar in COFER of IMF is available only from 2012. So we do not include these two currencies in this research.

countries in the world economic and trade system. Current international currency issuing countries are the largest economies and trading countries in the world, except for Switzerland. However, after rapidly growing for three decades, China has emerged as the second largest economy and trading country in the world⁵⁸. From Figure 6.13, we can see that China's share of GDP and trade in the world has increased dramatically. It now accounts for 11.62 per cent of the world's total GDP, following the US share of 21.81 per cent and the eurozone share of 16.96 per cent in 2012. In terms of foreign trade, China's trade share in the world's total trade reached 13.46 per cent in 2012, while the eurozone and US trade shares were 16.38 and 13.51 per cent, respectively, in 2012. This evidence suggests that China has great potential to become an international currency issuing country in terms of the sizes of its economy and foreign trade.

Figure 6.13: Size of output and trade of international currency issuing countries and China, 1999–2012



Source: CEIC database.

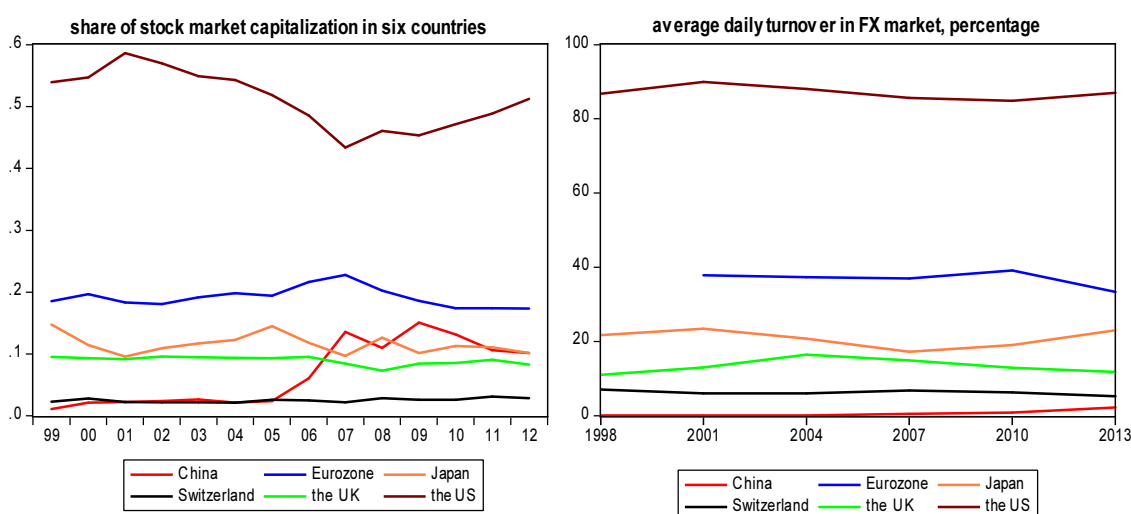
Financial markets:

Development of financial markets is another determining factor for a national currency to be used globally. China's stock market capitalization increased more than ten times from US\$ 330.7 billion in 1999 to US\$ 3,697.4 billion in 2012. Compared with other international currency issuing countries, China's share of stock market capitalization accounted for 10.15 per cent in the total stock market capitalization of five international currency issuing countries and China, which is slightly higher than the 10.11 per cent of Japan, but still much lower than the US at 21.25 per cent and the eurozone at 17.32 per cent in 2013 (see Figure 6.14). Another indicator measuring the

⁵⁸ Some statistics showed that China surpassed the US to become the largest trading country in 2012. But according to the CEIC's data, China's total foreign trade was US\$ 3.867 trillion in 2012, slightly lower than that of the US, which was US\$ 3.881 trillion.

size of financial markets is foreign exchange market turnover. Figure 3 indicates that the RMB's share of average daily turnover in the world's total exchange market turnover reached 2.24 per cent and ranked ninth in the world in 2013. Although Chinese financial markets are still relatively shallow and immature, rapid growth of China's stock market capitalization and RMB turnover in foreign exchange markets imply that more foreign investors and central banks could conduct investments and financial transactions in the RMB, thereby improving the status of the RMB as an international currency.

Figure 6.14: Financial markets of international currency issuing countries and China, 1999–2012



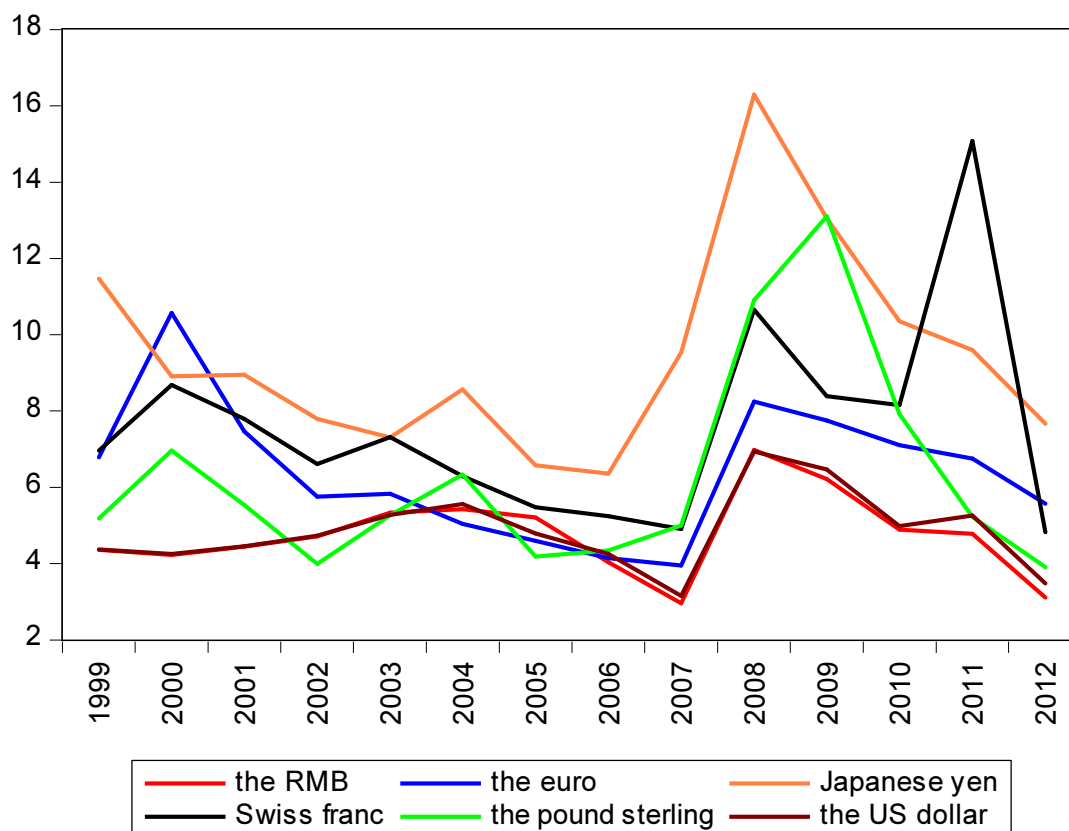
Source: BIS and CEIC database.

Confidence in the value of the currency:

According to Chinn and Frankel (2005), it seems that declining status as an international currency is associated with currency depreciation. The euro appeared to rival the US dollar as the leading international currency when the euro's value was stronger against the US dollar. The RMB exchange rate has been in the upward trend since July 1997, except for the period during the global financial crisis (see Figure 2.2). One of reasons for the RMB appreciation is the growing demand for the RMB in trade, financial transactions and foreign reserves management. Exchange rate volatility also affects the status of a currency as reserve currency. Chong and Hui (2011) show that there is a negative relation between reserve currency share and exchange rate volatility. In other words, higher volatility of an exchange rate means a lower reserve currency share of the currency. But other previous studies do not find that exchange rate volatility significantly impacts reserve currency share. Figure 6.15 depicts exchange rate volatility of five international currency issuing countries and China over the period of 1994–2012. We can see that exchange rate volatility of the RMB is much lower than that of the Japanese yen, British pound sterling and Swiss franc, and similar to that of the euro and the US dollar. The upward trend and relatively lower exchange rate volatility of the

RMB imply that the increasing confidence in the RMB would facilitate it to be used more globally.

Figure 6.15: Exchange rate volatility: standard deviation of daily percentage change of nominal exchange rate, against SDR, 1999–2012



Source: The IMF database.

Network externalities:

Chinn and Frankel (2005) point out that there is strong inertia in the process of substitution of international currencies. Due to the effect of economies of scale, a new international currency replacing an old one would be a slow and long process at the early stage—this is called network externalities. Change of the international currency from one currency to another one will be lagged for years. This happened to the pound sterling when the US dollar overtook it as the leading international currency. However, in the latter stages, the shift to the new international currency would be very fast due to the “tipping phenomenon”. In other words, there would be more individuals or countries to use the new international currency when it is used by everyone else (Chinn and Frankel 2005). The RMB is still in the very early stage of internationalization (Eichengreen 2010, Yu 2012 and Cui 2013). Thus it would take decades for the RMB to become an international currency, especially an international reserve currency.

Political power and prestige:

In addition to the above economic factors, political economic factors as possible determinants of an international currency need to be carefully considered. One of the benefits of issuing an international currency is gaining political power and prestige (Chinn and Frankel, 2005 and Frankel, 2011). This happened to the pound sterling in the past and the US dollar now. The inverse causality also holds. A currency from an economically and politically powerful country is more likely to become an international currency. Chong and Hui (2011) find that the ratio of military expenditure to GDP and the political stability index are significant in determining the status of a currency as an international reserve currency on the world stage. In this research, we will examine whether the international competitiveness, which has not been examined in previous studies, is a determining factor for the international use of a national currency.

6.10.3 Data and methodology

6.10.3.1 Data

Due to data constraints, this analysis refers to five international currency issuing economies: the US, the eurozone, Japan, the UK and Switzerland covering the period of 1999–2012 to project the RMB's share as a reserve currency in the global monetary system in the coming decades. These currencies are used globally and are widely regarded as international currencies. Data of reserve currency shares held by central banks is from the Currency Composition of Foreign Exchange Reserves (COFER) database of the IMF.⁵⁹ Data of foreign exchange market turnover is from the Bank for International Settlements (BIS). The rest of the data is from the CEIC database.

6.10.3.2 Methodology

The determinants of reserve currency share have been extensively discussed. According to Chinn and Frankel (2005), there are four factors in determining the status of reserve currency: size of output and trade, size and breadth of financial markets, currency volatility, and network externalities. Based on the model of Chinn and Frankel (2005), various combinations of determining factors have been tested in forecasting the RMB's share as a reserve currency (Chen and Peng 2007, Lee 2013 and Chong and Hui 2011). Chen and Peng (2007) apply GDP share, trade share, inflation rate differential, stock market capitalization, exchange rate volatility and lagged reserve currency share

⁵⁹ Since 2005, the IMF reported the quarterly data on the currency composition of official foreign exchange reserves (COFER). The currencies identified in the COFER are: the US dollar, the euro, pound sterling, Japanese yen, Swiss franc, Canadian dollar and Australian dollar. But data of Canadian dollar and Australian dollar is available only from the last quarter of 2012. Reserves are in the form of banknotes; bank deposits; treasury bills; other, short-and long-term, government securities; and other claims usable in the event of balance of payments needs. They don't include holdings of a currency by the issuing country.

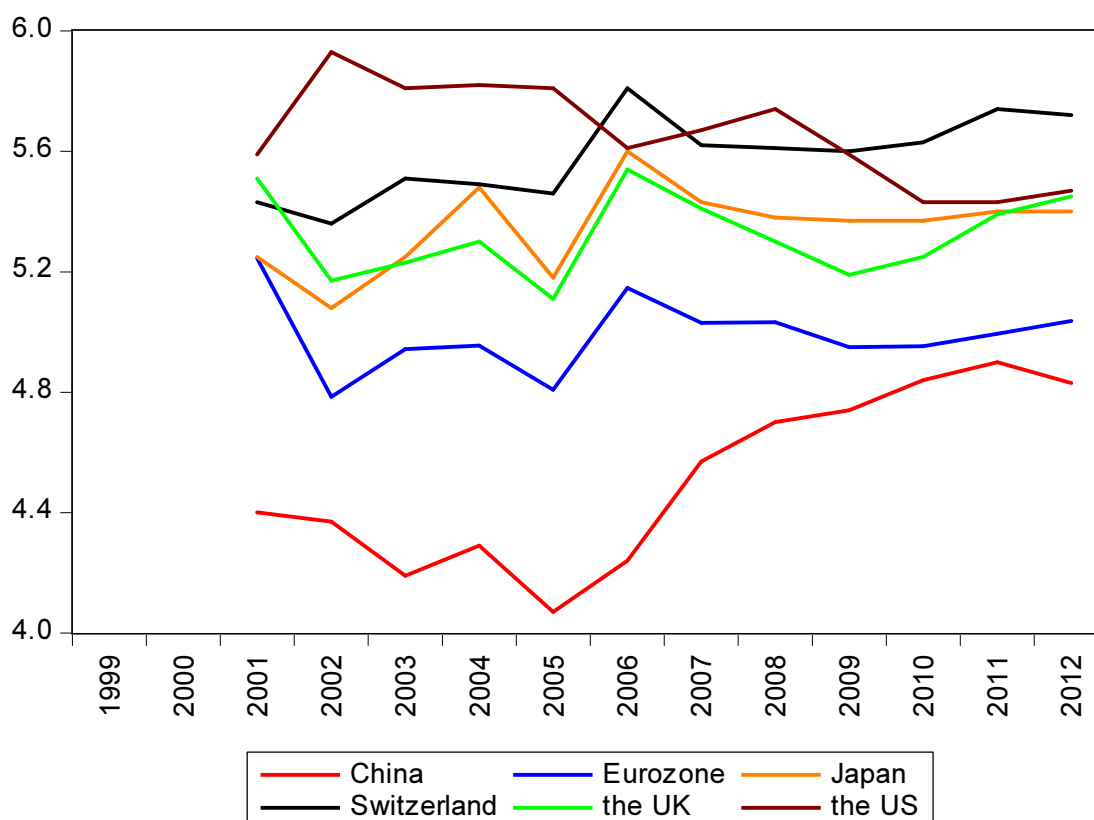
(See <http://www.imf.org/External/np/sta/cofer/eng/index.htm>)

as explanatory variables. While Lee (2013) uses GDP share, inflation differential, foreign exchange turnover, capital account openness and lagged reserve currency share in his research. Chong and Hui (2011) include more variables into Chinn and Frankel's (2005) model. But they do not include lagged reserve currency share, which was used to measure network externalities as an explanatory variable. However, they give attention to the influence of politics and military on the status of a currency as an international currency. Thus they add the ratio of military expenditure to GDP, and a political stability index as determinants into Chinn and Frankel's (2005) model. They find that most of the variables have significant effects on reserve currency share in global reserve holdings, except for stock market capitalization and exchange rate volatility. In addition, as expected, military expenditure and policy stability positively facilitates a national currency in becoming an international currency.

By simulating Chinn and Frankel (2005), this analysis includes most of the variables employed by previous studies. We use GDP share of world total GDP and trade share of total international trade to measure the size of the output and trade. Stock market capitalization and foreign exchange market turnover are used to measure the size and breadth of financial markets. In respect of confidence on the value of currency, exchange rate volatility and the inflation rate differential are used to measure it. Similarly to Chinn and Frankel (2005) and other studies, we add the lagged reserve currency share to capture the effect of network externalities. Except for Chong and Hui (2011), previous studies on the potential of the RMB as an international currency have only considered economic factors as determinants of the status of an international currency.⁶⁰ To make a contributable extension, we consider a country's international competitiveness as a determining factor that plays an important role in determining whether a currency could be used as a reserve currency. International competitiveness is a complex concept that includes many factors, from the economic to the political. In this research, we apply the Global Competitiveness Index (GCI) from the World Economic Forum (WEF) as an explanatory variable. Figure 6.16 illustrates the development of the GCI of five countries and China over the past decades. We can see that the US's competitiveness declined after 2005 although it recovered in 2007 and 2008. The competitiveness of Switzerland, the UK and China strengthened over the period. In particular, China's competitiveness improved considerably since 2005, although China is still less competitive than the other five developed economies. The eurozone and Japan's GCI remained relatively stable over the period.

Figure 6.16: The Global Competitiveness Index (GCI), 2001–2012

⁶⁰ Chong and Hui (2011) add the ratio of military expenditure to GDP and political stability index into their model.



Note: The eurozone's GIC is the GDP-weighted GCI of 17 member nations of the eurozone: Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Malta, the Netherland, Portugal, Slovakia, Slovenia and Spain (see Appendix 1).

Source: Annual Report of the Global Competitiveness Index (GCI) of World Economic Forum (various years).

Based on Chinn and Frankel (2005)'s model, our model can be represented as follow:

$$LSHARE_{it} = \beta_0 + \beta_1 GDP_{it} + \beta_2 TRADE_{it} + \beta_3 STOCKCAP_{it} + \beta_4 FXTURNOVER_{it} + \beta_5 IR_{it} + \beta_6 EXVOL_{it} + \beta_7 INF_{it} + \beta_8 COM_{it} + \beta_9 LSHARE_{it}(-1) + C_{it} \quad (6.1)$$

Where i denote the countries, t denotes time, and the variables are defined as follow:

- $LSHARE^{61}$ is logistic transformation of the reserve currency share of major currencies in the world's total reserve holdings;
- GDP is the GDP share in the world's total GDP;
- $TRADE$ is trade share in the world's total trade;

⁶¹ Chinn and Frankel (2005) find a nonlinear relationship between the reserve currency share and its determinant variables. Accordingly, we follow them to transform the reserve currency share into logit form which extends between $(-\infty, +\infty)$. $LSHARE = \log(\text{share} / (1-\text{share}))$.

- *STOCKCAP* is the ratio of stock market capitalization of country *i* to the total of five countries;
- *EXTURNOVER* is the ratio of foreign exchange turnover of currency of country *i* to the total of five countries;
- *IR* is the interest rate differential between country *i* and the average of five countries;
- *EXVOL* is the annualized standard deviation of daily percentage change of exchange rate of currency *i* against the SDR;
- *INF* is the inflation rate differential between country *i* and the average of five countries;
- *COM* is the Global Competitiveness Index (GCI);
- *LSHARE(-1)* is the lagged reserve currency share;
- *C* is the constant.

6.10.4 Results analysis

Due to the very different characteristics of the five sample countries we covered, each of countries may have different impacts on the dependent variable (reserve currency share). A fixed-effects model may be appropriate for this panel data analysis. The results of Hausman test confirm that we need to follow the process of fixed effects—rather than random-effects in this analysis (see Table 6.13).

Table 6.13: Hausman test

	(b) fixed	(B) random	(b-B) difference	sqrt(diag(V_b-V_B)) S.E.
<i>gdp</i>	0.17751	0.17751	-9.86E-14	4.89E-08
<i>trade</i>	0.08646	0.08646	-9.71E-14	.
<i>ir</i>	0.02454	0.02454	-2.32E-16	8.07E-10
<i>exvol</i>	-0.00740	-0.00740	3.61E-16	5.21E-10
<i>inflation</i>	-0.00711	-0.00711	-1.27E-15	5.21E-10
<i>cap</i>	0.56752	0.56752	8.22E-14	2.06E-07
<i>fxturnover</i>	-0.17178	-0.17178	5.49E-14	1.28E-07
<i>com</i>	-0.07686	-0.07686	-6.54E-14	.
<i>lshare_1</i>	0.91538	0.91538	-1.52E-14	7.57E-09

b = consistent under Ho and Ha; obtained from xtreg

B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2 (9) = (b-B)'[(V_b-V_B)^(-1)]b=0.00

In addition, there exists a high possibility of multicollinearity between the explanatory variables we use in this research, so this must be checked. Table 6.14 shows that there is some correlation between some variables. Unsurprisingly, the GDP share and trade share are highly correlated. Also, there is high correlation between stock market capitalization and foreign exchange market turnover. Therefore, we use the GDP

(*gdp*) and trade (*trade*), stock market capitalization (*cap*) and foreign exchange market turnover (*fxturnover*) alternately to find the relationship between reserve currency share (*lshare*) and its determining factors.

Table 6.14: Correlation Test

	<i>gdp</i>	<i>trade</i>	<i>ir</i>	<i>exvol</i>	<i>inflation</i>	<i>cap</i>	<i>fxturnover</i>	<i>com</i>
<i>gdp</i>	1							
<i>trade</i>	0.7766*	1						
<i>ir</i>	0.0525	0.16	1					
<i>exvol</i>	-0.4434	-0.4053	-0.0305	1				
<i>inflation</i>	0.4323	0.4211	0.5186	-0.0954	1			
<i>cap</i>	0.8779*	0.6308*	0.0529	-0.2628	0.4614	1		
<i>fxturnover</i>	0.9021*	0.6545*	0.064	-0.2756	0.4639	0.9932*	1	
<i>com</i>	-0.0798	-0.3404	-0.1557	0.2702	-0.1052	0.2752	0.2372	1

Firstly, we test the relationship between reserve currency share and its determining factors without the variable of global competitiveness index (*com*), which has been examined by previous studies. Table 6.15 reports the results of various combinations of the explanatory variables. We find that the lagged reserve currency share is statistically significant in all scenarios. Also, coefficients of the GDP and foreign exchange turnover are significant in determining the reserve currency share in some variable combinations. However, the rest of variables are not significant. This is consistent with the findings in Chinn and Frankel (2007), Chen and Peng (2007) and Lee (2013), but differs from Chong and Hui's (2011) results, in which they find that the most determining factors are statistically significant.

Table 6.15: Regression result of determining factors (without global competitiveness index) to reserve currency share

Dependent variable: <i>lshare</i>	Coefficient			
	I	II	III	IV
<i>gdp</i>	0.8258 [0.60]*		0.7512 [0.56]	
<i>trade</i>		-0.3778 [0.50]		-0.1942 [0.50]
<i>ir</i>	0.0019 [0.13]	0.00553 [0.01]	-0.0025 [0.13]	0.0006 [0.01]
<i>exvol</i>	-0.0590 [0.00]	-0.0059 [0.00]	-0.0062 [0.00]	-0.0065 [0.00]
<i>inflation</i>	0.0162 [0.00]	0.0128 [0.02]	0.0171 [0.20]	0.1310 [0.02]
<i>cap</i>	0.1009 [0.70]	0.4430 [0.66]		

			0.4901	0.5793
			[0.34]	[0.35]*
<i>lshare_1</i>	0.5313	0.598	0.4722	0.5259
	[0.11]***	[0.11]***	[0.02]***	[0.11]***
<i>_cons</i>	-0.6249	-0.5098	-0.8201	-0.6793
	[0.20]***	[0.19]***	[0.23]***	[0.20]***

Source: Author's estimation.

Note: (1). I: we excluded *trade* and *fxturnover*, included *gdp* and *cap*; II: we excluded *gdp* and *fxturnover*, included *trade* and *cap*; III: we excluded *trade* and *cap*, included *gdp* and *fxturnover*; IV: we excluded *gdp* and *cap*, included *trade* and *fxturnover*.

(2) *, ** and *** represent statistical significance at the 10%, 5% and 1% levels, respectively.

(3) Numbers in parentheses denote the standard error.

We are more interested in testing how international competitiveness impacts on reserve currency share (*lshare*). To have robust estimation results, we test the different combinations of global competitiveness index (*com*) with other determining factors. From Table 5, we can see that GDP significantly impacts on the international usage of a country's currency as reserve currency in most of the combinations of variables, while trade does not. As expected, international competitiveness has a significant effect on reserve currency share. Surprisingly, international competitiveness negatively impacts on a currency's international usage as reserve currency, although its coefficient is relatively small. Intuitively, the higher international competitiveness is, the more likely a currency is to be an international currency. Historically, the pound sterling and the US dollar emerged as international currencies when these two countries became more competitive countries in term of economic and politics. It seems that our findings are not in line with this reality. In fact, the share of the euro as an international reserve currency increased considerably while international competitiveness of the eurozone as a whole stayed relatively stable during the period we cover. Meanwhile, the share of the Japanese yen as a reserve currency has steadily dropped, but Japan's GCI grew over the period (see Figure 6.16). It is ambitious and wrong to argue that there is negative relationship between degree of status of international currency and a country's international competitiveness. However, our findings may prove the "tipping phenomenon" which means that if one currency is used by more and more countries to a certain level, the increase in use of the currency will become more rapid (Chinn and Frankel, 2005). The euro used as an international reserve currency grew rapidly since it emerged in 1999, particularly in the euro area, although the CGI of the eurozone as a whole did not improve significantly over the period.

Table 6.16: Regression result of determining factors (including global competitiveness index) of reserve currency share

Dependent variable: <i>lshare</i>	Coefficient										
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI

Number of obs. =61
Number of countries=5

<i>com</i>	-0.1905	-0.0919	-0.1551	-0.1848	-0.1976	-0.1878	-0.1887	-0.1745	-0.0919	-0.0880	-0.1050
	[0.10]***	[0.90]	[0.10]*	[0.10]**	[0.09]***	[0.66]***	[0.10]***	[0.10]*	[0.90]	[0.94]	[0.09]
<i>gdp</i>	1.6728	0.8400		1.6732	1.5155	1.6878	1.7306	1.2552	0.8399	0.3077	0.7888
	[0.67]***	[0.64]		[0.66]***	[0.67]***	[0.66]***	[0.72]***	[0.94]	[0.64]	[0.89]	[0.72]
<i>trade</i>			-0.2160								
			[0.68]								
<i>ir</i>				-0.0207					-0.0058	-0.0027	
				[0.16]					[0.17]	[0.02]	
<i>exvol</i>					-0.0088				-0.0079	-0.0081	
					[0.06]*				[0.00]*	[0.00]*	
<i>inflation</i>						0.0352			0.0133	0.0104	
						[0.02]			[0.02]	[0.02]	
<i>cap</i>							-0.1908				-0.0437
							[0.81]				[0.77]
<i>fxturnover</i>								0.7946		0.9472	
								[1.26]		[1.20]	
<i>lshare_1</i>		0.4315							0.4315	0.3792	0.3923
		[0.12]							[0.12]***	[0.14]***	[0.14]***
<i>_cons</i>	-0.3412	-0.2689	-0.3118	-0.3719	-0.2239	-0.3645	-0.3201	0.6377	-0.2689	-0.5433	-0.1738
	[0.51]	[0.46]	[0.54]	[0.51]	[0.51]	[0.50]	[0.52]	[0.70]	[0.46]	[0.66]	[0.48]

Source: Author's estimations

Note: *, ** and *** represent statistical significance at the 10%, 5% and 1% levels, respectively.

Numbers in parentheses denote the standard error.

The results in Table 5 show that GDP and international competitiveness significantly affect the share of a currency as a reserve currency, although other determining factors also have impacts on it in some scenarios. Here, we only consider the effects of GDP and international competitiveness as determining factors on reserve currency share. By using equation (2), we then forecast the RMB's share in the global reserve holdings in the coming decades. Also, we could compare the shares of current international currencies with that of the RMB in the future. In 2012, China's GDP accounts for 11.62 per cent of the world's total GDP, while China's GCI is 4.83 in 2012. According to Equation (2), the RMB's share as reserve currency in the world's total reserve holdings should be 22.61 per cent, which is much lower than 61.25 per cent of the US dollar's share, but similar to the share of the euro (24.16 per cent) today.

$$LSHARE = 1.6728 \cdot GDP - 0.1905 \cdot COM \quad (6.2)$$

To forecast the RMB's share in global reserve holdings in the coming decades, we assume that China's economy will grow at 7.5 per cent annually from 2013 to 2015, 6.5 per cent from 2016 to 2020 and 5.0 per cent from 2021 to 2025.⁶² The other five economies and the rest of world will maintain their average growth rates of the past ten

⁶² According to China's 12th Five-Year Plan, the target of GDP growth in 2011-2015 was set at 7.5 per cent. While given the ongoing adjustment of economic growth model, it is wildly believed that China's economic growth will slow down in the next several decades.

years.⁶³ Changes of GCI for China and the five countries will follow the average change over the period 2001 to 2012. Based on the above assumptions, China's GDP share in the world's total GDP will be 13.19 per cent in 2015, 15.53 per cent in 2020 and 17.09 per cent in 2025. Correspondingly, the US's GDP share will be 20.93 in 2015, 19.53 in 2020 and 18.29 per cent in 2025, while the eurozone's GDP share will be 15.96 in 2015, 14.41 in 2020 and 13.63 per cent in 2025. The GCI of China will be 4.96 in 2015, 5.19 in 2020 and 5.44 in 2025. According to equation (6.2), the RMB as an international reserve currency would account for about 32.07 per cent of world's total foreign reserves by 2025. This is comparable to 32.87 per cent for the US dollar and 33.08 per cent for the euro in 2025. Our results suggest that the RMB would become an international reserve currency comparable to the US dollar and the euro by 2025. We should note here that one of conditions to achieve this goal is that the RMB becomes a fully convertible currency and that controls on China's capital account are removed. It also heavily depends on not only China's strategy in RMB internationalization, but also the global economic environment and other countries' responses to RMB internationalization.

6.11 Chapter Conclusions

Chinese authorities have shown explicit, in some aspects, aggressive intention to internationalize the RMB since 2009. Over the last four years, the world has witnessed significant progress made by introducing numerous measures to push forward RMB internationalization. Whether or not internationalizing the RMB and pace of RMB internationalization largely depends on the evaluation of benefits and costs by the Chinese authorities. In the long term, however, the internationalization of the RMB is inevitable. Considering China's increasing prominence in the world economy and trade network, the RMB has great potential to become the next leading international currency in the medium or long term. A Possible road map for RMB internationalization is to begin from RMB settlement in cross-border trade, followed by regionalization of the RMB, and finally globalization. With respect to achieving the functions of an international currency, the RMB should first become a settlement currency, then a denomination currency, and lastly, a reserve currency.

However, given relatively the immature financial markets, absence of regulatory and laws as well as underdeveloped risk management capacity, the gradualism may be the optimal strategy for China to internationalize the RMB. It would be unrealistic to expect China to complete RMB internationalization within decade. RMB internationalization should be parallel with China's ongoing financial system reform. Liberalization of capital account, exchange rate regime reform and establishment of deep and liquid financial markets would be long-term tasks. Therefore, the internationalization of the RMB should be a natural result of China's economic growth and financial system reform. Any unrealistic and aggressive strategy in RMB internationalization would distort China's original goal, and may hurt China's economy even the world economy.

⁶³ Assumption of growth rate: the eurozone: 0.99%; Japan: 0.87%; Switzerland: 1.89%; the UK: 1.39% and the US: 1.66% and the rest of world: 4.0% (we follow Lee (2013) to assume that growth rate of the rest of world is 4.0 per cent during the period of 2013 to 2025).

In addition, the ongoing RMB internationalization is being pushed forward under the background of deepening East Asian economic and financial integration. East Asia's regional integration lays a broad foundation for China to internationalize the RMB. An internationalized RMB, in turn, will play more important roles in the economic and financial aspects of East Asian regionalization. Given the long-term and complexity of RMB internationalization, China's policy priority could be regionalizing the RMB firstly, followed by internationalizing the RMB. Therefore, Chinese authorities should promote RMB internationalization not only under framework of China's financial system reform, but also integrate it into the process of East Asia's economic and financial integration. A mutually-beneficial RMB internationalization strategy for China and East Asian countries is needed to create a win-win situation.

The US dollar's unchallenged status as the leading international currency has seemed to weaken in the last decade—in particular, in the aftermath of the global financial crisis. The euro emerged as a potential rival currency to the US dollar when it was created in 1999, but the recent European sovereign debt crisis and euro crisis seriously undermined the prospect of the euro as a rival currency. Along with China's remarkable economic growth over the last several decades, the RMB has showed great potential in becoming another international currency since 2009, when the Chinese authorities moved to accelerate the internationalization of the RMB. Our results show that the RMB could become an international reserve currency comparable to the US dollar and the euro by 2025. Given network externalities and historical experiences of currency internationalization, however, it will be a long and bumpy process for the RMB to become another international currency, particularly an international reserve currency.

Chapter 7: Concluding Remarks

In this thesis, we conducted a comprehensive and systematic research on China's exchange rate regime and RMB internationalization under the background of the recent rapid development of RMB revaluation and internationalization. Chinese authorities announced to adopt a managed floating exchange rate regime with reference to a basket of currencies in July 2005, but did not unveil the exact weight of each of component currencies in the RMB basket. Our results illustrated that the RMB has not perfectly pegged to a basket of currencies as the PBoC announced during the period of January 2007 to March 2013. But we found that the US dollar's weight in the RMB basket has declined steadily since 2011, although it is still the most important reference currency to peg for the RMB. More interestingly, other currencies like the Singaporean dollar and Japanese yen received increasing weight in the RMB basket. This implied that the RMB exchange rate regime is in a transitional period from a single currency peg regime to a currency basket peg regime.

By applying the Behavioral Equilibrium Exchange Rate (BEER) approach and employing monthly data with reference to China's top 20 trading partners, we estimated the degree of RMB misalignment from its equilibrium exchange rate spanning the period 1997–2012. Our results show that the RMB was significantly undervalued before 2005. Since 2005 when the RMB began to be revaluated, the RMB gradually shifted from undervaluation to overvaluation in a short period. However, the RMB was undervalued by about 3 per cent in the beginning of 2008 mainly because the RMB was re-pegged to the US dollar during the period of the global financial crisis. More recently, the RMB became overvalued by about 3–5 per cent when the RMB continued to appreciate and China's ratio of current account surplus to GDP shrank considerably. Our results confirmed the findings of previous studies that the RMB has approached its equilibrium level since China launched the exchange rate reform in July 2005.

RMB revaluation could impair China's international competitiveness in the global market. Recently, rapid RMB appreciation has attracted extensive debate if China could continue its past success of economic growth by still heavily relying on the labor-incentive and low-cost goods exports. Under this background, we assessed China's international competitiveness in order to come up with a proper policy implication how China could keep its economic growth when the RMB is being revaluated. Our results indicated that China's international competitiveness has significantly weakened over the past several years. China has lost its international competitiveness relative to its East Asia neighboring countries in the manufacturing sector in terms of the ULCs. It is because China's national ULCs has increased rapidly and surpassed those in ASEAN countries. However, for a large economy such as China, the higher ULCs at the national level do not necessarily mean that all regions of China are less competitive. We found that some regions of China are still competitive compared with ASEAN countries because the ULCs in some regions of China are still lower than these in ASEAN countries. In addition, we found that RMB appreciation and rising ULCs negatively impacted on China's export growth. The impact of RMB

appreciation on China's exports is more significant than that of rising ULCs in the coastal region of China. Therefore, we suggested that China can form a domestic flying geese formation to further develop its economy. Chinese authorities should encourage the traditional manufacturing industry shifting from the coastal area to the non-coastal areas where they still remain competitive advantage compared with some ASEAN countries in order to prolong China's economic growth, although the RMB has appreciated rapidly.

Apart from the empirical studies on the RMB exchange rate regime, we believe that other countries' experiences on the exchange rate regime reform are valuable and important for China to reform its exchange rate regime, although some could argue that today's China is different from other countries then. We thus review the process of the exchange rate regime reform of three economies: Japan, Korea and Taiwan with particular emphasis on the economic background, exchange rate and monetary policies applied as well as corresponding consequence in each period of their exchange rate reforms. We argue that gradualism approach is the optimal option for RMB revaluation rather than one-off approach. The follow-up monetary and fiscal policies are needed to reduce the impact of RMB appreciation on economic growth, but the timing and scale of policies are equally important. China's exchange rate regime reform should be regarded as an integral component of a broad financial system reform rather than be alone. In addition, integrated financial market reform is one of pre-conditions for a smooth exchange rate regime reform. Last but not least, a policy for a long-term economic structure adjustment and industry upgrading need to be prepared by Chinese authorities.

Regarding the internationalization of the RMB, Chinese authorities has undertaken some concrete steps to push forward RMB internationalization since 2009, such as the Polite Scheme of Cross-Border Trade Settlement in the RMB, the Administrative Rule of Settlement for RMB-denominated Outward Direct Investment (ODI) and Administrative Rule of Settlement of RMB-Denominated Foreign Direct Investment (FDI), the RMB QFII, the Dim Sum bonds issuance, the bilateral currency swap agreements and so forth. Nevertheless, the historical experience and reality tell us that RMB internationalization would not a smooth journey but with numerous challenges, although the remarkable progress has been made in the process of RMB internationalization so far. These challenges include the asymmetry of RMB inflows and out flows, a deep and liquid financial market, higher flexibility of exchange rate, RMB full convertibility, capital account liberalization and so forth. Therefore, we conclude that the RMB is still in the very early stage of internationalization. A possible roadmap for internationalizing the RMB can be summarized from two perspectives: the functions of the RMB as an international currency and the scope of RMB use in global financial system. From the perspective of the scope of RMB use as an international currency, RMB internationalization should begin from RMB settlement in cross-border trade, followed by regionalization of the RMB, and finally globalization. While with respect to achieving the functions of an international currency, the RMB should first become a settlement currency, then a denomination currency, and lastly, a reserve currency.

Compared with the external environment when the current international currencies

were internationalized, the ongoing RMB internationalization is being promoted under the background of deepening economic and financial integration in East Asia. After the Asian Financial Crisis of 1997 which hit East Asian economy severely, Asian countries, in particular East Asian countries, have achieved remarkable progress in deepening regional economic and financial integration. FTAs proliferation across East Asia significantly improved the interdependence and deepened the regional economic integration, while numerous of initiatives of financial and monetary policy cooperation also strengthened East Asian financial safety net and promoted regional financial integration. We argue that the East Asia's regional integration lays a broad foundation for China to push forward RMB internationalization. In turn, an internationalized RMB will play more important roles in the process of East Asian regionalization. Chinese authorities should push the RMB toward internationalization not only under the framework of China's financial system reform, but also integrate it into the process of East Asian economic and financial integration. Therefore, a win-win strategy of RMB internationalization for China and East Asian countries is needed. In addition, we found that the RMB has a great potential to become an international currency in the coming decades. It could become an international reserve currency comparable to the US dollar and the euro by 2025, if the controls on China's capital account would be lifted and the RMB becomes a fully convertible currency. But we did not find a negative relationship between the volatility of RMB exchange rate and RMB internationalization. Given the network externalities and historical experience of currency internationalization, however, it will be a long and bumpy process for the RMB to become an international currency, particularly an international reserve currency in the next decades.

To sum up, the RMB exchange rate regime is in a transitional period from a single currency peg to a currency basket peg regime. The RMB is not significantly undervalued as before. It has gradually approached its equilibrium level since 2005. The gradualism approach is better than the one-off approach for China to reform its exchange rate regime and revalue the RMB. The RMB revaluation, together with rising wages, has significantly impaired China's international competitiveness. However, some areas of China still have competitive advantage relative to some East Asian countries due to China's regional disparity. Under the background of rapid East Asian regional integration, a win-win strategy of RMB internationalization for China and East Asian countries is needed.

In addition, I am fully aware that several questions need to be addressed in order to understand China's exchange rate regime and RMB internationalization more deeply, although this thesis sheds some lights on them. Firstly, the composition of currency basket of the RMB and weight of each of component currencies may be adjusted frequently by Chinese authorities. Also, there is an increasingly tight link between the US dollar and other currencies which are included into the RMB basket. In this regard, Frankel and Wei (1994)'s currency basket inference model is relatively rigid. An innovative methodology is needed so that we could have a better estimation on currency basket of the RMB. Secondly, different methodologies may provide various results about RMB misalignment. We need to be careful to make a conclusion on RMB misalignment. Thirdly, how will RMB revaluation impact on China's exports and economic growth is a desirable question. We have assessed China's international

competitiveness by comparing the ULCs between China and ASEAN countries at the national and regional level. A research on China's competitiveness at the sector level or firm level could help us more deeply understand the relationship between RMB revaluation and China's economic development. The last but not least, several questions about RMB internationalization remained unclear such as the preconditions of RMB internationalization, the relationship between RMB internationalization and China's capital account liberalization, and the sequence of China's financial system reform for internationalizing the RMB and so on. I leave these questions for the future studies.

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Appendix

Appendix 3.1: Data Description and Sources

To differ from previous studies on RMB equilibrium exchange rate by applying the BEER model, we used monthly data to find more detailed information on RMB misalignment. Period we covered in this paper is from 1997 to 2012 given data availability. Majority of data is from CEIC⁶⁴, International Monetary Fund (IMF) and National Bureau of Statistics of China. More detailed information about data as below:

Trade weights of China's 20 trading partners:

China's foreign trade data by trading partner is from National Bureau of Statistics of China. We compared China's top 20 trading partners in 2005–2010 and found little change of composition of China's top 20 trading partners during this period. We used bilateral trade share of China's top 20 trading partners in China's total trade with these 20 trading partners in 2010 as trade weight of each trading partner because we pay particular attention on RMB misalignment in recent years.

REER:

Monthly data of CPI and bilateral nominal exchange rate of each country against the US dollar is from CEIC. However, Australia only report quarterly CPI data. So we used quarterly CPI instead of monthly CPI for Australia. Also, base year of CPI index varies among countries. We converted them into base year=2005 for all countries.

Terms of Trade (ToT):

Majority of monthly data of import and export price index is from CEIC and International Financial Statistics (IFS) of IMF. However, China, Russia and Vietnam don't report their import and export price index. We computed import and export price index by using yearly import and export volume index and import and export value index from WDI of World Bank for these three countries.

Balassa-Samuelson Effect (BSE):

Monthly data of CPI and PPI of each country is from CEIC. CPI data is the same as series data in computing the REER. But PPI data is limited and not long enough to cover our period of 1997 to 2012. For the countries which don't report monthly PPI or cover long enough periods of monthly series data, like Australia, Hong Kong and Vietnam, we use quarterly or yearly PPI data to instead.

Degree of openness (OPENNESS):

China's monthly data of import and export as well as yearly GDP are from CEIC.

Foreign reserves (FR):

China's monthly data of foreign reserves is from CEIC.

Foreign direct investment (FDI):

China's monthly data of FDI is from CEIC. However, it is FDI stock data rather than flow data. So we computed monthly FDI flow data.

⁶⁴ CEIC is the database provides economic and financial data from emerging and developed economies. See http://www.ceicdata.com/about_ceic.html.

Appendix 4.1: Wages of China and ASEAN Countries

Wages in the manufacturing sector	China ¹ (Yuan)	Indonesia ² (Rupiah)	Malaysia ³ (Ringgit)	Philippines ⁴ (Peso)	Singapore ⁵ (Dollar)	Thailand ⁶ (Baht)
1989	158.33		640	3441	1242.9	2996
1990	172.25		660	4108	1395	3357
1991	190.75		719	4831	1551.8	3688
1992	219.58		794	5386	1686.2	3986
1993	279.00		848	5584	1817.8	4138
1994	356.92		928	6272	1995.3	4229
1995	430.75		1002	6654	2157.3	4994
1996	470.17		1115	6817	2319.5	5502
1997	494.42		1210	7283	2486.7	5935
1998	588.67		1299	7734	2716	6389
1999	649.50	303251	1343	8347	2803	5907
2000	729.17	578669	1388	9142	3036	5839
2001	814.50	370078	1531	9936	3117	6064.6
2002	916.75	426769	1606	10551	3154	6795.3
2003	1041.33	482658	1670	11166	3265	6432.2
2004	1169.42	522445	1738	12070	3350	6129
2005	1313.08	562456	1580	12973	3495	6407.4
2006	1497.17	578669	1405	13872	3618	6941.6
2007	1740.33	836337	1469	14749	3764	6999.2
2008	2016.00	868886	1447	15625	3955	7864.6

Source: International Labour Organization (ILO) and Ministry of Human research, Malaysia (MOHR) and Department of Statistics, Malaysia (DOSM), 2010.

Note: 1. State-owned units, urban collective-owned units and other ownership units; 2. Persons aged 15 years and over; 3. Data in Red is computed based on the data of real wage growth from Ministry of Finance of Malaysia; 4. Firms with 20 or more persons employed. Data in Red is average value; 5. Methodology revised in 2005 and data not strictly comparable; 6. Average wage rates for normal/usual hours of work. Public enterprises are excluded for 1994–1999. Figures in red are computed by author.

Appendix 6.1: Global Competitiveness Index (GCI), 2001-2012

Global Competitiveness Index (GCI)		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
the EA¹		5.24	4.78	4.94	4.95	4.81	5.15	5.03	5.03	4.95	4.95	4.99	5.04
	Austria	5.33	4.93	5.07	5.20	4.95	5.32	5.23	5.23	5.13	5.09	5.14	5.22
	Belgium	5.31	4.81	4.88	4.95	4.63	5.27	5.10	5.14	5.09	5.07	5.20	5.21
	Cyprus	4.62 ²	4.60 ²	4.58 ²	4.56	4.54	4.36	4.23	4.53	4.57	4.50	4.36	4.32
	Estonia	4.87	4.73	4.96	5.08	5.49	5.12	4.74	4.67	4.56	4.61	4.62	4.64
	Finland	6.03	5.74	6.01	5.95	5.94	5.76	5.49	5.50	5.43	5.37	5.47	5.55
	France	5.29	4.62	4.91	4.92	4.78	5.31	5.18	5.22	5.13	5.13	5.14	5.11
	Germany	5.39	5.06	5.24	5.28	5.10	5.58	5.51	5.46	5.37	5.39	5.41	5.48
	Greece	4.46	4.32	4.58	4.56	4.26	4.33	4.08	4.11	4.04	3.99	3.92	3.86
	Ireland	5.56	4.86	4.73	4.90	4.86	5.21	5.03	4.99	4.84	4.74	4.77	4.91
	Italy	4.90	4.31	4.38	4.27	4.21	4.46	4.36	4.35	4.31	4.37	4.43	4.46
	Luxembourg	5.07 ²	5.03 ²	4.99	4.95	4.90	5.16	4.88	4.85	4.96	5.05	5.03	5.09
	Malta	5.51 ²	5.27 ²	5.03	4.79	4.54	4.54	4.21	4.31	4.30	4.34	4.33	4.41
	Netherlands	5.56	5.03	5.24	5.30	5.21	5.56	5.40	5.41	5.32	5.33	5.41	5.50
	Portugal	4.92	4.87	4.92	4.96	4.91	4.60	4.48	4.47	4.40	4.38	4.40	4.40
	Slovakia	4.36	4.02	4.23	4.43	4.59	4.55	4.45	4.40	4.31	4.25	4.19	4.14
	Slovenia	4.70	4.64	4.70	4.75	4.31	4.64	4.48	4.50	4.55	4.42	4.30	4.34
	Spain	5.17	4.88	4.94	5.00	4.80	4.77	4.66	4.72	4.59	4.49	4.54	4.60
Japan		5.25	5.08	5.25	5.48	5.18	5.60	5.43	5.38	5.37	5.37	5.40	5.40
Switzerland		5.43	5.36	5.51	5.49	5.46	5.81	5.62	5.61	5.60	5.63	5.74	5.72
the UK		5.51	5.17	5.23	5.30	5.11	5.54	5.41	5.30	5.19	5.25	5.39	5.45
the US		5.59	5.93	5.81	5.82	5.81	5.61	5.67	5.74	5.59	5.43	5.43	5.47
China		4.40	4.37	4.19	4.29	4.07	4.24	4.57	4.70	4.74	4.84	4.90	4.83

Source: Annual Report of the Global Competitiveness Index (GCI) of World Economic Forum (WEF) (various years).

Note: 1. The eurozone's GIC is the GDP-weighted GCI of 17 member nations of eurozone; 2. Data is not reported by the WEF. So we calculated the average figure based on back-ward trend.