

UNIVERSITY OF KWAZULU-NATAL

CHINA'S EXCHANGE RATE REGIME: 1994 TO 2008

**By
JIAN XIA LIU
205524592**

**A dissertation submitted in partial fulfillment of the requirements for the degree of
Master of Business Administration**

**Graduate School of Business
Faculty of Management Studies**

Supervisor: Dr Mihalis Chasomeris

2009

Supervisor`s permission to submit for examination

Date: 2 December 2009

Student Name: Jian Xia Liu

Student no.: 205524592

Dissertation Title: China`s exchange rate regime: 1994 to 2008

As the candidate`s supervisor I agree/do not agree to the submission of this dissertation for examination.

The above student has satisfied the requirements of English language competency.

Name of Supervisor: Dr M Chasomeris

Signature:

Declaration

IJianXia Liu..... declare that

- (i) The research reported in this dissertation, except where otherwise indicated, is my original work.
- (ii) This dissertation has not been submitted for any degree or examination at any other university.
- (iii) This dissertation does not contain other persons' data, pictures, graphs or other information, unless specifically acknowledged as being sourced from other persons.
- (iv) This dissertation does not contain other persons' writing, unless specifically acknowledged as being sourced from other researchers. Where other written sources have been quoted, then:
 - a) their words have been re-written but the general information attributed to them has been referenced;
 - b) where their exact words have been used, their writing has been placed inside quotation marks, and referenced.
- (v) Where I have reproduced a publication of which I am an author, co-author or editor, I have indicated in detail which part of the publication was actually written by myself alone and have fully referenced such publications.
- (vi) This dissertation does not contain text, graphics or tables copied and pasted from the Internet, unless specifically acknowledged, and the source being detailed in the dissertation and in the References sections.

Student name: JianXia Liu
Student number: 205524592

Signed

Date

Acknowledgements

I wish to express my sincere appreciation and gratitude to the following individuals, without whose assistance, this study would not have been possible.

- My parents, who raised me and encouraged me to study abroad.
- The Graduate School of Business, University of KwaZulu-Natal.
Thank you for giving me a chance to study in the department. My memory of studying in the department will last forever.
- My supervisor, Dr Mihalis Chasomeris, who is a very important expert in my academic life. He is teaching me knowledge and providing guidance. I am indebted to him for his help. Thank God for giving me the destiny to meet him in South Africa.
- My fellow students who encouraged me and assisted me. I enjoyed the time we studied together, day and night.

Abstract

The value of the RMB, China's currency has become a contentious issue. China's RMB exchange rate regime has moved from a fixed exchange rate before July 2005, to a managed floating change rate regime. There has been external pressure on China to agree to the RMB's appreciation to the US dollar. There is a common view that the RMB is considerably undervalued at this moment, with some quarrelling that this is an issue of global concern. This study has two objectives. First, to review and critically comment on China's exchange rate regime over the period 1994 to 2008. Second, to review and critically comment on whether the RMB was undervalued over the period 1994 to 2008. This study shows that the evidence is mixed. The popular Big Mac Index shows that the RMB was significantly undervalued from 1994 to 2008. In contrast, this study reviewed research that provides evidence for alternative perspectives on the valuation of RMB.

Table of Contents

SUPERVISOR'S PERMISSION TO SUBMIT FOR EXAMINATION	II
DECLARATION	III
ACKNOWLEDGEMENTS.....	IV
ABSTRACT	V
LIST OF FIGURES	
LIST OF TABLES	
LIST OF ABBREVIATIONS AND EXPLANATIONS	
CHAPTER 1	1
INTRODUCTION	1
1.1 BACKGROUND AND CONTEXT.....	2
1.2 FOCUS OF THE STUDY	3
1.3 RESEARCH OBJECTIVES AND RESEARCH QUESTION.....	4
1.4 RESEARCH APPROACH/ METHODS.....	5
1.5 STRUCTURE OF THE STUDY	6
1.6 CONCLUSION.....	7
CHAPTER 2	8
LITERATURE REVIEW	8
2.1 INTRODUCTION	8
2.2 THEORETICAL FRAMEWORK	8
2.2.1 <i>Exchange rate</i>	8
2.2.2 <i>Purchasing Power Parity (PPP)</i>	13
2.2.3 <i>Big Mac Index (BMI)</i>	13
2.2.4 <i>Real Effective Exchange Rate (REER)</i>	16
2.2.5 <i>China's Gross Domestic Product and Consumer Price Index</i>	16
2.2.6 <i>Behavioural Equilibrium Exchange Rate (BEER)</i>	19
2.2.7 <i>Fundamental Equilibrium Exchange Rate (FEER)</i>	20
2.3 CHINA'S CHOICE OF EXCHANGE RATE REGIME	20
2.3.1 <i>Phase one (1986-1993)</i>	20
2.3.2 <i>Phase two (1994-2005)</i>	23
2.3.3 <i>Foreign exchange administration in China, 2005-2009</i>	25
2.4 CONCLUSION.....	26
CHAPTER 3	27
DEBATE ON THE CHINESE CURRENCY: IS THE RMB UNDERVALUED?	27
3.1 INTRODUCTION	27
3.1.1 <i>Overview of China's exchange rate, 1994-2009.</i>	27
3.2 EVIDENCE OF RMB OVERVALUATION	29
3.3 EVIDENCE OF RMB UNDERVALUATION	33

3.4	EVIDENCE OF NO CLEAR INDICATION THAT THE RMB IS SIGNIFICANTLY UNDERVALUED	36
3.5	CONCLUSION.....	38
CHAPTER 4	40
CONCLUSIONS	40
REFERENCES	45

List of Figures

No.	Description	Page
2.1	The Big Mac Index for the period 1994 to 2009	15
2.2	China`s consumer price index, 1994-2008	18
2.3	The real growth and Inflation in China, 1980-2004	19
2.4	China`s RMB Exchange Rate 1984-1993	22
2.5	China`s RMB Exchange Rate 1994-2005	24
2.6	China`s RMB Exchange Rate 2005-2009	26
3.1	China`s Monetary Policy and the Yuan/dollar Rate, 1995 – 2009	30
3.2	REER of RMB from 1980 to 1999	37

List of Tables

No.	Description	Page
3.1	Studies of the Exchange Rate of the RMB compared with BMI	30
3.2	Estimated effective equilibrium exchange rates and misalignments	35

List of abbreviations and explanations

BEER	Behavioural Effective Exchange Rate
BMI	Big Mac Index
BOC	Bank of China
CFETS	China Foreign Exchange Trade System
CPI	Consumer Price Index
FDI	Foreign Direct Investment
FEACs	Foreign Exchange Adjustment Centers
FEER	Fundamental Effective Exchange Rate
FFEs	Foreign-Funded Enterprises
FTC	Federal Trade Commission
GDP	Gross Domestic Product
IMF	International Monetary Fund
NBFIs	Non-Bank Financial Institutions
NAFTA	North American Free Trade Agreement
OECD	Organization for Economic Cooperation and Development
PBC	People`s Bank of China
PPP	Purchasing Power Parities
REER	Real Effective Exchange Rate
RMB	Renminbi
SAEC	State Administration of Exchange Control
SAFE	State Administration of Foreign Exchange

SEZs Special Economic Zones
US United States
WTO World Trade Organization

Chapter 1

Introduction

According to Lardy (2002) and Naughton (1996), as China implements its reform and opening-up policies, it is changing with each passing day and has successfully transformed itself from a poor, backward country into an important trading and manufacturing centre.

Zhang and Pan (2004) found that the Renminbi¹ (RMB) received revaluation pressure from three main sources: firstly, the rapid rise of China's economy has not only created opportunities for many but is also increasing trade disputes with its major trading partners from the national foreign exchange transactions causing market pressure; secondly, there is political pressure by the governments to protect their own interests of the game, finally, there is pressure on the policy. Tung (2004) said that the United States (US) Congress even considered legislation that if the RMB was not re-valued, they would place a 27.5% tariff on Chinese imports to the US.

What has caused the revaluation and appreciation of the RMB?

In this study the main reasons provided for the appreciation of the RMB are as follows:

- Firstly, since 1994, the RMB exchange rate had been a fixed rate pegged to the US dollar for 10 years, and China's economy had undergone profound changes during this period.

- Secondly, since the 1990s, some authoritative international organizations and trade partners argued that the Yuan had been undervalued at varying degrees.

¹ The 'renminbi' is the Chinese currency, and it is the official name, while 'Yuan' is the denomination.

- Thirdly, foreign exchange savings show, through the excessively high price of foreign currency that the RMB is undervalued.
- Fourthly, since 2001, the world's major currencies, including the currencies of Southeast Asian countries, have appreciated substantially. Only the Yuan exchange rate against the dollar had not adjusted. In fact, the Yuan-dollar exchange rate had depreciated sharply against other currencies, causing excessively low pricing. In recent years, whilst currencies of other countries have appreciated substantially against the dollar, only the Yuan exchange rate against the dollar did not move.

The Chinese government adopted a controlled floating exchange rate regime set on market supply and demand with a link to a market basket of currencies at 21 July 2005.

Given China's *socialist market economy*, this study investigates China's exchange rate regime over the period from 1994 to 2008. This study investigates whether the Chinese currency, the RMB, was significantly undervalued.

1.1 Background and Context

Tallberg (2007) found that the financial crisis that emerged due to the inadequately functioning pegged float exchange rate regimes in the late 20th century spurred research into optimal currency areas and regimes. The causes and driving forces behind China's rise in economic power and its major balance of payments surpluses have also been at the centre of research in recent years. A vast range of literature (Tallberg, 2007) including

work by organizations like the International Monetary Fund (IMF) suggested that China should change its exchange rate regime to a more movable one.

A second branch of research, including work by Anderson (2006), Coudert and Couharde (2007) have focused explicitly on the RMB's valuation, arguing that the RMB is misaligned and undervalued due to its peg against the dollar. Although less apparent in academic literature than in political discourse, the US Congress has exerted pressure on China to let the RMB appreciate. Frankel and Wei (2007) suggest that these charges have contributed to wide speculation about the RMB misalignment.

1.2 Focus of the study

In this study the discussion will focus on the exchange rate of China's currency, the RMB, which has become a controversial issue lately. The RMB had been kept at a fixed rate to the dollar over a period of 10 years, until July 2005. Under the fixed rate, China was capable of managing the high inflation rate as before and keeping Gross Domestic Product (GDP) growth at a high rate which is almost 9%. During the Asian financial crisis, from 1997 to 1998, China resisted a lot of stress to devalue the RMB in this period, which might have caused further depreciations for other Asian currencies.

There has been huge external pressure on China to accept the RMB appreciation to the dollar. There is a general, but disputed belief that the RMB was significantly undervalued before 2005 (Coudert and Couharde, 2007). The following points are also evident.

- The extent of the US trade account deficit in 2005 was over 6% of America's GDP.
- From early 2002, the US dollar depreciated against nearly all other currencies

(including the RMB).

- China`s fast economic growth is causing its fast rising position in the world`s economy.
- The level of China`s increase of foreign-exchange reserves shows high capital inflows as a result of the authorities` hard work to keep the RMB constant against the US dollar.

1.3 Research Objectives and Research Question

This study was done by reading a large volume of literature, and by using different models, and analysing an overview perspective of economists from different countries who have carried out a large amount of research on RMB`s exchange rate from 1994 to 2008. This study aims to provide a convenient way for non-economists to better understand the changes in RMB exchange rate.

The value of China`s currency, the RMB, has become a controversial issue lately. The RMB exchange rate, from 1994 until July 2005, had been pegged to the US dollar at a virtually unchanged rate for a decade. During the Asian financial crisis, from 1997 to 1998, China resisted a lot of pressure to devalue the RMB in this period, which might have caused further depreciations for other Asian currencies.

Recently, there has been a lot of external pressure on China to agree to the RMB`s appreciation to the US dollar. There is a common view that the RMB is considerably undervalued at this moment, with some quarrelling that this is an issue of global concern.

This study has two major objectives.

- 1) To review and critically comment on China`s exchange rate regime over the period 1994 to 2008.
- 2) To review and critically comment on whether the RMB was undervalued over the period 1994 to 2008.

This study will begin with a brief overview of the recent literature and findings of research on exchange rate regimes. Following the literature review the study will consider various forms of exchange rate regimes at the theoretical level, showing their more elaborate effects on macroeconomic policy at large.

1.4 Research approach/ methods

This study is based on a descriptive research approach, combining both deductive and inductive thinking. It is very important to analyse and explain the author`s approach in the research process in order to understand how the result is achieved.

This study utilized practical descriptive statistics analysis of quarterly exchange rate data from 1994 to 2008. In this study secondary data has been used from different sources which include, the IMF, the Direction of Trade Statistics (DOTS), The Economist, and the People`s Bank of China.

This study also provides a comparative study on the four major measurement approaches: purchasing power parity (PPP), behavioural effective exchange rate (BEER), fundamental effective exchange rate (FEER), and the Big Mac Index (BMI). This study concludes with a summary overview of the various studies and their calculation of the RMB valuation and the reasons for the differences between them.

1.5 Structure of the study

The structure of this study is as follows.

Chapter 1 reveals the aim of this study, states the research problem, the research purpose, the significance of the study, the approach, demarcates and outlines the scope of the study, explains the research design and provides a chapter outline of the study.

Chapter 2 discusses the theories behind the determination of an exchange rate. It defines and describes conceptually the flexible and fixed exchange rate, the BMI, the PPP, the FEER, the BEER and the consumer price index. It will investigate the situation of China's exchange rate reforms from 1986 to 2005 and will explain China's flexible exchange rate situation after July 21, 2005.

Chapter 3 Investigates points of views on whether the RMB is overvalued or undervalued. It compares various theories to measure the exchange rate. In the end, it shows some evidence to indicate whether the RMB is significantly overvalued or undervalued.

Finally, the conclusion is presented in Chapter 4.

1.6 Conclusion

This chapter introduced the study, and stated the research problem. The objectives of this study are to review and critically comment on the policy debate centered on China`s exchange rate regime over the period 1994 to 2008. It also provided an overview of this study.

The next chapter proceeds to the literature review which provides the theoretical and practical background to the study necessary to understand the research propositions developed.

Chapter 2

Literature Review

2.1 Introduction

The aim of this chapter is to briefly discuss the theories behind the determination of the exchange rate. Section 2.2 defines the characteristics of a flexible and fixed exchange rate, the BMI, PPP, the REER and the consumer price index. Section 2.3 investigates the situation of China`s exchange rate system reforms from 1986 to 1993. Section 2.4 explains China`s flexible exchange rate situation after July 21, 2005. Section 2.5 concludes.

2.2 Theoretical Framework

2.2.1 Exchange rate

The exchange rate is one currency`s price in exchange for another or the amount that one currency can buy or sell with another currency.

“In finance, the exchange rates (also known as the foreign-exchange rate, forex rate or FX rate) between two currencies specifies how much one currency is worth in terms of the other. It is the value of a foreign nation`s currency in terms of the home nation`s currency” (Sheffrin and Arthur, 2003, p.211).

When the government permits market forces or demand and supply elements to decide the price of its currency connected to another currency, an exchange rate is said to be floating (Stokes, 2006). The following arguments are in favour of a purely floating exchange rate:

- “A simple laissez-faire view exchange rate should be determined by private demand and supply without government interference.
- A parallel view the exchange rate is easier to be adjusted to respond to the new development of the economy than wages and prices, which are always assumed to be sticky.
- Policy independence floating exchange rate is said to be able to equilibrate the trade balance by altering the relative price of imports and exports, hence the amount of imports and exports. So, the countries can pursue their internal economic goals such as full employment, low inflation, independently” (Rogers and Jenkins, 1995).

On a theoretical level, Sorensen and Jacobsen (2005) grouped exchange rates into three different broad categories: *hard peg*, *intermediate* and *float* regimes. Since the 1990s there has been a gradual *polarization*, i.e. a shift from intermediate regimes to either a hard peg or alternatively a floating exchange rate. Following the financial crisis of the late 1997, Fischer (2001), the governor of the Bank of Israel, along with others suggested that intermediate regimes are unsustainable in the long run. Tallberg (2007) said a hard peg exchange rate regime involves the loss of self-reliance on monetary policy, the challenge of maintaining a stable real exchange rate and relying on effective fiscal policy to counter price level changes that arise from asymmetric demand and supply shocks. Furthermore, negative currency speculation and devaluation expectations pose great challenges for cyclical monetary policy.

The following are definitions of a fixed exchange rate and flexible exchange rate.

2.2.1.1 Fixed or pegged exchange rate

Stokes (2006) explains that any system is said to be operating a fixed or pegged exchange rate where government and central bank proclaim buying and selling rates for its currency related to foreign currency and, essentially, guarantees to trade in any amounts at that rate. A set price will be concluded against a main world currency (generally it means the US dollar, but also other important currencies such as Yen, Euro, or a basket of currencies). It is similar to any system of floor prices and price ceilings, as is often found with agricultural products.

In fact, there is no currency that is completely fixed or floating. In a fixed regime, the market forces can also affect the changes of exchange rate. Sometimes, a black market will be developed when a local currency really shows its actual value against its pegged currency, because it is more reflective of real supply and demand.

Usually a fixed exchange rate regime normally imposes significant constraint on a country's monetary policy, because, as the domestic interest rates diverge too much from foreign rates, the country could change the flow of capital. For example, a decrease in China's real interest rate could cause an outflow of capital. Copeland (2005) describes a fixed exchange regime (including a *managed* or *dirty* float) as one, such that the balance of payments for official financing is not identically zero, the surplus or deficit being covered by the domestic monetary authority's use of the foreign currency reserves to intervene in currency markets.

2.2.1.2 Flexible and managed exchange rate

Exchange rates which are formed by the interaction of demand and supply in a free and smoothly functioning foreign exchange system are called floating exchange rates. A floating rate is often referred to as self-correcting, because any difference between supply and demand will be corrected in the market automatically. The model is simple: if the demand for a dollar is low, its value will reduce, making the imported products more expensive and promoting demand for local products and services. A completely flexible or floating exchange rate is dependant exclusively on the underlying balance of supply and demand for the currencies implicated, with no outside interference.

In contrast to the currency boards² or monetary unions of fixed exchange rates, independently floating exchange rates are determined by the foreign exchange market and are affected by inflation targets and interest rate levels. In such a system, the currency fluctuates continuously as investors speculate about its value. Managed float (a.k.a. dirty float) regimes differ from free-float regimes in the degree of government intervention in the foreign exchange market, i.e. in a system of dirty float; a central bank could meddle in the market to prevent speculative attacks against its currency. Sorensen and Jacobsen (2005, p.17) said that “currency *intermediate* exchange rate regimes, are built on the idea that the value of the currency stems from a reference currency basket, which is then allowed to float within a narrow range.” Tallberg (2007) explains that, a *crawling peg* system entails a temporarily pegged exchange rate with seasonal adjustments.

Frederick and Fourie (2001) point out in their book that in the extreme of an instantly adjusting floating exchange rate, monetary policy would be maximally effective: any

² A currency board is a country's monetary authority that issues notes and coins (Heakal, 2008).

monetary stimulus is boosted since the falling interest rates weaken the domestic currency, which stimulates net exports.

2.2.1.3 Consequences of exchange rate movement

Exchange rate, that is the ratio at which one currency can be changed into another currency, is an important instrument for achieving the internal and external balance³ of an economy. It is also the most direct and effective means of regulating international economic competition. After the breakdown of the Bretton Woods System in 1973, large exchange rate movements appeared in the floating exchange rate system, and the growth in world trade had a significant slowdown, which motivated the study of the impact of exchange rate volatility on world trade. In recent decades, the world economy is developing towards globalization rapidly. The liberalization of capital flows, the great expansion in the scale and variety of international financial transactions and trade, would increase or reduce the impact of exchange rate volatility on world trade in different directions.

The main consequences of exchange rate movements are changes in exports and imports, in the current account; however, capital inflows can also be affected. This means that the exchange rate has an effect on the balance of payments. For example, an increase in the demand for imports will increase demand for foreign currencies, appreciating the foreign currencies relative to the domestic currency (Mujeeb, 2009).

A downward adjustment of exchange rates (Tung, 2004):

³ Internal balance: “A situation where the level of activity in an economy is consistent with a stable rate of inflation. At higher activity levels inflation tends to rise, and at lower levels unemployment is unnecessarily high. Maintaining internal balance is one objective of macroeconomic policy. Internal balance is contrasted with external balance, which is a situation where the economy has a balance of payments, on current and capital account combined, which is sustainable, at least in the medium run” (Stolper and Fuentes, 2007, p.132).

1. “Encourages remittances
2. Fuels inflation
3. Increases government debt servicing liabilities
4. Reduces income disparities
5. Reduces government income
6. Encourages export and discourages import” (Tung, 2004, p.102).

2.2.2 Purchasing Power Parity (PPP)

PPP is a theory that the nominal exchange rate between two currencies should be equivalent to the ratio of total price levels between the two countries, so that there will be the same foreign purchasing power in the monetary unit of a country (Wang, 2004).

According to a microeconomic view, the PPP hypothesis is a natural consequence or a by-product of the law of one price, reflected at an aggregate level. PPP is a very important benchmark to analyze the exchange rate movements, especially insofar as they are attached to international competitiveness.

2.2.3 Big Mac Index (BMI)

Starting in 1986, the Big Mac Index (BMI) has been generated to measuring the PPP in an informal way; it is between two currencies with a select measuring range at market exchange rates, resulting in products costing the same in different countries. The index takes its name from the Big Mac, a hamburger sold by McDonald`s restaurants. The index is a rough approximation of the purchasing power of currencies. The economists celebrated the index as it stands for the PPP notion in a simplified form. The Big Mac

hamburger is consumed in more than 120 countries. Economists compare its price in different global cities to calculate approximate PPPs.

According to Yang et al. (1999), for many countries, the Big Mac provides the Big Mac hamburger price, a measure that can be used to differentiate from the traditional foods of China. This product differentiation shows McDonald to have the market power to regulate prices in the local market. Furthermore, the price of a Big Mac reflects not only the cost of ground meat and bread, but also non-food inputs such as wages, rent, electricity, and other local operating costs; it can differ clearly across countries.

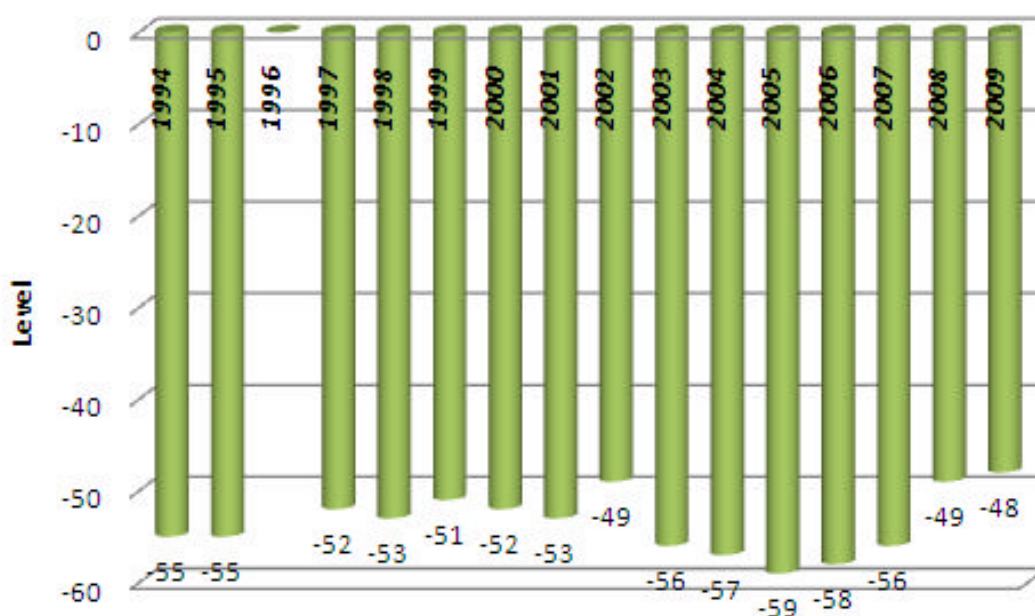


Figure 2.1 The Big Mac Index for the period 1994 to 2009.

Note: There was no data for China for the 1996 survey.

Source: *The Economist* (January 2009).

Figure 2.1 shows the BMI from 1994 to January 2009 with no data for 1996. Over the period 1994 to 2009, the BMI shows that the RMB has ranged between 59% undervalued

against the dollar in 2005 and 48% undervalued in 2009. It was widely believed at the time that the RMB was undervalued after the Asian financial crisis in 1998. The Big Mac rate might be erroneous, but it is a good indicator for the same currency for a longitudinal comparison.

According to the Economist (2008), the burgers have the lowest price in China (at 1.20 US dollar each) and the most expensive burgers are in Switzerland (at 4.52 US dollars each). According to the investigation, the most undervalued currency was the RMB and the most overvalued currency was the Swiss franc. Based on PPP, the exchange rate between the RMB and the US dollar should be 3.65 Yuan to 1 US dollars while the real exchange rate was 8.28 RMB to 1 US dollar. This means that the Chinese currency was 56% undervalued against the US dollar in 2003.

According to the Economist's (2009) study, a Big Mac in China costs 12.5 Yuan, equal to 1.82 US dollars at the current exchange rate, which denotes that China's currency is 48% undervalued. But before China's critics prepare for a fight, they should keep in mind that the PPP is aimed at where currencies should go in the long run. The price of a burger very much depends on local costs like rent and wages, which are not easy to arbitrate across countries and inclined to be lower in poorer countries. Because of this, PPP is a guide which is better to examine currency misalignments between the countries which are at a parallel stage of development.

2.2.4 Real Effective Exchange Rate (REER)

Caballero and Corbo (1989) defined the REER as a key of macroeconomic relative price, which plays an important role in the extensive resource allocation of production and spending behaviour in the economy. The REER, as a competitive standard of measuring, also determines and influences the export sector's performance.

REER is a very significant economic indicator, usually used in measuring the competitiveness of international trade. It can also be used for studying both the early warning index of the monetary crisis, and the level of resident's living standards from one country to another.

2.2.5 China's Gross Domestic Product and Consumer Price Index

The gross domestic product (GDP) is a basic measure of the economic output of an economy. "GDP can be defined in three ways, all of which are conceptually identical. First, it is equal to the total expenditure for all final goods and services produced within the country in a stipulated period of time (usually a 365-day year). Second, it is equal to the sum of the value added at every stage of production (the intermediate stages) by all the industries within a country, plus taxes and less subsidies on products, within the period. Third, it is equal to the sum of the income generated by production in the country within the period, that is, compensation of employees, taxes on production and imports less subsidies, and gross operating surplus (or profits)" (Frank and Bemanke, 2004, p.110).

One approach to measure and quantify GDP is the expenditure method:

$GDP = \text{consumption} + \text{gross investment} + \text{government spending} + (\text{exports} - \text{imports})$, or,
 $GDP = C + I + G + (X - M)$.

There are different ways of calculating GDP, which is the total amount of goods and services produced in one economy. GDP is always calculated by some type of currency unit, and for the sake of comparing GDP across countries the unit needs to be the same. Usually, the US Dollar is used for these comparisons. However, this is creating a problem because most countries have their own national currency and the price of products in their countries is not measured in dollars. This means that the price of products must be changed into dollars. The two central ways to do this are using the exchange rate and PPP.

With exchange rate calculations, the value of a country's GDP is measured by the nominal exchange rate on the currency markets. With PPP calculations, the computation is worked on how much one could buy with a given currency.

The consumer price index (CPI) measures a basket of consumer goods and services and a standard of measuring of the weighted average of the price of services and products, such as food, transportation and medical care. To calculate the CPI price changes, each item needs to be considered in a predetermined basket of products and the products are weighted based on their importance. Changes in the CPI are used to assess price changes related to the cost of living. Consumer price index is a weighted average of all the individual product prices, with weights based on expenditure shares.

“Inflation rates will cause the residents of the country with the highest inflation rate to demand more imported (cheaper) goods. If a country's inflation rate is higher than its

trading partners', the demand for the country's currency will be low, and the currency will depreciate” (Mujeeb, 2009). Figure 2.2 shows that the 6.6 % CPI figure in February 2004 was the highest since 1996, when it hit 17.1%, a penalty for over-depreciating the exchange rate in the post 1994 regime of greater economic openness.

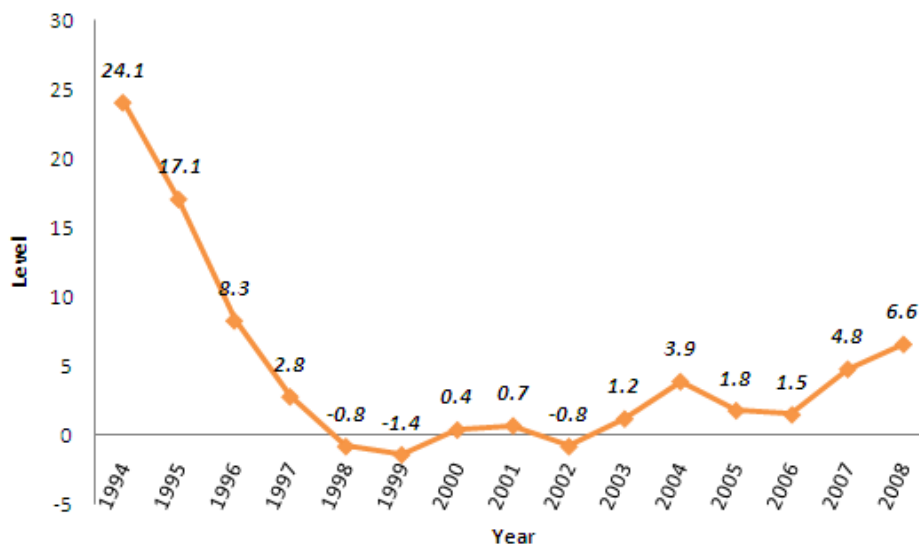


Figure 2.2: China consumer price index; from 1994-2008.

Data Sources: China Statistical Yearbook (2009).

Figure 2.3 shows that China's very high real GDP growth also became more stable after 1994. The CPI in China increased from -0.8 percent to +3.9 percent from April 2002 to April 2004; it was the highest in seven years.

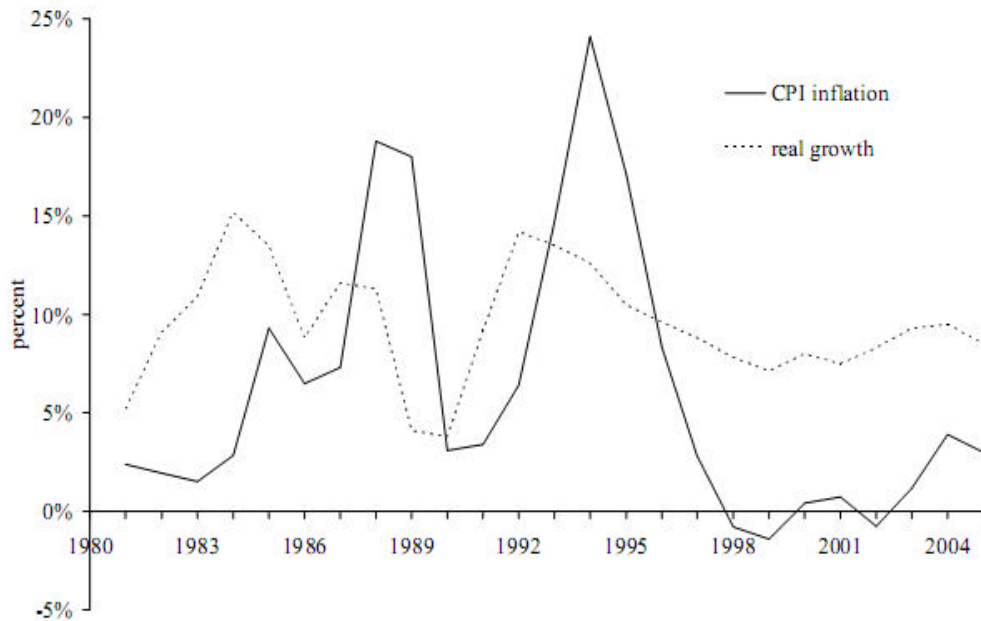


Figure 2.3. The real growth and inflation in China, 1980-2004.

Source: IMF (2005).

2.2.6 Behavioural Equilibrium Exchange Rate (BEER)

BEER serves to calculate approximately at what index level, in the medium or long term period, the market exchange rate may revert to, without shocks, (Cline and Williamson, 2007).

Whilst the PPP makes direct price comparisons for an internationally comparable baskets of products, the BEER deals with a period of indexes of domestic rates as opposed to international prices and exchange rates. The BEER is limited to determining whether the currency is undervalued or overvalued only on the premise that the currency was based on an equilibrium average real exchange rate over the specified evaluation period (Cline and Williamson, 2007).

2.2.7 Fundamental Equilibrium Exchange Rate (FEER)

Fundamental equilibrium exchange rate is estimated using a new empirical approach, where the internal and external balances are estimated simultaneously with the real exchange rate, and their long-term values are used to compute the equilibrium exchange rate (Zhang, 2002).

According to Williamson (2009), FEER which is also called macroeconomic balances, and has been broadly employed by the IMF (2007). They define internal balance as “non-inflationary full employment or whatever is judged to be the optimal pressure of demand” (Williamson, 2009). The general assumption that the long-run Phillips curve had to be vertical (except at minimal inflation rates) limited the disputes regarding the levels of internal balance.

2.3 China’s choice of exchange rate regime

2.3.1 Phase one (1986-1993)

Just before 1980 the Chinese government built Special Economic Zones (SEZ`s) in the south of China at seashore areas. Yang et al. (1999) explain that the SEZ`s developments rapidly attracted a lot of FDI. Since the Foreign-Funded Enterprises (FFE`s) grew very fast, lots of foreign exchange was needed by these companies. In 1986, the Chinese government established Foreign Exchange Adjustment Centres (FEACs), commonly known as swap centres, (Wang, 2004). Both foreign finance and domestic companies were permitted to trade foreign exchange from the swap centres. China now had a duplicated exchange rate system, one being the swap exchange rate and the other, the official exchange rate.

Lin and Schramm (2003) explained that companies could now negotiate their own exchange rates in the swap centre, depending on the forces of market supply and demand. This was a first for China.

In the developed countries the swap market was unlike the traditional swap market⁴. In this swap market foreign financed companies and domestic enterprises sold their foreign currency for domestic currency (Zhang and Pan, 2004).

Zhang and Pan (2004), pointed out that the inflexibility of the official exchange rate at the time, made it less effective than the flexible swap market exchange rate. After the opening of the first swap market in Shen Zhen, this concept rapidly accelerated in China (Zhang and Pan, 2004). Policies approved by the Chinese government in 1988, allowed for both expansion and restructuring of the exchange rate system. This gave the trader more leverage to hold a higher share of preservation and to deregulate the prices. By 1993, there were a total of 110 swap centres (Zhang and Pan, 2004).

Tan (2004) argued that though the swap market was an achievement signalling the reformation of China`s foreign exchange, it nevertheless had its own problems. The swap market exchange rate was unpredictable because of the Federal Trade Commission`s (FTC) accumulated volumes of retention quotas. It led to a major fluctuation with large amounts of quotas entering and exiting the swap. As this could have created several problems, it presented the urgency to unite the varied exchange rates. However the foreign exchange

⁴ “A traditional swap is a derivative, where two counterparties exchange one stream of cash flows against another stream. These streams are called the legs of the swap. The cash flows are calculated over a notional principal amount. Swaps are often used to hedge certain risks, for instance interest rate risk. Another use is speculation” (Tripathy, 2008, p.287).

control still remained tight. From July 5, 1986 to December 15, 1988 the official rate remained fixed at 3.72 Yuan per US dollar (see Figure 2.4).

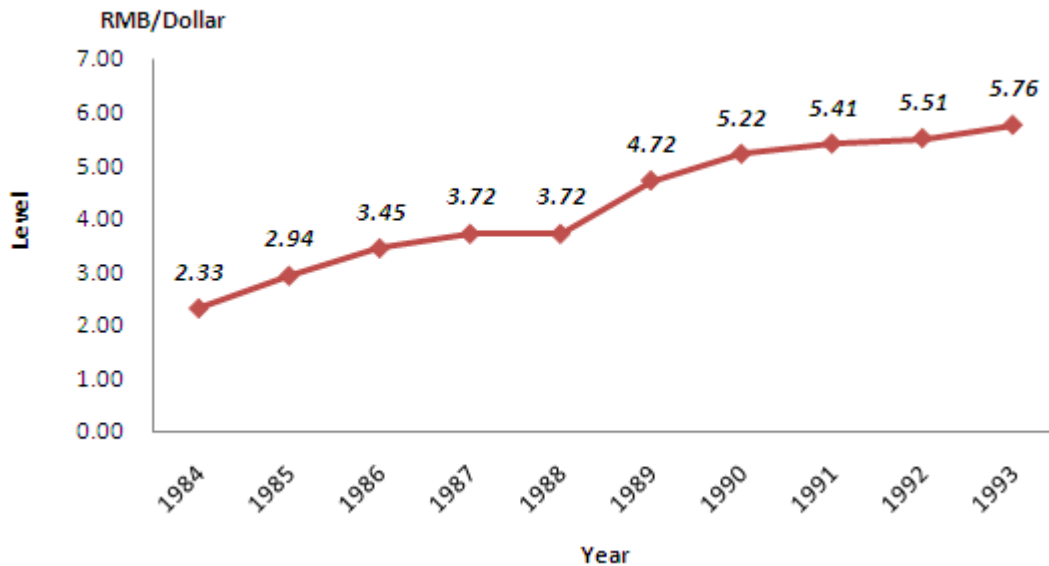


Figure 2.4. China's RMB Exchange Rate 1984-1993.

Source: data from International Financial Statistics (2008).

The official RMB/Dollar exchange rate was 4.72 at the end of 1989. Meanwhile the state administration of exchange control (SAEC) also had the authority to control market admission on the basis of guiding precedence lists and retention quotas (Mehran, et al., 1996). It also functioned on behalf of the People's Bank of China (PBC) to intermittently intervene in stabilizing prices in the swap centre. Market forces arising from the swap centre pressurised the RMB to depreciate. Augmented by China's expansive policy, this inclination increased, causing fast economic growth and high inflation. In June 1993, the RMB depreciated against the dollar from 5.25 in March 1989 to 10.5 in June 1993. By the end of 1993, the official RMB/Dollar exchange rate was regulated to 5.8. This extreme variation between the two rates, led to the PBC ruling that the RMB exchange rate be

integrated within a period of five years, in order to facilitate both the progress of trade and the process of integration with the World Trade Organization (WTO) and the global market.

2.3.2 Phase two (1994-2005)

At the close of 1993, the official and swap market exchange rates were integrated in a unitary swap market exchange rate of 8.7 Yuan per US dollar. Subsequently, a floating exchange rate regime functioned and has been managed as the official unified and a controlled floating exchange rate was established. The China Foreign Exchange Trade System (CFETS) provides trading and settlement services to its members, including domestic banks, foreign banks and many non-bank financial institutions (NBFIs). The RMB trades largely against the US Dollar but also to a smaller degree against the Japanese Yen and the Hong Kong Dollar.



Figure 2.5. China's RMB Exchange Rate 1994-2005.

Source: data from International Financial Statistics (2008).

Under the new structure, the RMB exchange rate was allowed to fluctuate within a minimal band of $\pm 0.3\%$ around the reference rate released by the PBC for interbank transactions. Retail transactions were allowed a maximum range of $\pm 0.15\%$. According to Lin and Schramm (2003) the interbank market structure was manipulated bilaterally by both the Bank of China (BOC), which dominated the retail foreign exchange and interbank transactions, and the PBC, who was the major consumer of foreign exchange, holding about 60% to 70% of the total buying power. This structure ensured that the strength of the RMB to the Dollar remained constant (see Figure 2.5). Although the inter-bank market was expected to determine the pricing for the RMB exchange rate, the RMB still basically functioned under a pegged exchange regime.

In contrast to the prospect of hastening the pace of restructuring following the liberalization of the current account in December 1996, the Asian Financial Crisis in 1997 contrarily caused China to keep strict controls on its capital account (Lin and Schramm, 2003).

In the face of devaluing Asian currencies, the Chinese authorities focussed on sustaining the stability of the RMB exchange rate. Lin and Schramm (2003) believe that enough foreign exchange reserves, strict policies on capital outflows and relatively solid fundamentals, helped the authorities to effectively sustain the RMB exchange rate. The real exchange rate regime for China from 1994-2005, could be labelled as a conventional peg. Between 1995 and 2005, the RMB was actually permitted to vary within a scope of less than $\pm 1\%$ around a de facto fixed rate of 8.28 RMB per US dollar. The rate did appreciate minimally from 8.29 RMB per US dollar in August 1997 to 8.28 RMB per US dollar at the end of 1997. This rate was sustained until July 2005 when the new managed

float connected to a market basket of currencies was implemented (see Figure 2.5).

2.3.3 Foreign exchange administration in China, 2005-2009

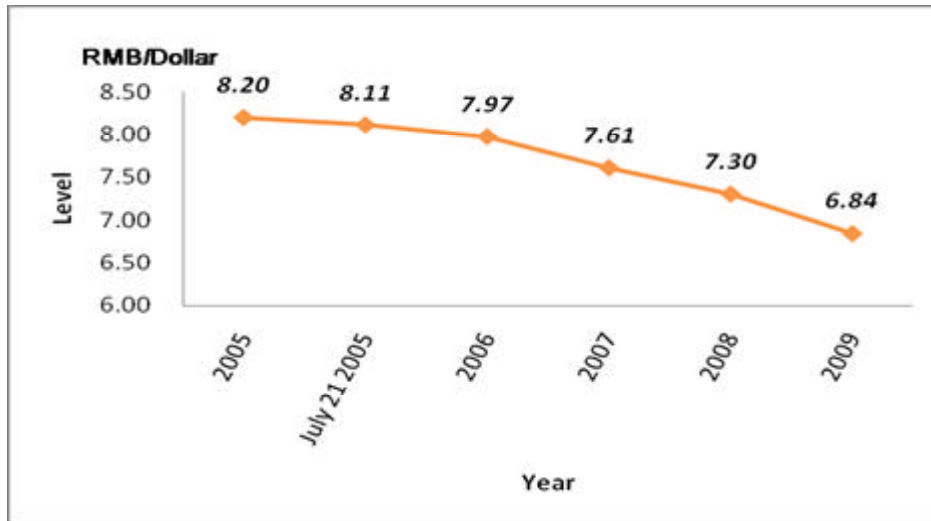


Figure 2.6: China's RMB Exchange Rate 2005-2009.

Source: data from International Financial Statistics (2009).

Figure 2.6 shows that on July 21, 2005, the Chinese government approved a managed floating exchange rate regime worked on market supply and demand with relation to a basket of currencies. In addition, the RMB was appreciated by 2.1% against the US dollar; i.e., the exchange rate of the US dollar against the RMB was regulated to 8.11 RMB: USD (Zhou and Feng, 2005).

Although this move was originally acknowledged at face value in public policy circles, early statistical tests showed that scepticism was in order. Frankel (2009) claims that the tests found that the basket allocated great weight to the dollar, and that the level of flexibility had barely improved at all.

Zhou and Feng (2005) considers that another lesson people had learned was that Asian countries needed to preserve higher levels of international reserves, since the IMF was seen to have responded insufficiently to the crisis in the late 1990s.

Tung (2004) points out that the official opinion is that China`s export increases have come from its comparative advantage of a rich low cost supply of labour, the skills of which have improved over time, and not from an operation of its currency. Zhou and Feng (2005) explains that it is usually understood that balancing China`s trade would not settle the problem of the U.S. current account deficit, which indicates an essential saving investment imbalance.

2.4 Conclusion

This chapter reviews briefly the theories following the determination of the exchange rate. It presents China`s exchange rate regime from 1986 to date. Especially after 2003, RMB has met with great external and some internal pressure to appreciate. PBC proclaimed on 21 July 2005 that China will carry out a managed floating exchange rate regime built on market supply and demand with reference to a basket of currencies. This chapter discussed the background and context of RMB appreciation. Is the RMB really undervalued? The next chapter will present the RMB revaluation debate and question whether the RMB is significantly undervalued or not.

Chapter 3

Debate on the Chinese currency: Is the RMB undervalued?

3.1 Introduction

The aim of this chapter is to debate on the Chinese currency: Is the RMB undervalued? Section 3.2 investigates evidence of RMB overvaluation. Section 3.3 investigates evidence of RMB undervaluation. Section 3.4 shows that some studies argue that the RMB exchange rate is not significantly undervalued. Section 3.5, provides the conclusion.

3.1.1 Overview of China`s exchange rate, 1994-2009.

For the most part of the past fifty years the RMB exchange rate has been fixed with a few important adjustments. It had remained at around 8.28 RMB against the dollar since 1994, when China approved a managed floating exchange rate policy. Figure 3.1 shows that the nominal exchange rate maintained at 8.28 against the dollar until July 2005 and then witnessed about 8% nominal appreciation over the next two years. With the generous appreciation of many other currencies against the dollar, RMB`s real effective exchange rate⁵ has depreciated extensively since 2002.

⁵ Real exchange rate: an exchange rate that has been adjusted for inflation.

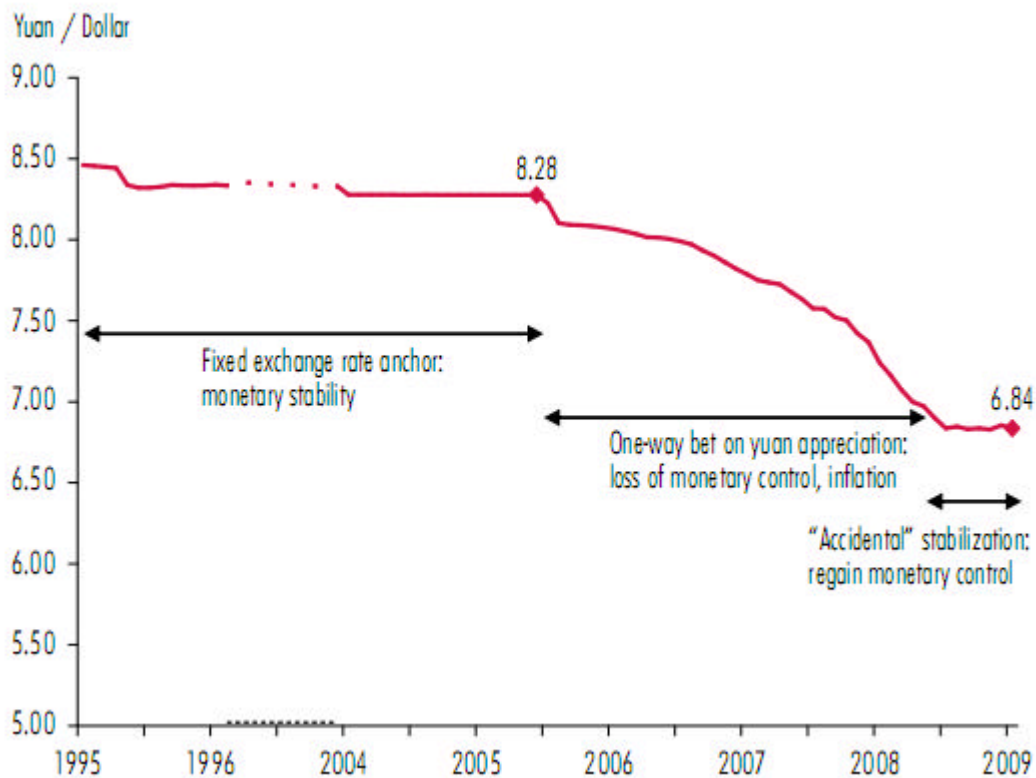


Figure 3.1. China's Monetary Policy and the Yuan/dollar Rate (1995 – 2009)

Source: FRB.

Before July 2005 China's exchange rate regime aroused little censure: in fact, it was mainly treated as contributing to the stability of its internal and external world. Under the peg, China was able to manage previously high inflation and maintain GDP growth at an average rate of about 9%. In the Asian financial crises, which happened in the years 1997-98, China was commended for struggling against a large amount of pressure to appreciate the RMB, which might have generated further instability and depreciations of other Asian currencies (Goldstein and Lardy, 2008).

From 2005, there has been increasing external pressure on China to allow the RMB appreciation against the US dollar. There is a general opinion that the RMB is currently

significantly undervalued, with a number of disputes indicating this is an issue of global concern (Goldstein and Lardy, 2008).

Since 1994, RMB has appreciated slowly year by year, especially when after 2003, RMB encountered great external and some internal pressure to appreciate. PBC proclaimed on 21 July 2005 that China will carry out a managed floating exchange rate regime built on market supply and demand with reference to a basket of currencies.

3.2 Evidence of RMB overvaluation

Table 3.1 shows a summary of the various studies on the exchange rate of RMB from 1994 to 2008.

Table 3.1 Studies of the Exchange Rate of the RMB compared with BMI.

Year	Study	Under(-)/Over-valuation(+) (percentage)		
		Model		BMI
1994 to 1995	Zhang (2004)	REER	-18.6	-55 (1994)
1994 to 1998	Zhang (1999)	BEER	Around +30	-55 (1995)
1997 to 1998	Zhang (2004)	REER	+12	-52 (1997)
1998	Bhalla (1998)	PPP	-10-15	-53
1999	Cerra & Dayal (1999)	PPP	-6	-51
2000	World Bank (2000)	PPP	-75	-52
	Frankel (2007)	PPP	-56	
	Jeong & Mazier (2003)	FEER	-60	
2001	Bénassy-Quéré et al (2004)	BEER	-47	-53
2002	Frunke & Rahn (2005)	BEER	-11	-49
	Coudert & Couharde(2005)	BEER	-18	
		FEER	-54	
	Wren-Lewis (2004)	FEER	-28	
2003	Yang & Bajeux B(2006)	PPP	-27.99	-56
	Williamson (2003)	FEER	+ 25	
	Coudert & Couharde(2005)	PPP	-41-50	
	Goldstein (2004)	FEER	-15-30	
	Wang (2004)	BEER	Near 0	
2004	Bénassy-Quéré et al (2006)	BEER	-30-59	-57
	Bosworth (2004)	PPP	-67	
	Goldstein (2004)	FEER	-20-35	
2005	Cline (2005)	FEER	-45	-59
2006	Anderson (2006)	FEER	-18-25	-58
	Bénassy-Quéré et al (2007)	BEER	-30-45	
2007	Goldstein & Lardy (2007)	FEER	-35-60	-56
	MacDonald & Dias (2007)	BEER	-8	
	Stolper & Fuentes (2007)	BEER	-7	
		FEER	-15	
2008	Eiji et al. (2008)	PPP	-10	-49

Source: Author compiled and tabulated.

Note: There was no data for China for the 1996 survey. 1994 to 1998 BMI rate RMB was undervalued by 55% in 1994 and 1995, 1997 is 52% undervalued.

In table 3.1, Zhang (1999) provided the annual data from 1994 to 1998. By using the BEER model to measure the RMB exchange rate and analyse its misalignment, he argues that, in comparison with the specified exchange rate, the REER of the RMB portrays China's international competitive power more objectively and completely, and is also close to the theory of equilibrium exchange rate. He also found that the RMB real exchange rate has been crooked during most of the sample period and undervaluation occurred during the second quarter (q2) of 1992 to the fourth quarter (q4) 1994 period. Overvaluation occurred from the first quarter (q1) of 1995 to the 1999q1, and undervaluation reoccurred since the third quarter (q3) of 1999. This also had an expanding trend since the second quarter of 2002. The paper also studies the economic reasons and policy significances of the findings. The first overvaluation occurred from 1983 to 1985. The overvaluation continued for more than 3 years and was severe; RMB was overvalued about 16.7% in 1983, 17.8% in 1984 and 13.3% in 1985. This can be attributed mainly to the fact that China's openness had increased from 7% to 13.8% from 1982 to 1985. As a result, the RMB average exchange rate devaluated from 2.39 to 1.64, whilst the RMB real exchange rate weakened from 2.50 to 1.85 and the real devaluation was a lot less than the devaluation of the average exchange rate. As for the consequence of the overvaluation, it induced a decline in foreign trade. For example, exports recorded a decreased growth in 1983 and the trade surplus was decreasing from 3.03 billion US dollars to 0.84 billion US dollar between 1982 and 1983. In the following three years, foreign trade had a deficit, and the trade deficit increased to 1.27 billion US dollars, 14.9 billion US dollars, and 12 billion US dollars in 1984, 1985 and 1986 respectively.

In 1989, according to Zhang (1999) RMB had a slight overvaluation. The growth rate of exports reduced from 20% to 10% in that year, and the trade deficit was 6.6 billion US

dollars. At the end of 1989 devaluation alleviated the result of overvaluation and evaded serious destruction of economic development (Zhang, 1999).

The overvaluation in 1997 was related to the Asian financial crisis which induced the appreciation of the RMB real exchange rate. Although the consequence of the Asian financial crisis was the degeneration of China's external economy in 1998, because of the decrease of price of the products, the overvaluation was at the equivalent level as that of 1997. The RMB real exchange rate did not appreciate. China's CPI decreased further and surrounding currencies started to appreciate in 1999, so the RMB REER had depreciated, and its overvaluation was depressed to 6% in 1999. An overvaluation can be ascribed to domestic policy regulation and does not have to devalue that currency when the currency is overvalued by less than 10%. Since this overvaluation was not serious, and China's foreign exchange regime was also highly improved, with the preceding undervaluation still playing its role, its foreign trade still sustained a big surplus. It might be hard to comprehend that the RMB was overvalued in 1997, and by the time China recognized the trade surplus was as high as 40.3 billion dollars. From 1995 to 1997, processing trade surplus increased from 15.3 billion dollars to 29.4 billion dollars and it escalated to 37.3 billion US dollars in 1999.

Liu (2005) calculated the RMB real effective exchange rate by using the comparative price level and the trade value of China's trade partners. He built a model for the RMB average exchange rate using Edwards' single equation model- its purpose being for real exchange rate misalignment. The dynamics of his model are the level of local credit, government expenditure, terms of trade, net export, and the range of foreign and local interest. The dependent variable is the RMB REER. The predictable value was the average exchange

rate. Based on the effect of its deterioration, the RMB was thought to be overvalued from 2005. Williamson (2003) estimates that the Chinese currency is overvalued at an average of 25% using the FEER approach. The RMB was moderately overvalued by 5 percent on average from 1994 to 1995. During the period from 1996 to 1998, RMB is severely overvalued in the context of the Asia financial crisis.

3.3 Evidence of RMB undervaluation

According to Zhang and Pan (2004), RMB has been undervalued twice since 1980: The first time was in 1986-1988; RMB was undervalued by 6.8 percent, 9.5 percent and 16.7 percent in 1986, 1987, and 1988 respectively. This was chiefly the result of the fall of the official exchange rate of the RMB from 3.2 to 3.7 in July 1986 and the extension of the foreign exchange trade market in 1988. Consequently, this was followed by a rapid depreciation of the actual exchange rate of the RMB from 185.4 in 1985 to 97.3 in 1988. Although this undervaluation was unable to alter the trade balance from deficit to surplus, it did decrease the deficit extensively during that period, as in 1987 when the trade deficit decreased from an average of 13.5 billion USD to 3.86 billion US dollars during 1985 and 1986. It should be noted these results were being manipulated by an incompetent foreign exchange and foreign trading system (Zhang, 2004).

The second undervaluation occurred, from 1991 to 1995 and sustained for a longer period and on a larger scale. In 1993, with the current market exchange rate being considerably less than the official rate, the undervaluation reached 18.6%. With the gradual effect of the undervaluation and the economic improvement occurring simultaneously, China

effectively gained a trade surplus of 6 billion USD and 16.7 billion US dollars in 1994 and 1995 respectively (Zhang, 2002).

Table 3.2 shows a variety of currencies and how similar the effects for the equilibrium exchange rates are. The results in Table 3.2 are offered in the article by Bé nassy-Qué ré et al (2006) and in Stolper and Fuentes' (2007) They agree that:

- the euro and the pound sterling have been overvalued;
- the Japanese Yen and the Chinese RMB have been undervalued; and
- the results on the US dollar are more indefinite.

Table 3.2 Estimated effective equilibrium exchange rates misalignments

Currency	Bé nassy-Qué ré et al. (2006)	Stolper and Fuentes (2007)
USD	Overvalued (5-10%)	Undervalued (around 5%)
EUR	Overvalued (1-10%)	Overvalued (around 6%)
CNY(RMB)	Undervalued (30-45%)	Undervalued (around 5%)
JPY	Undervalued (7-12%)	Undervalued (around 8%)
GBP	Overvalued (15-20%)	Overvalued (around 20%)

Source: Schnatz, 2006.

For the RMB, however, there is an important divergence in terms of the importance of the misalignment. While Bé nassy-Qué ré et al. (2006) find an undervaluation of the Chinese currency RMB of 30-45%, Stolper and Fuentes (2007) suggest a more modest undervaluation of the RMB (about 5%).

Bosworth (2004) compiled the PPP study in table 3.2, for the Tokyo Club. Most of the paper was devoted to describing the theories concerned with computing misalignments. He argued that, while a simple PPP evaluation would recommend the need for the RMB's value to quadruple, the standard Balassa-Samuelson analysis implies that this recommendation would be excessive.

Frankel (2007) also uses the PPP method to focus on the advantages of different exchange rate regimes for China. He asserts that the RMB was approximately 36% undervalued in comparison to the US dollar in the year 2000 (this means the RMB would need a revaluation of 56% to eliminate undervaluation). Frankel also argues that, despite the undervaluation being approximately equal to this amount in 1990 (at 34%), the unchanged level of undervaluation in the face of much higher current account surpluses in recent years further questions the reliability of the improved PPP method.

Coudert and Couharde (2005) utilised the BEER, FEER and PPP as their models of assessment. Their enhanced PPP assessment, places the Chinese undervaluation between 41% and just over 50%. And they also used a panel data evaluation of the Balassa-Samuelson effect in 21 markets over the period 1980q1 to 2002q4. The dependent variable is a real exchange rate index against the US dollar. They assess China to be notably less misaligned (18% undervalued in 2002) as compared to their improved PPP test. They discuss the reasons for the absence of the Balassa-Samuelson result evident in operation in China during 1998q1 to 2004q4 for which they have statistics, but do not identify the culprit: China's exchange rate policy adjustment.

Jeong and Mazier (2003) and Bé nassy-Quéré (2004) point out that this big misalignment is in line with other accessible estimates derived either from FEER or BEER methods. Table 3.1 shows that these studies also uncover a great undervaluation of the RMB, particularly against the dollar in 2000-2003. Other studies (Goldsyein, 2004; Wang et al., 2004) also advise that the RMB exchange rate is undervalued. In the study of Bé nassy-Quéré (2004), another unpredictable factor is comprised in the model: net foreign capital is supposed to bring an appreciation of the currency, when compared with a large sample of countries. Here again, improvement in net foreign capital in China should have resulted in an appreciation of the RMB.

3.4 Evidence of no clear indication that the RMB is significantly undervalued

Tallberg (2007) stated that the RMB is not significantly undervalued. If the RMB was far below its balance level, China`s trade surplus would be pretty high compared to China`s trade amount or GDP. In fact, the ratio of trade surplus to GDP is 10.1% in 2006, lower than 13.4% in 1998 when the RMB was broadly anticipated to depreciate. International contrast also shows that the ratio of trade surplus to GDP for China is the smallest in East Asia, but the other East Asian currencies are not recognized as undervalued. In 2004, for example, the ratio is 1.7% in China, 3.7% in Japan, 19.8% in Singapore, 4.2% in Korea, 13.7% in Malaysia, 3.2% in Philippine, and 4.5% in Thailand (Tallberg, 2007). It can be assumed that the issue of the RMB exchange rate was raised primarily because of international political factors.

China's foreign exchange reserves are certainly rapidly increasing. This problem, however, cannot be worked out by extensive appreciation. In the short term, looking forward to appreciation will make trade dealers inflate export amounts and understate import amounts, resulting in higher trade surplus and foreign exchange reserves. In the long term, appreciation will weaken the competitive role of the areas of export and import substitution. The excess capacity of these areas will force them to reduce prices. Price cuts will counteract the influences of appreciation. Finally, trade surplus and foreign exchange reserves will increase again (Chu, 2005).

The most important thing is to eliminate the expectation of appreciation and control currency trading with actual measures. If the RMB appreciates gradually (say 3% annually), international investors will lose money if they operate the RMB, because their trading cost (4-5%) is higher than the appreciation scope of the RMB (Tallberg, 2007).

Huge foreign exchange reserves provide China the chance to regulate its export tariff rebate policy and Foreign Direct Investment (FDI) policy, enlarge its domestic consumption, improve its macroeconomic management ability and improve the institutional arrangements for foreign exchange reserve operation.

3.5 Conclusion

Using a range of studies, this chapter described and examined the assertion that the Chinese currency has been and is presently undervalued.

This study has found that for the same year the various models of currency valuation frequently do not agree. For example in the year of 2003, Williamson (2003) used FEER model the RMB was overvalued 25%, Goldstein (2004) also used a FEER model but the RMB was undervalued from 15% to 30%. Wang (2004) used BEER model the RMB was near 0. For 2003, Coudert & Couharde (2005) used the PPP model the RMB was undervalued between 41% and 50%; the BMI model for 2003 showed the RMB was undervalued 56%. The BMI model from 1994 to 2008 showed the RMB undervalued in a range from 48% to 59%.

Table 3.1 showed that the majority of the studies investigated show the RMB was undervalued for the period 1994-2009. Since 2005, however, the BMI and PPP techniques and the RMB/Dollar exchange rate all show that the RMB is still undervalued, but less undervalued each year. For example, the BMI was 59% undervalued in 2005 and was only 48% undervalued in 2009.

The evaluation of the RMB using measures based on basic PPP will always be higher than those dependants on the traded products market. Price indices, comprising the BMI, contain non-tradable components, and China's wage rates are considerably lower than those in the United States.

The next chapter presents the findings of this study, and provides some conclusions as well as recommendations for future research.

Chapter 4

Conclusions

The aim of this chapter is to show the research problem and present the major finding of this study.

The first objective of this study is to review and critically comment on China's exchange rate regime over the period 1994 to 2008. This study reviewed the RMB exchange rate system divided into three planned periods of economic transition.

First, phase one (1986-1993). From July 5, 1986 to December 15, 1988 the official rate remained fixed at 3.72 Yuan per US dollar, during which time the RMB depreciated by 21.2% (see Figure 2.4). The official RMB/Dollar exchange rate was 4.72 at the end of 1989. Augmented by China's expansive policy, this increased, causing fast economic growth and high inflation. In June 1993, the RMB/Dollar exchange rate depreciated from 5.25, in March 1989, to 10.5, in June 1993. By the end of 1993, the official RMB/Dollar exchange rate was regulated to 5.8. This extreme variation between the two rates, led to the PBC ruling that the RMB exchange rate be integrated within a period of five years, in order to facilitate both the progress of trade and the process of integration with the World Trade Organization (WTO) and the global market.

Second, phase two (1994-2005). At the close of 1993, the official and swap market exchange rates were integrated in a unitary swap market exchange rate of 8.7 Yuan per US dollar. Subsequently, a controlled floating exchange rate was established. The real exchange rate regime for China from 1994-2005, could be labelled as a conventional peg. Between 1995 and 2005, the RMB was actually permitted to vary within a scope of less

than +/-1% around a de facto fixed rate of 8.28 RMB per US dollar.

Third, phase three (2005- 2009). On July 21, 2005, Chinese authorities declared a change to a new exchange rate regime. The exchange rate from then on would be set with reference to a basket of other currencies. Although this move was originally acknowledged at face value in public policy circles, early statistical tests showed that scepticism was in order. Frankel (2009) claims that the tests found that the basket allocated great weight to the dollar, and that the level of flexibility had barely improved at all.

The second objective of this study is to review and critically comment on whether the RMB was undervalued over the period 1994 to 2008. This study finds that the evidence is mixed. This study undertakes an objective evaluation of studies on the RMB exchange rate and compares the standard exchange rate models including the FEER, BEER, PPP and BMI models commonly used in the literature to explain the exchange rate behaviour of developing and transition economies.

This study shows clearly that the BMI data of each year shows a significantly different perspective compared with the data of other models. Hence the need to be aware of the various perspectives on the RMB and to models very cautiously. For example, Zhang (1999) using BEER to evaluate the RMB from 1994 to 1998 shows the RMB was 30% overvalued, but the BMI showed the RMB to be undervalued between 52% and 55% over the same period. In 2008, Eiji et al. (2008) using the PPP model showed that the RMB is 10% undervalued, but the BMI shows that the RMB exchange rate is 49% undervalued. As a result, most articles (see Table 3.1) refer to the extreme accumulation of foreign exchange reserves, related to current account surplus and FDI, as proofs of undervaluation.

In 2000, Jeong and Mazier (2003) showed the RMB was 60% undervalued. In 2007 Goldstein and Lardy, based on a FEER model, both senior fellows at the Peterson Institute, estimated the needed appreciation to eliminate undervaluation at between 35% and 60%. Their method uses an elasticity approach, which emphasizes price changes to determine a country's balance of payments and exchange rates. They suggest that each 10% change in China's real effective exchange rate is associated with a change of 2% to 3.5% of GDP in China's global trade balance.

In 2001 Bé nassy-Quééré et al (2004) showed that the RMB was 47% undervalued. In 2002, Frunke and Rahn (2005) and Coudert and Couharde (2005) showed that RMB was 11% and 18% undervalued. Bé nassy-Quééré et al. (2006; 2007) showed the RMB undervaluation at 30% to 59% for 2004 and 30% to 45% for 2006. MacDonald and Dias (2007) computed the undervaluation rate of the RMB at 8% using a BEER model.

Goldstein and Lardy (2008), Williamson et al. (2003, 2008) and Frankel (2009) find evidence of a widening RMB undervaluation. They point out that China's global current account surplus has grown without disturbance from 1 percent of GDP to 9 percent of GDP from 2001 to 2006, and to an expected 11 percent of GDP in 2007; that China's net assets account position has also been in surplus over this time, at times becoming even more connected to GDP than the trade balance surplus; that China's actual effective exchange rate through January 2008 has really depreciated on a cumulative basis over this time despite the 15 percent nominal appreciation of the RMB comparative to the US dollar; that China's monthly involvement in the exchange market has been constant, one-way, and

growing in size; and that China's local economy has been increasing at or more than its potential.

The PPP studies showed, in 2000, that the RMB was 75% undervalued (World Bank, 2000) and 56% undervalued in 2003 (Frankel, 2007). Coudert and Couharde (2005) utilised the PPP as their models of assessment and places the RMB undervaluation between 41% and just over 50%. But the degree that the RMB is undervalued has reduced since 2005 and Eiji et al. (2008) showed the RMB was 10% undervalued in 2008.

This study investigated the BMI over the period 1994 to 2009. The BMI is a good indicator for the same currency for a longitudinal comparison. Using the BMI, it is evident that the RMB has been significantly undervalued for the entire period under review. It is clear that the RMB was 59% undervalued against the dollar in 2005. Since 2005, the RMB has strengthened against the dollar and in 2009 the BMI showed that the RMB was now 48% undervalued.

An IMF study by Dunaway and Li (2005), for example, shows that all the estimates of the RMB undervaluation range from zero to almost 50 percent. Furthermore, Dunaway and Li (2005) argue that a more definitive answer on the undervaluation of the RMB is improbable to come out soon because of information problems, instability in the essential modelling relationships, and disputes on the appropriate methodology. These issues of data, modelling and methodology provide important areas for future research.

In conclusion this study has contributed towards a better understanding of the evolution in China`s exchange rate regime from 1994 to 2008.

References

Anderson, J., 2006. *The Complete RMB Handbook* (fourth edition) Hong Kong:UBS.

Bé nassy-Quéré, A., Béreau, S. and V. Mignon, 2004. Burden Sharing and Exchange Rate Misalignments Within the Group of Twenty. In C.F Bergsten and J. Williamson, eds., *Dollar Adjustment: How Far? Against What?* (Washington: Institute for International Economics).

Bé nassy-Quéré, A., Béreau, S. and V. Mignon, 2006. *World Consistent Equilibrium Exchange Rates*. (Paris: CEPII working paper no. 2006-20).

Bergsten and J. Williamson, eds., 2004. *Dollar Adjustment: How Far? Against What?* (Washington: Institute for International Economics).

Bhalla, A. S., 1998. The Role of Trade and Foreign Investment. *Economics of Planning* 31:151-173,1998. UK.

Bosworth, B., 2004. Valuing the RMB. *Tokyo Club Research Meeting*, Available from: http://www.brookings.org/views/papers /bosworth/20040209_bosworth.pdf. [Accessed on 5th Feb 2009].

Caballero, R. J. and Corbo, V., 1989. "How does uncertainty about the real exchange rate affect exports?," Policy Research Working P 221, The World Bank.

Cerra, V. and Dayal, G., 1999. China's trade flows: Changing price sensitivities and the reform process. IMF Working Paper No. 99/01. Washington, DC.

China Statistical Yearbook. 2009. National Bureau of Statistics of China. ISBN/ISSN: 978-7-5037-5800.

Cline, W. R., 2005. *The United States as a Debtor Nation*. (Washington: Institute for International Economics and Center for Global Development).

Cline, W. R. and Williamson, J., 2007. *Estimates of the Equilibrium Exchange Rate of the Renminbi: Is There a Consensus and, If Not, Why Not?* Washington: Peterson Institute.

Copeland, L. S., 2005. *Exchange Rate and International Finance*. 4th ed. Pearson Education Limited.

Coudert, V. and Couharde, C., 2005. "Real Equilibrium Exchange Rate in China", *CEPII working paper* No 05 01.

Coudert, V. and Couharde, C., 2007. *Real Equilibrium Exchange Rate in China: Is the Renminbi Undervalued?* University of Paris.

Dunaway, S. and Li, X. M., 2005. "Estimating China's "Equilibrium" Exchange Rate," IMF Working Paper No. 05/202 (Washington, International Monetary Fund).

Economist Intelligence Unit (2008), Country Profile 2008: China, London, United Kingdom: *The Economist Intelligence Unit*.

Edwards, J. E., 1979. *Journal of Economics and Management*. 6, 332–334 (1979).

Eichengreen, B., 2006. *China's Exchange Rate Regime: The Long and Short of IT*. University of California Berkeley.

Eiji, F. Yin, W. C. Menzie, D. C., 2008. Pitfalls in measuring exchange rate misalignment: the Yuan and other currencies. Working Paper 14168. <http://www.nber.org/papers/w14168>. Cambridge, MA 02138. July 2008.

Federal Reserve Bank of Boston. 2009. *The International Adjustment Mechanism*. Federal Reserve Bank of Boston Conference Series No. 2.

Fischer, S., 2001. Exchange Rate Regimes: Is the Bipolar View Correct? *International Monetary Fund*.

Frank, R. H. and Bermanke, B. S., 2004. *Principles of Macroeconomics*. 2nd ed. Tsinghua University Press.

Frankel, J. and Wei, S. J., 2007. Assessing China's Exchange Rate Regime. *Working Paper 13100, National Bureau of Economic Research*.

Frankel, J. 2007. Comments on Cline and Williamson`s Estimates of the Equilibrium Exchange Rate of the Renminbi? Organized by Morris Goldstein and Nicholas Lardy, Petersen Institute for international Economics, Washington DC.

Frankel, J., 2009. New Estimation of China`S Exchange Rate Regime. National Bureau of Economic Research. *Massachusetts Avenue Cambridge, MA 02138.*

Frederick, C. and Fourie, N., 2001. *How to Think and Reason in Macroeconomics*. 2nd ed. Juta Education (Pty) Ltd.

Funke M. and Rahn J., 2005. *Just How Undervalued is the Chinese Renminbi?*, "The World Economy", Vol. 28, No. 4, pp. 465-489.

Goldstein, M,Lardy, N. Wang, Y., 2004. *Adjusting China`s Exchange Rate Policies*. Revised version of the paper presented at the International Monetary Fund's seminar on China`s Foreign Exchange System. Dalian, China.

Goldstein, M. and Lardy, N., 2006. China`s Exchange Rate Policy Dilemma. *American Economic Review*, 96(2), May, pp. 422-26.

Goldstein, M. and Lardy, N., 2007. China`s Exchange Rate Policy: An Overview of Some Key Issues. Paper prepared for the conference on China`s Exchange Rate Policy, Peterson Institute for International Economics, Washington, October 19.

Goldstein, M. and Lardy, N., 2008. Peterson Institute for International Economics:

Debating China's Exchange Rate Policy. April 2008 • 401 pp. ISBN 978-0-88132-415-0.

Heakal, R., 2008. *Floating Rates Versus Fixed Rates*. [online]. available from: http://finance.yahoo.com/education/currencies/article/106076/Basic_concepts_for_currencies_markets. [Accessed on 9th Nov 2008].

IMF., 2005. *Asia-Pacific Regional Outlook*, September 2005, Washington, DC: International Monetary Fund.

IMF., 2007. *World Economic Outlook*, October 2007, Washington, DC: International Monetary Fund.

International Financial Statistics Yearbook , 2008. Washington, DC, International Monetary Fund, 2008.

Jeong and Mazier., 2003. Exchange Rate Regimes and Equilibrium Exchange Rates in East Asia, *Revue Economique*, Vol.54, No.5, pp.1161-1182.

Lardy, N., 2002. *Integrating China Into the Global Economy*. Washington: Brookings Institution Press.

Lin, G. and Schramm, R. M., 2003. China's Foreign Exchange Policies Since 1979: A Review of Developments and an Assessment. *China Economic Review*, 14, 246-280.

Liu, L. G., 2005. China`s Role in the Current Global Economic Imbalance. *RIETI Discussion Paper*, Series 05-E-0105.

MacDonald, Ronald, and Preethike Dias. 2007. BEER Estimates and Target Current Account Imbalances. Paper presented to a workshop at the Peterson Institute sponsored by Bruegel, KIEP, and the Peterson Institute, Feb.

McKinnon, R. I., 2006. Predicting RMB exchange rate. Wall Street Journal. (Eastern edition). Aug 29, 2006. p.14.

Mehran, H., Quintyn M., Nordman, T. and Laurens, B., 1996. *Monetary and Exchange System Reform in China: An Experiment in Gradualism*. [online]. available from: <http://www.img.org/external/pubs/>. [Accessed on 18th Nov, 2008].

Mujeeb,A., 2009. How does any currency appreciate or depreciate? Money Management. [online]. available from: http://wiki.answers.com/Q/Howdoes_any_currency_appreciate_or_depreciate [Accessed on 20th May, 2010].

Naughton, B., 1996. China's Emergence and Prospects as A Trading Nation. *Brookings Papers on Economic, Activity 2*.

Rogers, J. H and Jenkins, M., 1995. What is Foreign Exchange Intervention? *Journal of International Economics*. Vol: 38(3-4). P. 339-360

Schnatz, B., 2006. Is reversion to PPP in euro exchange rates non-linear? Published in: *International Economics and Economic Policy*, 4, 3, 281-297, November.

Sheffrin, M. S. and Arthur, S., 2003. *Economics: Principles in action*. Upper Saddle River, New Jersey 07458: Pearson Prentice Hall. pp. 458. ISBN 0-13-063085-3.

Sorensen, P. and Jacobsen, H. W., 2005. *Introducing Advanced Macroeconomics: Growth and Business Cycles*. McGraw Hill.

Stokes, A., 2006. *A Fixed or Float Exchange Rate Strategy?* [online] available from: http://www.jamaicaobserver.com/magazines/Business/html/20060412T2100000500_102487_OBS_A_FIXED_OR_FLOAT_EXCHANGE_RATE_STRATEGY_.asp. [Accessed on 18th Nov, 2008].

Stolper, T. and Fuentes, M., 2007. GSDEER and Trade Elasticities. Paper presented to a workshop at the Peterson Institute sponsored by Bruegel, KIEP, and the Peterson Institute, February.

Tallberg, A., 2007. Assessing China's Exchange Rate Regime. *Advanced Macroeconomics*.

Tan, C., 2004. China Banks on Reform. *Asian Chemical News*, 11. The People's Banks of China (2004). *China Monetary Report, Quarter 4*.

The Economist, 1994 – 2009. *The Big Mac Index*. [online] available from: <http://www.economist.com/markets/bigmac/> [Accessed on 11th Jan, 2010]

Tung, C. Y., 2004. RMB Revaluation Will Serve China's Self-Interest. *China Economic Review*, 15(3), 331-5.

Wang, T., 2004. China: Sources of Real Exchange Rate Fluctuations. *IMF Policy Discussion Paper*, WP/04/18.

Wapedia., 2004. *Wiki: Gross domestic product*. [Online] Available from: <http://wapedia.mobi/en/GDP> [Accessed on 18th Nov, 2008].

William, R .C. and Williamson, J., 2008. *New Estimates of Fundamental Equilibrium Exchange Rates*. Peterson Institute for International Economics Policy Brief 08-7. Washington: Peterson Institute for International Economics. Energy Information Administration. 2009.

Williamson, J., 2003. The renminbi exchange rate and the global monetary system, Institute for International Economics, Washington 2003.

Williamson, J., 2009. *Estimates of Fundamental Equilibrium Exchange Rates*. PB09-10. Washington: Peterson Institute for International Economics.

World Bank., 2000. *World Development Indicators* (Washington: World Bank).

Wren-Lewis, S., 2004. The Needed Changes in Bilateral Exchange Rates. In C.F.

Yang, Z. et al., 1999. *Foreign Exchange and Foreign Debt Management Handbook*. Beijing: Bureau of Foreign Exchange Press.

Yang, J. and Bajeux, B., 2006. "Is the Chinese Currency Undervalued?" International

Research Journal of Finance and Economics, 2, March, pp. 106-30.

Zhang, P. X., 1999. Theory and model of RMB equilibrium exchange rate, *Economic Research*, No. 12, 22- 28. (Chinese version).

Zhang, P. X., 2002. Equilibrium and Misalignment: An Assessment of the RMB Exchange Rate from 1978 to 1999. Stanford, CA 94305-6015.

Zhang, F. and Pan, Z.H., 2004. Determination of China`s Long-Run Nominal Exchange Rate and Official Intervention. *China Economic Review*, 15(3), 360-5.

Zhang ,Z., 2004. “Real Exchange Rate Misalignment in China: An Empirical Investigation, ”*Journal of Comparative Economics* . No. 29.

Zhou, F. and Feng, X., 2005. An Empirical Study on Components of CPI and Its Forecasting for Macroeconomic Performance in China. *Working Paper. Debon, China: Fixed Income Department.*