

A STUDY OF CHINESE YUAN (RMB) APPRECIATION ACCOMPANYING WITH OTHERS FACTORS INCLUDING FOREIGN DIRECT INVESTMENT (FDI) AND THEIR EFFECT ON CHINA ECONOMY

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Abstract

The Chinese Yuan (RMB) has been on the trend of appreciation over the last decade, and such a trend will likely be continuing for some years over the next decade. According to some scholars in their published literatures, the appreciation of RMB, the influx of Foreign Direct Investment (FDI) has been ongoing accompanying the sustained growing economy in mainland China over the past decade. It is believed that the China economy has an implication from some significant factors including appreciation of RMB, interest rate of RMB, inflation and continuous increase of FDI for the next several years. The present study aims to provide an emphasis on investigation into effect on China economy as a result of appreciation of RMB and FDI together with some other factors, and to provide an outlook on the economy in China for the coming decades. First, a review was carried on relevant background information and development history of RMB and FDI. There are many reasons and factors behind leading to the sustained growth in the economy in China in the last decade and such effects were in coverage in the literature review. An overview of the development of RMB exchange mechanism, and other variables including (1) RMB exchange rate, (2) China interest rate, (3) Foreign Direct Investment (FDI), (4) Trade Balance of China, (5) Annual Inflation rate in China, (6) Energy Consumption in China, (7) Foreign Exchange Reserve in China, (8) China wages, (9) China External Debt and (10) China Consumer Price Index, which may have effect on the growth of the economy in China is covered in the literature review conducted in Chapter 2.

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1. Introduction

1.1. Background of the Research

In early eighty of the last century, China began to remove some of its barriers to encourage the inflow of Foreign Direct Investments (FDI). Following a period of relatively slow growth, the inflow of FDI into China was eventually picked up in early 1990, and it will likely continue to be a key player in the integration of China into the world economy. The future of Chinese state-owned enterprises and the country's economic development are closely related to FDI activities. In particular, coastal regions of China have received the bulk of FDI inflows to the country.

2. Literature review

1.2. Introduction

The continued depreciation of US dollar has progressively developed pressure from the west on the China's currency reform policy. Many developed countries, particularly the US, have urged China to accelerate its pace on removing its hurdle of manipulating RMB exchange rate and allow RMB appreciation. In fact, in 1994 China has already set a reference exchange rate for the RMB against USD, a breakthrough step for the exchange rate regime in China.

2.2. Background of Chinese Yuan Exchange Rate Regime and revaluation

Tung and Baker (2004) argued that the optimal adjustment of 15% for RMB should be made in a one-time against the USD. In addition, China's trade surplus is largely due to slowing imports, rather than growing exports. According to Frankel (2006), Zhang and Pan (2004), Chang and Shao (2004), and Goldstein and Lardy (2003), the RMB was undervalued in as much as 15 to 35%. A few US politicians believed that the undervalued RMB is responsible for much of the U.S trade deficit while other commentators, such as Tung and Baker (2004), and Frankel (2006) argued that a considerable revaluation for RMB is deadily needed in order to serve China's own interest timely. Joseph Stiglitz (2005) also argues that the RMB revaluation will have

little effect on the trade balance for the US and the global economy since the gaps in reduced Chinese imports in the US could be easily filled by increased imports from other developing countries.

According to Guerinneau and Guiliamont Jeanneney (2005), China has experienced a prolonged period of falling prices since 1994. Bergsten (2006) criticized that China RMB has been kept undervalued and prevent most other Asian countries from allowing their currencies to rise against the dollar changing competitive position against China. According to K. Bradsher (2007), the China Central Bank has long favoured a stronger RMB. Like most of his Western counterparts, the government is less likely to opt for a one-time revaluation and more likely to choose a faster pace of daily appreciation. According to Bhala (2008), the U.S. government demanded a timely revaluation of the RMB and also was to threaten punitive tariffs against merchandise from China for a change of rules on currency policy.

2.3. The global crisis in 2008 and the rising Chinese Yuan

According to Mengzhi (2009), the US has been widely blamed for the recent financial crisis and China continued to grow during the recession in 2008 and 2009. The US, following the bubble conditions in its subprime mortgage market and in the state of growing deficits, proved more vulnerable than it had been before the financial crisis. According a Pew Research Center (2009) poll, majorities of countries believed that China would replace US as the world's leading superpower. As projected by National Intelligence Council (2008), the U.S. dominance would be "much diminished" by 2025. Some analysts believed that China's impressive success in overcoming the financial crisis and its increased holdings of dollars greatly put China in a favourable position in the international stage.

2.4. Chinese Yuan on its path to become a Reserve Currency

According to Carbaugh and Hedrick (2008), the US Treasury Bills provides a highly liquid platform that allows foreign central banks to convert their currencies into interest-bearing and US dollar-denominated assets. The pros of the US included the promise of a good yield, secure political institutions, liquidity and an enormous support of financial expertise. The US faced a dilemma because it cannot run a current-account deficit and a current-account surplus at the same time (Triffin, 1960). The U.S. trade deficits together with the amount of U.S. borrowing had resulted in a depreciation of USD. Since

the US is the prime supplier of both reserve currency and assets for international reserves, it must continue to maintain the issue of monetary liabilities sufficiently attractive enough for acquisition by other nations (Stiglitz, 2006). According to Xiaochuan (2009), the addition of the RMB as a reserve currency is not inconceivable, and officials at the Peoples Bank of China had cited the “Triffin Dilemma” as a main concern USD’s present and future role as a reserve currency.

2.5. Influx of Foreign Direct Investment (FDI)

According to China State Statistics Bureau (1994), China had long been one of the most closed economies in terms of policy toward foreign investment and external debt. Among the studies of economic growth, Krugman’s (1994) and Collins & Boseworth (1996) contributed in the study on whether China would experience the same problems of other Asian countries in terms of excessive capital and labour input accumulation without rising production efficiency, which were posited as a possible explanation in the case of China’s remarkable growth. Until recently, according to other scholars (Wei, 1995; Borensztein, de Gregorio, & Lee, 1998; Wu, 1999; Wei & Liu, 2001; Graham & Wada, 2001; Whalley & Xin, 2006; Tuan & Ng, 2004, 2007; Ng & Tuan, 2006; Yao & Wei, 2007), inward FDI has been considered a critical factor among others contributing to sustained economic growth in China. Yao & Wei (2007) and Tuan & Ng (2007), investigated into the exact mechanism of how FDI has impacted the development process.

From a technical perspective, technological aspects had been considered to relate more to innovation other than R&D, where firm sciences would draw improvements from technology advancements in and technical progress as sources of innovation. FDI is believed to transfer technology and technological know-how to the host countries via channels such as spillovers, demonstration and transfer of management know-how (Teece (1977); Aitken & Harrison (1999); Blomstrom & Kokko (2001); Javorcik (2004)). FDI not only served as a capital injection to the domestic market but also played a key role for technological spillover and advancement of managerial skills. FDI was believed to be embedded with innovative technologies and hence improve efficiency in production. A number of literatures suggested that FDI was a significant source of innovation and technology transfer (Caves, 1974; Findlay, 1978; Mansfield & Romeo, 1980).

In sum, the above evidence suggests that the critical role of FDI in technological transfer and innovative activities are of significant effect. According to Archibugi & Iammarino (2002), multinationals play

a key role in global generation of innovations in the form of R&D and acquisitions of existing R&D laboratories or green-field R&D investment.

2.6. Energy Consumption in China

According to (Galli 1998, Sinton and Fridley 2000), the fall in end-use energy intensity is partially the result of an improvement in energy efficiency and development of new materials. These explanations have also been supported by a recent study involving firm-level data (Fisher-Vanden et al. 2004).

2.7. Inflation Rate in China

There are two ways for RMB to appreciate against the USD through changes in (i) nominal exchange rates and (ii) inflation. China intervenes the RMB exchange rate by selling RMB for USD to keep RMB from rising and piles up massive "reserves" of USD. According to Huang and Gu (2006), the rapid growth of foreign exchange reserve has an implication to an effective monetary policy and results in higher inflation. Also, the RMB appreciation not only results in lower domestic inflation but also has a long term impact on CPI. According to Ihrig, Kamin, Lindner, and Marquez (2007), the phase of low inflation rates can be attributed to China's opening up since the early 1980s. Several papers find no evidence for the hypothesis that the role of import prices in explaining consumer price inflation has increased with growing trade openness.

2.8. Trade Balance in China

Global imbalances have been a controversial financial and economic issue in recent years. China has been blamed to be accountable for the global financial crisis and the subsequent economic recession in the US and European countries. According to the statistics of China Customs (2008), China had a US\$298 billion trade surplus in goods. It was only US\$5.4 billion in 1994. Decomposing trade into normal and processing trade reveals that, the drastic growth of the trade surplus is mainly due to the rapid expansion of processing trade.

2.9. GDP growth in China

According to the National Bureau of Statistics of China, the major change took place in 1992 when Deng Xiaoping's Southern Tour led foreign direct investment inflows into coastal areas massively and generated a wave of government investment in Shanghai. Record

trade and GDP growth followed. Since 1993 when Zhu Rongji was appointed to rein in the overheating economy at the time, growth rates in China was slowed down gradually in subsequent years, ending with a "soft landing" the financial market in China.

2.10. China Consumer Price Index (CPI)

According to National Bureau of Statistics of China, Consumer Price Index (CPI) as shown in Figure 2.8a China decreased to 101.70 Index Points in October of 2012 from 101.90 Index Points in September of 2012. Consumer Price Index (CPI) in China is reported by the National Bureau of Statistics, China.

2.11. China Population

According to Statistical Bureau of China and World Bank, the total population in China was last recorded at 1347.35 million people in 2011 from 667.1 million in 1960, changing 102 percent during the last 50 years. From 1960 to 2011, China Population as shown in Figure 2.9a averaged 1043.72 Million reaching an all time high of 1347.35 Million in December of 2011 and a record low of 660.33 Million in December of 1961.

2.12. China Wages

According to Statistical Bureau of China, wages in China increased to 42452 RMB in 2011 from 37147 RMB in December of 2010, accounting for a 14.28% significant increase in average wages. The sharp increase in wages in China, particularly in the Guangdong province in recent years, has created a huge impact on the processing industries.

2.13. China Foreign Exchange Reserves

According to the People's Bank of China, Foreign Exchange Reserves in China increased to 328.51 USD Billion in 2012 from 327.29 USD Billion in 2011, accounting for less than 1% change. Foreign Exchange Reserves in China as shown in Figure 2.11a averaged 55.35 USD Billion reaching an all time high of 330.97 USD Billion in February of 2012 and a record low of 2262.0 USD Million in December of 1980.

2.14. China Interest Rate

The benchmark interest rates include lending and deposit interest rate. According to data provided by the People's Bank of China, from 1996 to 2012, China Interest Rate averaged 6.5 Percent reaching an all time high of 11.0 Percent in May of 1996 and a record low of 5.3

Percent in August of 2010. The China Interest Rate is shown in Figure 2.12 for the period of 1996 to 2011. In China, the decision of interest rates is determined by The Peoples' Bank of China Monetary Policy Committee.

3. Methodology

3.1. Introduction

In-depth review on various literatures and relevant materials was conducted in this research paper. Among all, inductive approach on reviewing data including RMB exchange rate, Foreign Direct Investment (FDI) and other factors was carried out. The limitation on using the analytical tool for the multiple regression analysis adopted in the second part of the study was by ANOVA Regression Function built in Microsoft Excel.

3.2 Construction of Analytical Model using Multiple Regression Analysis

Y =	X ₁	X ₂	X ₃	X ₄	X ₅	X ₆	X ₇	X ₈	X ₉	X ₁₀
GDP in China (Billion USD)	RMB exchange rate (to USD) RMB/1USD	Benchmark Interest Rate (%)	FDI (100M USD)	Trade Balance of China (100 M USD)	Annual Inflation rate in China (%)	Energy Consumption (Million tons of SCE)	Foreign Exchange Reserve (Million USD)	China wages (RMB)	China External Debt (100M RMB)	China Consumer Price Index (CPI)

The dependent variable is defined as follows

$$Y = \text{GDP in China (Billion USD)}$$

The independent variables are defined as follows:

$$X_1 = \text{RMB exchange rate (RMB/1USD)}$$

$$X_2 = \text{China interest rate (\%)}$$

$$X_3 = \text{Foreign Direct Investment (FDI) (100 Million USD)}$$

$$X_4 = \text{Trade Balance of China (100 Million USD)}$$

$$X_5 = \text{Annual Inflation rate in China (\%)}$$

$$X_6 = \text{Energy Consumption (Million tons of SCE),}$$

where SCE= standard coal equivalent

$$X_7 = \text{Foreign Exchange Reserve in China (Million USD)}$$

$$X_8 = \text{China wages (RMB)}$$

X_9 = China External Debt (100 Million USD)

X_{10} = China Consumer Price Index (CPI)

The first predicted regression equation involved all variables and was constructed as follows:

$$Y_{\text{req'd}} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \epsilon$$

3.3. Assumptions and limitations of the linear multiple regression model

3.3.1. Assumptions

It may be noticed a dissimilar situation during different periods of time, and unusual banks behavior for the monetary policy propulsion taken from money creation into economy point of view. These discrepancies can be noticed much better if the graphic of propulsion indicator evolution is analyzed.

- China will maintain its RMB regime and its current state of FDI policy in the coming years.
- RMB exchange mechanism will maintain as it was over the past decade.
- China will carry on its inflation target for the coming decades.

3.3.2. Limitation of the model

The time series of data observed such as interest rate and China trade balance could only be obtained from 1996 to 2011. It is another reason that a minimum number of data sample size for the model is to be maintained as far as possible.

3.3.3. Hypothesis

Null Hypothesis at 5% level of significance was adopted to test the validity of the statement assumption of no change or no effect on China economy due to the RMB appreciation and other variables as discussed in the preceding sections.

3.3.4. Hypothesis

A total of 12 test cases including the lagging effect of some independent variables on China's economy were considered in the multiple regression model as shown below:

Financial Studies - 2/2014

Case-1a Model	variables $X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, X_{10}$
Case-1b Model (X_3, X_5, X_8 lagged by 1 year)	variables $X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, X_{10}$
Case-2a Model	variables $X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_{10}$
Case-2b Model (X_3, X_5, X_8 lagged by 1 year)	variables $X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_{10}$
Case-3a Model	variables $X_1, X_2, X_3, X_4, X_7, X_8, X_9, X_{10}$
Case-3b Model (X_3, X_8 lagged by 1 year)	variables $X_1, X_2, X_3, X_4, X_7, X_8, X_9, X_{10}$
Case-4a Model	variables $X_1, X_2, X_3, X_4, X_7, X_8, X_{10}$
Case-4b Model (X_3, X_8 lagged by 1 year)	variables $X_1, X_2, X_3, X_4, X_7, X_8, X_{10}$
Case-5a Model	variables $X_1, X_2, X_3, X_4, X_6, X_7, X_{10}$
Case-5b Model (X_3 lagged by 1 year)	variables $X_1, X_2, X_3, X_4, X_6, X_7, X_{10}$
Case-6a Model	variables X_1, X_2, X_3
Case-6a Model (X_3 lagged by 1 year)	variables X_1, X_2, X_3

3.5 Formulation of Multiple Regression Equations

The multiple regression equation is represented by:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \epsilon$$

where: $\sum_{i=0}^n (Y_i - Y'_i)^2$

X_1 to X_{10} are the independent variables in the regression model:

X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}
RMB exchange rate (to USD)	Interest Rate (%)	FDI (100 M USD)	Trade Balance of China (100M USD)	Annual Inflation rate in China (%)	Energy Consumption (Million tons of SCE)	Foreign Exchange Reserve (100M USD)	China wages (RMB)	China External Debt (100M USD)	China Consumer Price Index (CPI)

The equations were formulated in the regression model with 5% level of significance. A total of 12 test cases were considered and carried out in the multiple regression analysis:

Cases	Multiple Regression Equation
Case 1a	$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \epsilon$
Case 1b (X_3, X_5, X_8 lagged by 1 year)	$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \epsilon$
Case 2a	$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \epsilon$
Case 2b (X_3, X_5, X_8 lagged by 1 year)	$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \epsilon$
Case 3a	$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \epsilon$
Case 3b (X_3, X_8 lagged by 1 year)	$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \epsilon$

Financial Studies - 2/2014

Case 4a	$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_7 X_7 + \beta_8 X_8 + \beta_{10} X_{10} + \epsilon$
Case 4b (X_3, X_8 lagged by 1 year)	$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_7 X_7 + \beta_8 X_8 + \beta_{10} X_{10} + \epsilon$
Case 5a	$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_6 X_6 + \beta_7 X_7 + \beta_{10} X_{10} + \epsilon$
Case 5b (X_3 lagged by 1 year)	$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_6 X_6 + \beta_7 X_7 + \beta_{10} X_{10} + \epsilon$
Case 6a	$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \epsilon$
Case 6b (X_3 lagged by 1 year)	$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \epsilon$

3.6. Test Cases and Variables

The model will be used for Null Hypothesis Test for “RMB appreciation and other variables including FDI has no direct correlation with the economy in China represented by its GDP growth”.

4. Data Finding and Analysis

4.1. Introduction

As mentioned in the Chapter 3, variables (1) RMB exchange rate, (2) China interest rate, (3) Foreign Direct Investment (FDI), (4) Trade Balance of China, (5) Annual Inflation rate in China, (6) Energy Consumption in China, (7) Foreign Exchange Reserve in China, (8) China wages, (9) China External Debt and (10) China Consumer Price Index, were considered in the regression model analysis:

Y =	X ₁	X ₂	X ₃	X ₄	X ₅	X ₆	X ₇	X ₈	X ₉	X ₁₀
GDP in China (Billion USD)	RMB exchange rate (to USD)	Interest Rate (%)	FDI (100M USD)	Trade Balance of China (100M USD)	Annual Inflation rate in China (%)	Energy Consumption (Million tons of SCE)	Foreign Exchange Reserve (100M USD)	China wages (RMB)	China External Debt (100M USD)	China Consumer Price Index (CPI)

A total of 12 test cases of different groups of independent variables in the regression model over a period from 1997 to 2011 were analysed using the multiple regression analysis as shown below:

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Cases	Multiple Regression Equation
Case 1a	$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \epsilon$
Case 1b (X_3, X_5, X_8 lagged by 1 year)	$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \epsilon$
Case 2a	$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_{10} X_{10} + \epsilon$
Case 2b (X_3, X_5, X_8 lagged by 1 year)	$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_{10} X_{10} + \epsilon$
Case 3a	$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \epsilon$
Case 3b (X_3, X_8 lagged by 1 year)	$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \epsilon$
Case 4a	$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_7 X_7 + \beta_8 X_8 + \beta_{10} X_{10} + \epsilon$
Case 4b (X_3, X_8 lagged by 1 year)	$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_7 X_7 + \beta_8 X_8 + \beta_{10} X_{10} + \epsilon$
Case 5a	$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_6 X_6 + \beta_7 X_7 + \beta_{10} X_{10} + \epsilon$
Case 5b (X_3 lagged by 1 year)	$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_6 X_6 + \beta_7 X_7 + \beta_{10} X_{10} + \epsilon$
Case 6a	$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \epsilon$
Case 6b (X_3 lagged by 1 year)	$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \epsilon$

The results of the analysis for the above cases are tabulated in Table 4.2a-b to Table 4.7a-b.

4.2. Analysis of Multiple Regression Models

Summary of outputs are all in appendix. The p-values, F-test values, t-statistic value and adjusted R-squares were captured from the output of the analysis as tabulated in Table 4.2a-b to Table 4.7a-b for further interpretation in section 4.2.6. Summary of output for all the 12 different cases is shown in Table 4.8 to Table 4.11. The test of the null hypothesis of “RMB appreciation and other variables have no direct correlation with the economy in China represented by its GDP growth” was carried based on the output from the multiple regression analysis.

4.2.1. Significance of Coefficients of Variables

In each test case, coefficients corresponding to their independent variables of the following equation were computed by means of the multiple regression analysis in the ANOVA of excel 2007.

4.2.2. Significance of p-values in the Regression Model

All the 12 cases were tested under level of significance 5%. A hypothesis will be rejected if the p-value is less than 0.05. From the finding of the analysis as shown in Table 4.2a-b to 4.7a-b, the p-values

of X_1 , RMB exchange rate (or RMB appreciation), in all the 12 cases were found less than 0.05 and therefore null hypotheses are rejected. That is, the RMB exchange rate has direct correlation with the economy of China represented by the China GDP growth. Table 4.9 shows a summary of result for p-value of X_1 in all the 12 different cases.

4.2.3. Significance of F-values for overall Regression Model

From the finding of the analysis as shown in Table 4.2a-b to 4.7a-b, the F-values in general are in the range between 205 and 26142, which are greater than the maximum critical value, $F(0.05, 10, 4) = 5.96$, hence $H_0: \beta_1 = \beta_2 = \beta_3 = \beta_K = 0$ is rejected and it is concluded that at least one coefficient in the model is significant. In other words, the test indicates the usefulness of the variables in the 12 test models. Table 8-11 also show a summary of F test results.

4.2.4. Significance of t-Statistic for Individual Variables

The t statistic (t test) results for the predictors in all 12 cases are in the output in Table 4.2a-b to Table 4.7a-b. A summary of t test results are also shown in Table 8-11.

4.2.5. Significance of R-Square (R²) to overall Regression Model

The interpretation of the results from multiple regression analysis could be complex. The values R-squares were captured from the output of the analysis and are tabulated in Table 4.2a-b to 4.7a-b. The adjusted R-square value was found greater than 0.9776 which indicates a perfect good fit of the data sample. The R-square is generally of secondary importance while the p-value as mentioned earlier indicates how confident that each individual variable has some correlation with the dependent variable.

4.2.6. Interpretation of Results

The output results for different cases are taken for examination. The empirical formulae in associated with the coefficients obtained from the output are as follows:

4.2.6.1. Examination of Case-1a

The empirical regression equation is expressed as:

$$Y = 4504.2495 - 419.2224X_1 + 40.4893X_2 + 0.3794X_3 - 0.1696X_4 - 34.3096X_5 + 0.0631X_6 + 0.0561X_7 + 0.1221X_8 - 0.2890X_9 - 11.5968X_{10}$$

Table 4.2a (case 1a) shows that the independent variable X_1 , RMB exchange rate, is significant in the regression model under 5% level of significance with p-value of 0.0304 (< 0.05) and the null hypothesis is rejected. Furthermore, the value of adjusted R^2 is very high (0.999) which implies the about 99.9% variation in GDP growth is explained by RMB exchange rate, interest rate, FDI and all other factors in associated with this case. In other word, the model has a significant fitting effect.

The coefficient of X_1 is -419.2224 which implies that 1% increase in RMB appreciation (denoted by decrease in RMB/USD exchange rate), would result in 4.19 X_1 billion USD increase in GDP of China. Thus, for example in the year end of 2011, the total GDP was 5879 billion USD while the exchange rate of RMB/USD (X_1) was 6.4588, GDP would be increased by 27.06 billion USD per 1% RMB appreciation accounting for about 0.46% increase in GDP growth in the same year. Therefore it is obvious that the driving effect of RMB appreciation on GDP growth is positive and significant.

However, from the regression result under significance level 5%, the p-value of FDI (X_3) was found to be 0.2925 which implies the null hypothesis cannot be rejected. But there is no strong evidence that the FDI has no effect on the China economy growth. It means that the independent variable FDI (X_3) is not significant and cannot explain the GDP correctly.

The F-test is a test to determine the overall significance of the model, and not just of one individual coefficient. Since the F test ($F = 4823.756652$) on the significance of the whole multiple regression equation is far larger than 5.96 under the 5% level of significance, the model is significant in general. This is also confirmed by the p-value of the entire regression model as a whole. Since the F-test is used to test the following hypotheses:

From the output of the regression analysis, the absolute value of t-statistic for X_1 is 6.4898 which is larger than 2.160 under the 5% level of confidence. Therefore the explanation of RMB exchange rate is significant. The regression coefficient β_1 of X_1 is significance in the multiple linear regression model.

4.2.6.2. Examination of Case-1b (X_3 , X_5 , X_8 lagged by 1 year)

The empirical regression equation is expressed as:

$$Y = 14015.1756 - 922.7765X_1 + 51.0195X_2 - 1.0109X_3 - 0.3151X_4 + 2.6990X_5 + 0.6616X_6 + 0.0395X_7 + 0.0847X_8 - 0.0482X_9 - 67.1828X_{10}$$

Table 4.2b (case 1b) shows that the p-value of RMB exchange rate (X_1) is 0.0009372 and the p-value of FDI (X_3) is 0.03744. Thus the null hypotheses for both the RMB appreciation and FDI have no effect on economy in China are rejected. In this case, a 1 % increase in RMB appreciation would result in 9.23 X_1 billion USD increase in GDP while 1% increase in FDI would result in 0.01 X_3 billion USD decrease in GDP. It means that the 1 year lag FDI is in negative proportion with the GDP in China. According to the theory the role of FDI on economy growth is positive in general. Many economists admit that FDI is very important to the development of a country, particularly to the developing countries like China. There are many reasons to explain the conflict such as small data sample size, data corruption or the complexity of the multiple regression model. Examination of the other cases with different combination of variables in the regression models may help to eliminate such errors.

Since the F-value ($F = 22348.19823$) on the significance of the whole multiple regression equation is far larger than 5.96 under the 5% level of significance, and the p-value ($p = 4.80496E-09$) is far less than 0.05, the model is significant in general.

The absolute value of t-statistic for X_1 is 8.7572 which is larger than 2.16 under the 5% level of confidence. Therefore the explanation of RMB exchange rate for GDP is significant. The regression coefficient β_1 of X_1 is significance in the multiple linear regression model.

4.2.6.3. Examination of the significance of RMB exchange rate (or RMB appreciation), X_1 , from the output of 12 cases

The study of impact of RMB exchange rate or appreciation on the China economy was selected for analysis and discussion. The results were summarized below:

Financial Studies - 2/2014

Cases	t-value for X1	P-value for X1	Adjusted R square	F-value
Case 1a	-3.283180451	0.030409682	0.999709794	4823.756652
Case 1b	-8.75722445	0.000937226	0.999937356	22348.19823
Case 2a	-3.174320496	0.024694948	0.999234722	2032.110773
Case 2b	-15.81618222	1.83811E-05	0.999940497	26141.89378
Case 3a	-5.343533123	0.001755373	0.999789882	8327.89169
Case 3b	-6.489835814	0.000636526	0.99959227	4291.310101
Case 4a	-5.911322778	0.000592673	0.999302789	2867.57263
Case 4b	-7.923230124	9.69326E-05	0.999465843	3743.216604
Case 5a	-4.378661235	0.003239737	0.997239686	723.5551798
Case 5b	-11.6221785	7.87882E-06	0.999079427	2171.560663
Case 6a	-3.000582337	0.012067273	0.977634948	204.9922142
Case 6b	-3.603516434	0.004144328	0.986584333	344.1853414

Source: Bank's People of China with authors calculations

From the output of the 12 different cases for RMB exchange rate X_1 , the range of the adjusted R-squared was found between 0.999940 and 0.977635 which shows that over 97% variation in GDP growth is explained by the RMB interest rate in all 12 cases. That is, the results above show that the variability of the Y values around the regression line is over 1-0.9776 times of the original variance. Therefore, it has more than 97% of the original variability, and left with less than 3% in residual variability. Therefore, the variability of the determinants around the regression line relative to the overall variability is of strong good fit in all the 12 cases regarding the predictions to the regression equation.

The null hypothesis refers to the case that each independent variable gives absolutely no effect or coefficient of zero. For the model under investigation, the null hypothesis of "RMB appreciation has no direct correlation with the economy in China represented by its GDP growth" was adopted. Since the all P-value were found in the range between $0.00000787882 < P < 0.030409682$ Hence, there is a strong a reason to reject this theory. Hence RMB appreciation has positive effect on the China's GDP growth.

Since the F-values were found in the range between 205 and 26142 on the significance of the whole multiple regression equation in all 12 cases, the minimum value of F-statistic is far larger than the critical $F_{(0.05, 10, 4)}$ value of 5.96 under the 5% level of significance. The model is significant in general.

Moreover, the output t-statistic value for X_1 is in a range between -3.000582337 and -15.81618222 for all 12 different cases 5% level of significance. The minimum absolute value of t-stat is 3.0006 which is greater than the critical $t_{(0.05, 13)}$ value of 2.16. Therefore, the regression coefficient β_1 of X_1 is significance in the multiple linear regression and the explanation of RMB exchange rate for GDP is significant.

In conclusion, it is strongly believed that RMB appreciation (denoted by RMB exchange rate) has a positive effect on the China's GDP growth.

4.2.6.4. Summary of the interpretation results for different cases

- From the 12 different cases, F-values on the significance of the whole regression models are found to be in the range between 204.9922 and 26141.8938 which are far larger than maximum critical F-value of 5.96 under the 5% level of significance, all the 12 regression models are generally significant. Adjusted R-square is in a range of 0.9776 and 0.9999 which implies over 97.76% variation in GDP growth is explained by RMB exchange rate, interest rate, FDI and all other factors in different regression models. In other words, the model has a significant fitting effect.

- 5 out of the 12 cases (cases 1b, 2b, 5b, 6a & 6b shown in Table 4.10-11), FDI (X_3) has p-value <0.05 and null hypotheses are rejected. The F-values are between 205 and 26142 which show that the variables are significant on these regression models. The absolute value of t-statistic is greater than 2.16. Therefore, the regression coefficient β_3 of X_3 is significance in the multiple linear regression model and the explanation of FDI for GDP is significant subject to limitation of the data sample size. In general, it can be explained that FDI has effect on the GDP but the evidence to support its claim is not very strong.

- From the output of Case 5b, all independent variables (X_1 , X_2 , X_3 , X_4 , X_6 , X_7 and X_{10}) are good fit into the regression equation. All the variables and intercept have p-value <0.05 which imply that null hypotheses are rejected. Since F value is 2171.5607 which is far larger than the critical value of F (5.96) under the 5% level of significance, the regression model is significant. That is, each of these variables is significance in the regression model. The absolute value of t-statistic is also greater than 2.16 for all variables in this case, which implies that the regression coefficient β of the corresponding X is significance in

the multiple linear regression model and the explanation of these independent variables for GDP is significant.

The empirical regression equation for case 5b is expressed as follows:

$$Y = 21840.3677 - 1515.5835X_1 + 74.9726X_2 - 2.8828X_3 - 0.5957X_4 + 1.6519X_6 + 0.0572X_7 - 97.6442X_{10}$$

Take 2011 in consideration:

1% increase in RMB exchange rate (X1) gives 15.155835X1 in Y = 97.8885 billion USD = 1.6651% increase in GDP

1% increase in Benchmark Interest Rate (X2) gives 0.749726X2 in Y = 4.7233 billion USD = 0.0803% increase in GDP

1% increase in FDI (X3) gives -0.028828X3 in Y = -30.4813 billion USD = -0.5185% decrease in GDP

1% increase in Trade Balance (X4) gives -0.005957X4 in Y = -9.2463 billion USD = -0.1573% decrease in GDP

1% increase in Energy Consumption (X6) gives 0.016519X6 in Y = 57.4865 billion USD = 0.9778% increase in GDP

1% increase in Foreign Exchange Reserve (X7) gives 0.000572X7 in Y = 18.876 billion USD = 0.3211% increase in GDP

1% increase in CPI (X10) gives -0.976442X10 in Y = 102.9170 billion USD = -1.7506% decrease in GDP

It is obvious that RMB exchange rate (X1), FDI (X3), Energy Consumption (X6) and CPI (X10) contribute greater impacts on GDP in China as per 1% change in these variables. FDI has a negative correlation with GDP which is uncommon as it is normally believed that FDI has important effect on driving China's economic growth.

However, from the summary of results in Table 4.11, the coefficient estimated for FDI (X3) both in case 6a and case 6b are positive. In both cases, FDI accounts for at most 0.807% of the GDP growth in China as per 1% increase in FDI while 1% increase in RMB appreciation accounts for about 1.098% in GDP growth at the same period in 2011.

5. Conclusions

However, from the summary of results in Table 4.11, the coefficient estimated for FDI (X3) both in case 6a and case 6b are positive. In both cases, FDI accounts for at most 0.807% of the GDP growth in China as per 1% increase in FDI while 1% increase in RMB appreciation accounts for about 1.098% in GDP growth at the same period in 2011.

Among the 12 regression models, case-5b model apparently appeared to be the best fit model verified by the results of estimated F-test, t-statistic and p-values from the output of empirical regression model analysis. Taken 2011 as an example, the predictor, RMB appreciation, among all other predictors contributes the most significant positive effect on the GDP in China based on a unit percentage change in value. The CPI has the biggest negative effect on the GDP growth as per unit percentage change in CPI. However, FDI is highly a controversial variable that has negative effect on China's GDP as many experts believe that FDI has a direct correlation with GDP in China. The result in some case of regression model shows there is about half percent drop in GDP growth as per unit percentage increase in FDI. The data sample of the FDI is doubtful and the effect of FDI on economic growth is inconclusive. Expert interviews and literature suggest that this effect is industry dependence, and it might be distorted by the ability of the economy to absorb the benefits of FDI. Research methodology should be refined and the result may prove that a devaluation of currency can induce FDI inflow. Based on the data analysis, energy consumption and CPI, apart from RMB appreciation, also seem to have significant effect on GDP in China. Thus establishing a comprehensive policy of energy consumption and maintaining CPI stability could ensure economic stability and in turn, stimulate GDP.

It is important to recognize that there are some other factors affecting GDP growth that were also included in the model, therefore this study attempts to quantify some merits of FDI and energy consumption in conjunction with the significant positive contribution of RMB appreciation to the GDP in China. Due to some constraints of the regression model, the results are not yet completely satisfactory and there are still more findings be found in the future. Based on the empirical findings of the regression models as shown in Table 4.2a-b to 4.7a-b and summary of Table 4.9 to Table 4.11, the p-values for the predictor RMB exchange rate (or RMB appreciation) were found to be in general very small and suggested that the null hypothesis is to be

rejected. That is, there is strong evidence that the RMB exchange rate has direct correlation with the economy of China represented by the China GDP growth. In other words, the contribution of Yuan appreciation to GDP growth is significant and positive.

Even though the FDI inflow is important for economic growth, the real impact on economic development is not so clear. In this research paper, the results reflect that FDI has less significant effect on the economy in China. In some cases, FDI has a negative effect on economy in China. Some impacts of FDI on GDP in China cannot be measured quantitatively such as professional services, knowledge acquisition and management training, technology transfer and international image, and it may take a considerable time before these variables affect growth. The methodology used for the empirical analysis has problem with low sample size and therefore might not be able to show the effects of these variables on growth. Besides, it is argued that a notable amount of FDI flow to China investing in assets such as real estate just for the purpose of speculating for the RMB appreciation and expected rising property price. Moreover, for instance, repatriated profits gained in China may be transferred by the multinational enterprises to their home countries and are being counted as part of GDP in China for the same period due to different accounting systems between China and the foreign country in concern. Hence the GDP figure may be misleading to the public. That might contribute to the reasons why FDI's contribution to GDP growth is not significant or even negative.

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Table 4.2a

Case1a: Y against X1, X2, X3, X4, X5, X6, X7, X8, X9, X10

Year	Y	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10
	GDP in China (Billion USD)	RMB ex change rate (to USD) RMB/1 USD	Bench-mark Interest Rate (%)	FDI (100M USD)	Trade Balance of China (100M USD)	Annual Inflation rate in China (%)	Energy Consumption (Million tons of SCE)	Foreign Exchange Reserve (100M USD)	China wages (RMB)	China External Debt (100M USD)	China Consumer Price Index (CPI)
1997	856	8.2898	9.75	452.57	406.80	2.81	1359.09	1398.90	6500	1163	102.8
1998	953	8.2791	7.50	454.63	433.61	(0.78)	1361.84	1449.59	6875	1310	99.2
1999	1019	8.2783	6.10	403.19	294.11	(1.40)	1405.69	1545.75	8200	1460	98.6
2000	1083	8.2784	5.85	407.15	241.46	0.35	1455.31	1655.70	9000	1518	100.4
2001	1198	8.2770	5.85	468.78	227.93	0.73	1504.06	2121.65	9750	1457	100.7
2002	1325	8.2770	5.40	527.43	300.41	(0.73)	1594.31	2864.07	11250	2033	99.2
2003	1454	8.2770	5.30	535.05	255.16	1.13	1837.92	4032.51	12500	2026	101.2
2004	1641	8.2768	5.40	606.30	320.55	3.84	2134.56	6099.32	14000	2194	103.9
2005	1932	8.1917	5.60	603.25	1019.76	1.78	2359.97	8188.72	16000	2630	101.8
2006	2236	7.9718	5.90	630.21	2003.54	1.65	2586.76	10663.40	18500	2965	101.5
2007	2713	7.6040	6.75	747.68	2623.75	4.82	2805.08	15280.00	21500	3386	104.8
2008	3494	6.9451	6.95	923.95	2976.16	5.97	2914.48	19460.30	25000	3892	105.9
2009	4522	6.8310	5.35	900.33	1963.82	(0.72)	3066.47	20000.00	29500	3902	99.3
2010	4991	6.7695	5.40	1057.35	1830.44	3.17	3249.39	23500.00	33000	4286	103.3
2011	5879	6.4588	6.30	1160.11	1552.17	5.53	3480.02	33000.00	37500	5489	105.4

Summary of Output

SUMMARY OUTPUT									
Regression Statistics									
Multiple R	0.999958541								
R Square	0.999917084								
Adjusted R Square	0.999709794								
Standard Error	27.69988381								
Observations	15								
ANOVA									
	df	SS	MS	F	Significance F				
Regression	10	37011891.91	3701189.191	4823.75665	1.03103E-07				
Residual	4	3069.134252	767.2835631						
Total	14	37014961.04							
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%	
Intercept	4504.249513	17436.80688	0.258318484	0.8089081	-43908.08761	52916.58664	-43908.0876	52916.58664	
X1	-419.222352	127.6878801	-3.28318045	0.03040968	-773.7407414	-64.7039621	-773.740741	-64.7039621	
X2	40.48930336	15.1308998	2.675934933	0.05546247	-1.520809339	82.49941605	-1.52080934	82.49941605	
X3	0.379380601	0.313253048	1.211099469	0.29251559	-0.490349292	1.249110494	-0.49034929	1.249110494	
X4	-0.16959722	0.03747211	-4.5259585	0.01060998	-0.273636474	-0.06555796	-0.27363647	-0.06555796	
X5	-34.3095639	173.9866801	-0.1971965	0.85328869	-517.3740301	448.7549022	-517.37403	448.7549022	
X6	0.063115618	0.135060792	0.467312661	0.6645976	-0.311873257	0.438104494	-0.31187326	0.438104494	
X7	0.056108874	0.015791935	3.553008264	0.02373441	0.012263435	0.099954313	0.012263435	0.099954313	
X8	0.122083463	0.016800778	7.266536348	0.00190505	0.075437026	0.168729901	0.075437026	0.168729901	
X9	-0.28898467	0.095352768	-3.03068986	0.03875431	-0.553726391	-0.02424294	-0.55372639	-0.02424294	
X10	-11.5968058	171.3037148	-0.06769734	0.94927541	-487.2121663	464.0185547	-487.212166	464.0185547	

Case 1b:

Y against X1, X2, X3, X4, X5, X6, X7, X8, X9, X10

(Independent variables X3, X5, X8 lagged behind dependent variable Y by 1 year)

Year	Y	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10
	GDP in China (Billion USD)	RMB exchange rate (to USD) RMB/1USD	Benchmark Interest Rate (%)	FDI (100M USD)	Trade Balance of China (100M USD)	Annual Inflation rate in China (%)	Energy Consumption (Million tons of SCE)	Foreign Exchange Reserve (100M USD)	China wages (RMB)	China External Debt (100M USD)	China Consumer Price Index (CPI)
1997	856	8.2898	9.75	417.26	406.80	8.33	1359.09	1398.90	6250	1163	102.8
1998	953	8.2791	7.50	452.57	433.61	2.81	1361.84	1449.59	6500	1310	99.2
1999	1019	8.2783	6.10	454.63	294.11	(0.78)	1405.69	1545.75	6875	1460	98.6
2000	1083	8.2784	5.85	403.19	241.46	(1.40)	1455.31	1655.70	8200	1518	100.4
2001	1198	8.2770	5.85	407.15	227.93	0.35	1504.06	2121.65	9000	1457	100.7
2002	1325	8.2770	5.40	468.78	300.41	0.73	1594.31	2864.07	9750	2033	99.2
2003	1454	8.2770	5.30	527.43	255.16	(0.73)	1837.92	4032.51	11250	2026	101.2
2004	1641	8.2768	5.40	535.05	320.55	1.13	2134.56	6099.32	12500	2194	103.9
2005	1932	8.1917	5.60	606.30	1019.76	3.84	2359.97	8188.72	14000	2630	101.8
2006	2236	7.9718	5.90	603.25	2003.54	1.78	2586.76	10663.40	16000	2965	101.5
2007	2713	7.6040	6.75	630.21	2623.75	1.65	2805.08	15280.00	18500	3386	104.8
2008	3494	6.9451	6.95	747.68	2976.16	4.82	2914.48	19460.30	21500	3892	105.9
2009	4522	6.8310	5.35	923.95	1963.82	5.97	3066.47	20000.00	25000	3902	99.3
2010	4991	6.7695	5.40	900.33	1830.44	(0.72)	3249.39	23500.00	29500	4286	103.3
2011	5879	6.4588	6.30	1057.35	1552.17	3.17	3480.02	33000.00	33000	5489	105.4

Summary of Output

SUMMARY OUTPUT								
<i>Regression Statistics</i>								
Multiple R	0.999991051							
R Square	0.999982102							
Adjusted R Square	0.999937356							
Standard Error	12.8695423							
Observations	15							
<i>ANOVA</i>								
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>			
Regression	10	37014298.54	3701429.854	22348.19823	4.80496E-09			
Residual	4	662.5017044	165.6254261					
Total	14	37014961.04						
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	14015.17561	1254.874032	11.16859163	0.000365844	10531.08675	17499.26448	10531.08675	17499.26448
X1	-922.7764888	105.3731686	-8.75722445	0.000937226	-1215.339307	-630.2136705	-1215.339307	-630.2136705
X2	51.01954887	15.65520654	3.258950863	0.031111603	7.553727298	94.48537043	7.553727298	94.48537043
X3	-1.010902195	0.329722385	-3.065919214	0.037441628	-1.926358296	-0.095446094	-1.926358296	-0.095446094
X4	-0.315133859	0.047722	-6.603534207	0.002725236	-0.447631372	-0.182636346	-0.447631372	-0.182636346
X5	2.698985138	3.437292918	0.785206615	0.47623162	-6.844469957	12.24244023	-6.844469957	12.24244023
X6	0.66156778	0.156885024	4.21689569	0.013511185	0.225985124	1.097150435	0.225985124	1.097150435
X7	0.039487746	0.008313185	4.750014074	0.00897081	0.016406644	0.062568848	0.016406644	0.062568848
X8	0.084694776	0.010997998	7.700926562	0.001529924	0.054159438	0.115230114	0.054159438	0.115230114
X9	-0.048177145	0.055655381	-0.865633194	0.435522401	-0.202701256	0.106346965	-0.202701256	0.106346965
X10	-67.18280601	5.987917098	-11.21972882	0.000359389	-83.80792913	-50.5576829	-83.80792913	-50.5576829

Table 4.3a
Case 2a: Y against X1, X2, X3, X4, X5, X6, X7, X8, X10

Year	Y GDP in China (Billion USD)	X1 RMB exchange rate (to USD) RMB/1USD	X2 Benchmark Interest Rate (%)	X3 FDI (100M USD)	X4 Trade Balance of China (100M USD)	X5 Annual Inflation rate in China (%)	X6 Energy Consumption (Million tons of SCE)	X7 Foreign Exchange Reserve (100M USD)	X8 China wages (RMB)	X10 China Consumer Price Index (CPI)
1997	856	8.2898	9.75	452.57	406.80	2.81	1359.09	1398.90	6500	102.8
1998	953	8.2791	7.50	454.63	433.61	(0.78)	1361.84	1449.59	6875	99.2
1999	1019	8.2783	6.10	403.19	294.11	(1.40)	1405.69	1545.75	8200	98.6
2000	1083	8.2784	5.85	407.15	241.46	0.35	1455.31	1655.70	9000	100.4
2001	1198	8.2770	5.85	468.78	227.93	0.73	1504.06	2121.65	9750	100.7
2002	1325	8.2770	5.40	527.43	300.41	(0.73)	1594.31	2864.07	11250	99.2
2003	1454	8.2770	5.30	535.05	255.16	1.13	1837.92	4032.51	12500	101.2
2004	1641	8.2768	5.40	606.30	320.55	3.84	2134.56	6099.32	14000	103.9
2005	1932	8.1917	5.60	603.25	1019.76	1.78	2359.97	8188.72	16000	101.8
2006	2236	7.9718	5.90	630.21	2003.54	1.65	2586.76	10663.40	18500	101.5
2007	2713	7.6040	6.75	747.68	2623.75	4.82	2805.08	15280.00	21500	104.8
2008	3494	6.9451	6.95	923.95	2976.16	5.97	2914.48	19460.30	25000	105.9
2009	4522	6.8310	5.35	900.33	1963.82	(0.72)	3066.47	20000.00	29500	99.3
2010	4991	6.7695	5.40	1057.35	1830.44	3.17	3249.39	23500.00	33000	103.3
2011	5879	6.4588	6.30	1160.11	1552.17	5.53	3480.02	33000.00	37500	105.4

Summary of Output

SUMMARY OUTPUT									
Regression Statistics									
Multiple R	0.999863334								
R Square	0.999726686								
Adjusted R Square	0.999234722								
Standard Error	44.9815428								
Observations	15								
ANOVA									
	df	SS	MS	F	Significance F				
Regression	9	37004844.35	4111649.372	2032.110773	2.29863E-08				
Residual	5	10116.69597	2023.339193						
Total	14	37014961.04							
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%	
Intercept	-13271.50013	26665.48203	-0.497703365	0.639806078	-81817.30385	55274.30359	-81817.30385	55274.30359	
X1	-590.3476239	185.9760615	-3.174320496	0.024694948	-1068.414309	-112.2809384	-1068.414309	-112.2809384	
X2	68.35363773	19.51462555	3.502687641	0.017234822	18.18969578	118.5175797	18.18969578	118.5175797	
X3	0.002097338	0.466794897	0.004493062	0.996588821	-1.197837145	1.202031822	-1.197837145	1.202031822	
X4	-0.214290977	0.055940175	-3.830716985	0.012238743	-0.358089774	-0.07049218	-0.358089774	-0.07049218	
X5	-219.1954361	264.5983342	-0.828408224	0.445168603	-899.3671076	460.9762354	-899.3671076	460.9762354	
X6	0.103879534	0.218233463	0.476001859	0.654144569	-0.457107442	0.66486651	-0.457107442	0.66486651	
X7	0.022463	0.018238017	1.231658012	0.272840091	-0.024419315	0.069345315	-0.024419315	0.069345315	
X8	0.116676375	0.027128336	4.300904235	0.007708832	0.046940768	0.186411983	0.046940768	0.186411983	
X10	176.4835688	259.2822417	0.680661998	0.526321706	-490.0226518	842.9897894	-490.0226518	842.9897894	

Table 4.3b

Case 2b: Y against X1, X2, X3, X4, X5, X6, X7, X8, X10

(independent variables X1, X5, X8 lagged behind dependent variable Y by 1 year)

Year	Y GDP in China (Billion USD)	X1 RMB exchange rate (to USD) RMB/ USD	X2 Bench- mark Interest Rate (%)	X3 FDI (100M USD)	X4 Trade Balance of China (100M USD)	X5 Annual Inflation rate in China (%)	X6 Energy Consumption (Million tons of SCE)	X7 Foreign Exchange Reserve (100M USD)	X8 China wages (RMB)	X10 China Consumer Price Index (CPI)
1997	856	8.2898	9.75	417.26	406.80	8.33	1359.09	1398.90	6250	102.8
1998	953	8.2791	7.50	452.57	433.61	2.81	1361.84	1449.59	6500	99.2
1999	1019	8.2783	6.10	454.63	294.11	(0.78)	1405.69	1545.75	6875	98.6
2000	1083	8.2784	5.85	403.19	241.46	(1.40)	1455.31	1655.70	8200	100.4
2001	1198	8.2770	5.85	407.15	227.93	0.35	1504.06	2121.65	9000	100.7
2002	1325	8.2770	5.40	468.78	300.41	0.73	1594.31	2864.07	9750	99.2
2003	1454	8.2770	5.30	527.43	255.16	(0.73)	1837.92	4032.51	11250	101.2
2004	1641	8.2768	5.40	535.05	320.55	1.13	2134.56	6099.32	12500	103.9
2005	1932	8.1917	5.60	606.30	1019.76	3.84	2359.97	8188.72	14000	101.8
2006	2236	7.9718	5.90	603.25	2003.54	1.78	2586.76	10663.40	16000	101.5
2007	2713	7.6040	6.75	630.21	2623.75	1.65	2805.08	15280.00	18500	104.8
2008	3494	6.9451	6.95	747.68	2976.16	4.82	2914.48	19460.30	21500	105.9
2009	4522	6.8310	5.35	923.95	1963.82	5.97	3066.47	20000.00	25000	99.3
2010	4991	6.7695	5.40	900.33	1830.44	(0.72)	3249.39	23500.00	29500	103.3
2011	5879	6.4588	6.30	1057.35	1552.17	3.17	3480.02	33000.00	33000	105.4

Summary of Output

SUMMARY OUTPUT									
<i>Regression Statistics</i>									
Multiple R	0.999989374								
R Square	0.999978749								
Adjusted R Square	0.999940497								
Standard Error	12.54279303								
Observations	15								
<i>ANOVA</i>									
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>				
Regression	9	37014174.44	4112686.048	26141.89378	3.87741E-11				
Residual	5	786.6082854	157.3216571						
Total	14	37014961.04							
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>	
Intercept	14780.914	867.4536922	17.03942716	1.2739E-05	12551.0533	17010.77471	12551.0533	17010.77471	
X1	-994.8787189	62.90258326	-15.81618222	1.83811E-05	-1156.574957	-833.182481	-1156.574957	-833.182481	
X2	62.42452175	8.240905371	7.574959175	0.000636129	41.2406001	83.6084434	41.2406001	83.6084434	
X3	-1.186364827	0.253455001	-4.680771023	0.005429827	-1.837891649	-0.534838004	-1.837891649	-0.534838004	
X4	-0.346870831	0.029772558	-11.65068962	8.18205E-05	-0.423403627	-0.270338034	-0.423403627	-0.270338034	
X5	1.010365178	2.758269587	0.366303998	0.729127308	-6.079992517	8.100722874	-6.079992517	8.100722874	
X6	0.757614892	0.108096912	7.008663571	0.000911544	0.479742932	1.035486851	0.479742932	1.035486851	
X7	0.033218716	0.003978099	8.350399243	0.000402948	0.022992687	0.043444745	0.022992687	0.043444745	
X8	0.078684365	0.008312546	9.465735371	0.000222307	0.057316284	0.100052446	0.057316284	0.100052446	
X10	-70.26788375	4.689622821	-14.98369622	2.3972E-05	-82.32294298	-58.21282452	-82.32294298	-58.21282452	

Table 4.4a
Case 3a: Y against X1, X2, X3, X4, X7, X8, X9, X10

Year	Y GDP in China (Billion USD)	X1 RMB ex change rate (to USD) RMB/1 USD	X2 Bench-mark Interest Rate (%)	X3 FDI (100M USD)	X4 Trade Balance of China (100M USD)	X7 Foreign Exchange Reserve (100M USD)	X8 China wages (RMB)	X9 China Ex ternal Debt (100M USD)	X10 China Consumer Price Index (CPI)
1997	856	8.2898	9.75	452.57	406.80	1398.90	6500	1163	102.8
1998	953	8.2791	7.50	454.63	433.61	1449.59	6875	1310	99.2
1999	1019	8.2783	6.10	403.19	294.11	1545.75	8200	1460	98.6
2000	1083	8.2784	5.85	407.15	241.46	1655.70	9000	1518	100.4
2001	1198	8.2770	5.85	468.78	227.93	2121.65	9750	1457	100.7
2002	1325	8.2770	5.40	527.43	300.41	2864.07	11250	2033	99.2
2003	1454	8.2770	5.30	535.05	255.16	4032.51	12500	2026	101.2
2004	1641	8.2768	5.40	606.30	320.55	6099.32	14000	2194	103.9
2005	1932	8.1917	5.60	603.25	1019.76	8188.72	16000	2630	101.8
2006	2236	7.9718	5.90	630.21	2003.54	10663.40	18500	2965	101.5
2007	2713	7.6040	6.75	747.68	2623.75	15280.00	21500	3386	104.8
2008	3494	6.9451	6.95	923.95	2976.16	19460.30	25000	3892	105.9
2009	4522	6.8310	5.35	900.33	1963.82	20000.00	29500	3902	99.3
2010	4991	6.7695	5.40	1057.35	1830.44	23500.00	33000	4286	103.3
2011	5879	6.4588	6.30	1160.11	1552.17	33000.00	37500	5489	105.4

Summary of Output

SUMMARY OUTPUT								
<i>Regression Statistics</i>								
Multiple R	0,999954974							
R Square	0,999909949							
Adjusted R Square	0,999789882							
Standard Error	23,56983626							
Observations	15							
<i>ANOVA</i>								
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>			
Regression	8	37011627,82	4626453,478	8327,89169	1,46017E-11			
Residual	6	3333,223089	555,5371815					
Total	14	37014961,04						
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	7517,154173	478,1402595	15,72165076	4,19724E-06	6347,187108	8687,121238	6347,187108	8687,121238
X1	-376,66655	70,49016846	-5,343533123	0,001755373	-549,1497783	-204,1833217	-549,1497783	-204,1833217
X2	40,07111108	12,68756997	3,158296756	0,019607312	9,025745812	71,11647635	9,025745812	71,11647635
X3	0,402996368	0,264199574	1,525348288	0,178017325	-0,243476699	1,049469434	-0,243476699	1,049469434
X4	-0,155406829	0,016305347	-9,531034684	7,61183E-05	-0,195304576	-0,115509082	-0,195304576	-0,115509082
X7	0,056477931	0,013017189	4,338719531	0,004882103	0,024626018	0,088329844	0,024626018	0,088329844
X8	0,129763497	0,008775509	14,78700573	6,01382E-06	0,108290601	0,151236393	0,108290601	0,151236393
X9	-0,306925849	0,073947779	-4,150575605	0,006007229	-0,487869546	-0,125982152	-0,487869546	-0,125982152
X10	-44,84893703	6,075613735	-7,381795319	0,000317022	-59,71542825	-29,98244581	-59,71542825	-29,98244581

Table 4.4b

Case 3b: Y against X1, X2, X3, X4, X7, X8, X9, X10

(Independent variables X3, X8 lagged behind dependent variable Y by 1 year)

Year	Y	X1	X2	X3	X4	X7	X8	X9	X10
	GDP in China (Billion USD)	RMB ex change rate (to USD) RMB/1 USD	Bench-mark Interest Rate (%)	FDI (100M USD)	Trade Balance of China (100M USD)	Foreign Ex change Reserve (100M USD)	China wages (RMB)	China Ex ternal Debt (100M USD)	China Consumer Price Index (CPI)
1997	856	8.2898	9.75	417.26	406.80	1398.90	6250	1163	102.8
1998	953	8.2791	7.50	452.57	433.61	1449.59	6500	1310	99.2
1999	1019	8.2783	6.10	454.63	294.11	1545.75	6875	1460	98.6
2000	1083	8.2784	5.85	403.19	241.46	1655.70	8200	1518	100.4
2001	1198	8.2770	5.85	407.15	227.93	2121.65	9000	1457	100.7
2002	1325	8.2770	5.40	468.78	300.41	2864.07	9750	2033	99.2
2003	1454	8.2770	5.30	527.43	255.16	4032.51	11250	2026	101.2
2004	1641	8.2768	5.40	535.05	320.55	6099.32	12500	2194	103.9
2005	1932	8.1917	5.60	606.30	1019.76	8188.72	14000	2630	101.8
2006	2236	7.9718	5.90	603.25	2003.54	10663.40	16000	2965	101.5
2007	2713	7.6040	6.75	630.21	2623.75	15280.00	18500	3386	104.8
2008	3494	6.9451	6.95	747.68	2976.16	19460.30	21500	3892	105.9
2009	4522	6.8310	5.35	923.95	1963.82	20000.00	25000	3902	99.3
2010	4991	6.7695	5.40	900.33	1830.44	23500.00	29500	4286	103.3
2011	5879	6.4588	6.30	1057.35	1552.17	33000.00	33000	5489	105.4

Summary of Output

SUMMARY OUTPUT								
<i>Regression Statistics</i>								
Multiple R	0.999912626							
R Square	0.999825259							
Adjusted R Square	0.99959227							
Standard Error	32.83301443							
Observations	15							
<i>ANOVA</i>								
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>			
Regression	8	37008493	4626061.625	4291.310101	1.06671E-10			
Residual	6	6468.041018	1078.006836					
Total	14	37014961.04						
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	8272.816088	816.5252444	10.1317334	5.37521E-05	6274.850795	10270.78138	6274.850795	10270.78138
X1	-502.7662538	77.46979557	-6.489835814	0.000636526	-692.3280143	-313.2044933	-692.3280143	-313.2044933
X2	20.23319767	16.84021231	1.201481151	0.2748336	-20.97331733	61.43971268	-20.97331733	61.43971268
X3	0.660914298	0.304537675	2.170221789	0.073039601	-0.084262547	1.406091142	-0.084262547	1.406091142
X4	-0.109355687	0.02063247	-5.300174316	0.001829516	-0.159841523	-0.058869852	-0.159841523	-0.058869852
X7	0.044997562	0.016604531	2.70995673	0.035108094	0.004367737	0.085627386	0.004367737	0.085627386
X8	0.124385961	0.010486223	11.86184621	2.1715E-05	0.098727099	0.150044824	0.098727099	0.150044824
X9	-0.172977591	0.09714565	-1.780600472	0.125272475	-0.410684433	0.064729252	-0.410684433	0.064729252
X10	-42.12944879	7.70186374	-5.470032996	0.001557867	-60.97523041	-23.28366716	-60.97523041	-23.28366716

Table 4.5a
Case 4a: Y against X1, X2, X3, X4, X7, X8, X10

Year	Y GDP in China (Billion USD)	X1 RMB ex change rate (to USD) RMB/1 USD	X2 Bench-mark Interest Rate (%)	X3 FDI (100M USD)	X4 Trade Balance of China (100M USD)	X7 Foreign Exchange Reserve (100M USD)	X8 China wages (RMB)	X10 China Consumer Price Index (CPI)
1997	856	8.2898	9.75	452.57	406.80	1398.90	6500	102.8
1998	953	8.2791	7.50	454.63	433.61	1449.59	6875	99.2
1999	1019	8.2783	6.10	403.19	294.11	1545.75	8200	98.6
2000	1083	8.2784	5.85	407.15	241.46	1655.70	9000	100.4
2001	1198	8.2770	5.85	468.78	227.93	2121.65	9750	100.7
2002	1325	8.2770	5.40	527.43	300.41	2864.07	11250	99.2
2003	1454	8.2770	5.30	535.05	255.16	4032.51	12500	101.2
2004	1641	8.2768	5.40	606.30	320.55	6099.32	14000	103.9
2005	1932	8.1917	5.60	603.25	1019.76	8188.72	16000	101.8
2006	2236	7.9718	5.90	630.21	2003.54	10663.40	18500	101.5
2007	2713	7.6040	6.75	747.68	2623.75	15280.00	21500	104.8
2008	3494	6.9451	6.95	923.95	2976.16	19460.30	25000	105.9
2009	4522	6.8310	5.35	900.33	1963.82	20000.00	29500	99.3
2010	4991	6.7695	5.40	1057.35	1830.44	23500.00	33000	103.3
2011	5879	6.4588	6.30	1160.11	1552.17	33000.00	37500	105.4

Summary of Output

SUMMARY OUTPUT								
<i>Regression Statistics</i>								
Multiple R	0.999825682							
R Square	0.999651395							
Adjusted R Square	0.999302789							
Standard Error	42.93452901							
Observations	15							
<i>ANOVA</i>								
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>			
Regression	7	37002057.43	5286008.204	2867.57263	1.47227E-11			
Residual	7	12903.61647	1843.373782					
Total	14	37014961.04						
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	7810.299827	861.4201144	9.066772062	4.06537E-05	5773.364934	9847.23472	5773.364934	9847.23472
X1	-569.9100867	96.40990826	-5.911322778	0.000592673	-797.8832938	-341.9368796	-797.8832938	-341.9368796
X2	72.34375344	18.26287243	3.961247263	0.005452964	29.15892239	115.5285845	29.15892239	115.5285845
X3	-0.039383131	0.440363165	-0.089433301	0.931242619	-1.08067655	1.001910288	-1.08067655	1.001910288
X4	-0.20373048	0.020794311	-9.797414161	2.44806E-05	-0.252901213	-0.154559747	-0.252901213	-0.154559747
X7	0.010376525	0.012364892	0.839192464	0.429085808	-0.0188618	0.039614849	-0.0188618	0.039614849
X8	0.136991416	0.015667455	8.743692842	5.14558E-05	0.099943772	0.174039061	0.099943772	0.174039061
X10	-36.1605777	10.38963526	-3.480447271	0.010260065	-60.7281612	-11.59299419	-60.7281612	-11.59299419

Table 4.5b

Case 4b: Y against X1, X2, X3, X4, X7, X8, X10

(Independent variables X3, X8 lagged behind dependent variable Y by 1 year)

Year	Y GDP in China (Billion USD)	X1 RMB ex change rate (to USD) RMB/1 USD	X2 Bench-mark Interest Rate (%)	X3 FDI (100M USD)	X4 Trade Balance of China (100M USD)	X7 Foreign Exchange Reserv e (100M USD)	X8 China wages (RMB)	X10 China Consumer Price Index (CPI)
1997	856	8.2898	9.75	417.26	406.80	1398.90	6250	102.8
1998	953	8.2791	7.50	452.57	433.61	1449.59	6500	99.2
1999	1019	8.2783	6.10	454.63	294.11	1545.75	6875	98.6
2000	1083	8.2784	5.85	403.19	241.46	1655.70	8200	100.4
2001	1198	8.2770	5.85	407.15	227.93	2121.65	9000	100.7
2002	1325	8.2770	5.40	468.78	300.41	2864.07	9750	99.2
2003	1454	8.2770	5.30	527.43	255.16	4032.51	11250	101.2
2004	1641	8.2768	5.40	535.05	320.55	6099.32	12500	103.9
2005	1932	8.1917	5.60	606.30	1019.76	8188.72	14000	101.8
2006	2236	7.9718	5.90	603.25	2003.54	10663.40	16000	101.5
2007	2713	7.6040	6.75	630.21	2623.75	15280.00	18500	104.8
2008	3494	6.9451	6.95	747.68	2976.16	19460.30	21500	105.9
2009	4522	6.8310	5.35	923.95	1963.82	20000.00	25000	99.3
2010	4991	6.7695	5.40	900.33	1830.44	23500.00	29500	103.3
2011	5879	6.4588	6.30	1057.35	1552.17	33000.00	33000	105.4

Summary of Output

Regression Statistics								
Multiple R	0.999866452							
R Square	0.999732921							
Adjusted R Square	0.999465843							
Standard Error	37.58020509							
Observations	15							
ANOVA								
		df	SS	MS	F	Significance F		
Regression		7	37005075.14	5286439.306	3743.216604	5.79593E-12		
Residual		7	9885.902701	1412.271814				
Total		14	37014961.04					
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	8690.097514	895.2638546	9.706744519	2.60233E-05	6573.134892	10807.06014	6573.134892	10807.06014
X1	-580.4743362	73.26233457	-7.923230124	9.69326E-05	-753.7122292	-407.2364432	-753.7122292	-407.2364432
X2	39.97470217	14.50833584	2.755292034	0.028287294	5.667939402	74.28146494	5.667939402	74.28146494
X3	0.527429911	0.33784349	1.561166417	0.162453259	-0.271442999	1.326302822	-0.271442999	1.326302822
X4	-0.134262502	0.017359946	-7.734039191	0.00011304	-0.175312251	-0.093212753	-0.175312251	-0.093212753
X7	0.020305856	0.010453706	1.942455297	0.093197425	-0.00441323	0.045024943	-0.00441323	0.045024943
X8	0.126961291	0.01188767	10.68008236	1.3843E-05	0.098851419	0.155071163	0.098851419	0.155071163
X10	-42.85123827	8.803226247	-4.867674313	0.001819092	-63.66756054	-22.034916	-63.66756054	-22.034916

Table 4.6a

Case 5a: Y against X1, X2, X3, X4, X6, X7, X10

Year	Y GDP in China (Billion USD)	X1 RMB exchange rate (to USD) RMB/1 USD	X2 Bench-mark Interest Rate (%)	X3 FDI (100M USD)	X4 Trade Balance of China (100M USD)	X6 Energy Consumption (Million tons of SCE)	X7 Foreign Ex change Reserve (100M USD)	X10 China Consumer Price Index (CPI)
1997	856	8.2898	9.75	452.57	406.80	1359.09	1398.90	102.8
1998	953	8.2791	7.50	454.63	433.61	1361.84	1449.59	99.2
1999	1019	8.2783	6.10	403.19	294.11	1405.69	1545.75	98.6
2000	1083	8.2784	5.85	407.15	241.46	1455.31	1655.70	100.4
2001	1198	8.2770	5.85	468.78	227.93	1504.06	2121.65	100.7
2002	1325	8.2770	5.40	527.43	300.41	1594.31	2864.07	99.2
2003	1454	8.2770	5.30	535.05	255.16	1837.92	4032.51	101.2
2004	1641	8.2768	5.40	606.30	320.55	2134.56	6099.32	103.9
2005	1932	8.1917	5.60	603.25	1019.76	2359.97	8188.72	101.8
2006	2236	7.9718	5.90	630.21	2003.54	2586.76	10663.40	101.5
2007	2713	7.6040	6.75	747.68	2623.75	2805.08	15280.00	104.8
2008	3494	6.9451	6.95	923.95	2976.16	2914.48	19460.30	105.9
2009	4522	6.8310	5.35	900.33	1963.82	3066.47	20000.00	99.3
2010	4991	6.7695	5.40	1057.35	1830.44	3249.39	23500.00	103.3
2011	5879	6.4588	6.30	1160.11	1552.17	3480.02	33000.00	105.4

Summary of Output

Multiple R	0.999309683							
R Square	0.998619843							
Adjusted R Square	0.997239686							
Standard Error	85.42871927							
Observations	15							
ANOVA								
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>			
Regression	7	36963874.58	5280553.512	723.5551798	1.81424E-09			
Residual	7	51086.46253	7298.066076					
Total	14	37014961.04						
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	14178.35644	1589.13816	8.922041395	4.51388E-05	10420.64181	17936.07107	10420.64181	17936.07107
X1	-1075.14245	245.5413636	-4.378661235	0.003239737	-1655.755513	-494.5293873	-1655.755513	-494.5293873
X2	21.11060486	30.67227624	0.688263391	0.513442016	-51.41780337	93.63901309	-51.41780337	93.63901309
X3	0.608423002	0.829389749	0.73357912	0.487041537	-1.352772112	2.569618117	-1.352772112	2.569618117
X4	-0.366651045	0.071528316	-5.125956604	0.001359732	-0.535788637	-0.197513454	-0.535788637	-0.197513454
X6	0.883106855	0.235359878	3.752155484	0.007147938	0.326569181	1.439644529	0.326569181	1.439644529
X7	0.045907002	0.020135221	2.279935268	0.056641672	-0.001705231	0.093519234	-0.001705231	0.093519234
X10	-58.71761977	19.20643408	-3.057184874	0.018396173	-104.1336196	-13.30161996	-104.1336196	-13.30161996

Table 4.6b

Case 5b: Y against X1, X2, X3, X4, X6, X7, X10

(Independent variables X3 lagged behind dependent variable Y by 1 year)

	Y	X1	X2	X3	X4	X6	X7	X10
Year	GDP in China (Billion USD)	RMB ex change rate (to USD) RMB/1 USD	Bench-mark Interest Rate (%)	FDI (100M USD)	Trade Balance of China (100M USD)	Energy Consumption (Million tons of SCE)	Foreign Exchange Reserve (100M USD)	China Consumer Price Index (CPI)
1997	856	8.2898	9.75	417.26	406.80	1359.09	1398.90	102.8
1998	953	8.2791	7.50	452.57	433.61	1361.84	1449.59	99.2
1999	1019	8.2783	6.10	454.63	294.11	1405.69	1545.75	98.6
2000	1083	8.2784	5.85	403.19	241.46	1455.31	1655.70	100.4
2001	1198	8.2770	5.85	407.15	227.93	1504.06	2121.65	100.7
2002	1325	8.2770	5.40	468.78	300.41	1594.31	2864.07	99.2
2003	1454	8.2770	5.30	527.43	255.16	1837.92	4032.51	101.2
2004	1641	8.2768	5.40	535.05	320.55	2134.56	6099.32	103.9
2005	1932	8.1917	5.60	606.30	1019.76	2359.97	8188.72	101.8
2006	2236	7.9718	5.90	603.25	2003.54	2586.76	10663.40	101.5
2007	2713	7.6040	6.75	630.21	2623.75	2805.08	15280.00	104.8
2008	3494	6.9451	6.95	747.68	2976.16	2914.48	19460.30	105.9
2009	4522	6.8310	5.35	923.95	1963.82	3066.47	20000.00	99.3
2010	4991	6.7695	5.40	900.33	1830.44	3249.39	23500.00	103.3
2011	5879	6.4588	6.30	1057.35	1552.17	3480.02	33000.00	105.4

Summary of Output

SUMMARY OUTPUT								
<i>Regression Statistics</i>								
Multiple R	0.99976983							
R Square	0.999539714							
Adjusted R Square	0.999079427							
Standard Error	49.33483413							
Observations	15							
ANOVA								
	df	SS	MS	F	Significance F			
Regression	7	36997923.56	5285417.652	2171.560663	3.89333E-11			
Residual	7	17037.48101	2433.925858					
Total	14	37014961.04						
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	21840.36772	2017.098724	10.82761466	1.2637E-05	17070.68716	26610.04828	17070.68716	26610.04828
X1	-1515.583499	130.4044245	-11.6221785	7.87882E-06	-1823.940964	-1207.226035	-1823.940964	-1207.226035
X2	74.97261695	22.55126919	3.324540907	0.012685718	21.64733892	128.297895	21.64733892	128.297895
X3	-2.8828483	0.729825189	-3.950053171	0.005531635	-4.60861064	-1.15708596	-4.60861064	-1.15708596
X4	-0.595694947	0.062000485	-9.607907878	2.78318E-05	-0.742302798	-0.449087097	-0.742302798	-0.449087097
X6	1.651901779	0.207713607	7.952785596	9.46584E-05	1.160737148	2.143066411	1.160737148	2.143066411
X7	0.057193107	0.011912403	4.801139182	0.001963703	0.029024749	0.085361465	0.029024749	0.085361465
X10	-97.64419299	15.0430907	-6.49096618	0.000366986	-133.2154501	-62.07293591	-133.2154501	-62.07293591

Table 4.7a**Case 6a: Y against X1, X2, X3**

Year	Y GDP in China (Billion USD)	X1 RMB ex change rate (to USD) RMB/1 USD	X2 Bench-mark Interest Rate (%)	X3 FDI (100M USD)
1997	856	8.2898	9.75	452.57
1998	953	8.2791	7.50	454.63
1999	1019	8.2783	6.10	403.19
2000	1083	8.2784	5.85	407.15
2001	1198	8.2770	5.85	468.78
2002	1325	8.2770	5.40	527.43
2003	1454	8.2770	5.30	535.05
2004	1641	8.2768	5.40	606.30
2005	1932	8.1917	5.60	603.25
2006	2236	7.9718	5.90	630.21
2007	2713	7.6040	6.75	747.68
2008	3494	6.9451	6.95	923.95
2009	4522	6.8310	5.35	900.33
2010	4991	6.7695	5.40	1057.35
2011	5879	6.4588	6.30	1160.11

Summary of Output

SUMMARY OUTPUT								
<i>Regression Statistics</i>								
Multiple R	0.991174787							
R Square	0.982427459							
Adjusted R Square	0.977634948							
Standard Error	243.16977							
Observations	15							
<i>ANOVA</i>								
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>			
Regression	3	36364514.14	12121504.71	204.9922142	6.22164E-10			
Residual	11	650446.9076	59131.53705					
Total	14	37014961.04						
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	9850.511532	3794.282146	2.596146294	0.024864262	1499.35284	18201.67022	1499.35284	18201.67022
X1	-1147.009704	382.2623662	-3.000582337	0.012067273	-1988.363499	-305.6559093	-1988.363499	-305.6559093
X2	-118.5900847	58.37653038	-2.031468536	0.067081283	-247.0759617	9.895792251	-247.0759617	9.895792251
X3	3.322609932	1.085841666	3.059939618	0.010853131	0.932688541	5.712531324	0.932688541	5.712531324

Table 4.7b**Case 6b: Y against X1, X2, X3****(Independent variable X3 lagged behind dependent variable Y by 1 year)**

Year	Y GDP in China (Billion USD)	X1 RMB exchange rate (to USD) RMB/1 USD	X2 Bench-mark Interest Rate (%)	X3 FDI (100M USD)
1997	856	8.2898	9.75	417.26
1998	953	8.2791	7.50	452.57
1999	1019	8.2783	6.10	454.63
2000	1083	8.2784	5.85	403.19
2001	1198	8.2770	5.85	407.15
2002	1325	8.2770	5.40	468.78
2003	1454	8.2770	5.30	527.43
2004	1641	8.2768	5.40	535.05
2005	1932	8.1917	5.60	606.30
2006	2236	7.9718	5.90	603.25
2007	2713	7.6040	6.75	630.21
2008	3494	6.9451	6.95	747.68
2009	4522	6.8310	5.35	923.95
2010	4991	6.7695	5.40	900.33
2011	5879	6.4588	6.30	1057.35

Summary of Output

SUMMARY OUTPUT								
<i>Regression Statistics</i>								
Multiple R	0.994715597							
R Square	0.989459119							
Adjusted R Square	0.986584333							
Standard Error	188.3348817							
Observations	15							
<i>ANOVA</i>								
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>			
Regression	3	36624790.74	12208263.58	344.1853414	3.75358E-11			
Residual	11	390170.3042	35470.02766					
Total	14	37014961.04						
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	7826.099768	2859.309197	2.737059628	0.019332807	1532.802661	14119.39687	1532.802661	14119.39687
X1	-999.2937467	277.3107227	-3.603516434	0.004144328	-1609.650532	-388.9369616	-1609.650532	-388.9369616
X2	-66.03488178	48.49017017	-1.361819964	0.20049269	-172.7610267	40.6912631	-172.7610267	40.6912631
X3	4.487582012	0.936800865	4.790326504	0.000562009	2.425697212	6.549466812	2.425697212	6.549466812

Table 4.8 - Summary of Multiple Regression Models for 12 Different Cases

Cases	Multiple Regression Equation
Case 1a	$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + \beta_9X_9 + \beta_{10}X_{10} + \varepsilon$
Case 1b (X ₃ , X ₅ , X ₈ lagged by 1 year)	$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + \beta_9X_9 + \beta_{10}X_{10} + \varepsilon$
Case 2a	$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + \beta_{10}X_{10} + \varepsilon$
Case 2b (X ₃ , X ₅ , X ₈ lagged by 1 year)	$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + \beta_{10}X_{10} + \varepsilon$
Case 3a	$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_7X_7 + \beta_8X_8 + \beta_9X_9 + \beta_{10}X_{10} + \varepsilon$
Case 3b (X ₃ , X ₈ lagged by 1 year)	$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_7X_7 + \beta_8X_8 + \beta_9X_9 + \beta_{10}X_{10} + \varepsilon$
Case 4a	$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_7X_7 + \beta_8X_8 + \beta_{10}X_{10} + \varepsilon$
Case 4b (X ₃ , X ₈ lagged by 1 year)	$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_7X_7 + \beta_8X_8 + \beta_{10}X_{10} + \varepsilon$
Case 5a	$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_6X_6 + \beta_7X_7 + \beta_{10}X_{10} + \varepsilon$
Case 5b (X ₃ lagged by 1 year)	$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_6X_6 + \beta_7X_7 + \beta_{10}X_{10} + \varepsilon$
Case 6a	$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \varepsilon$
Case 6b (X ₃ lagged by 1 year)	$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \varepsilon$

Table 4.9 - Summary of Output for RMB Exchange Rate (X₁)

Cases	t-value for X ₁	P-value for X ₁	Adjusted R square	F-value
Case 1a	-3.283180451	0.030409682	0.999709794	4823.756652
Case 1b	-8.75722445	0.000937226	0.999937356	22348.19823
Case 2a	-3.174320496	0.024694948	0.999234722	2032.110773
Case 2b	-15.81618222	1.83811E-05	0.999940497	26141.89378
Case 3a	-5.343533123	0.001755373	0.999789882	8327.89169
Case 3b	-6.489835814	0.000636526	0.99959227	4291.310101
Case 4a	-5.911322778	0.000592673	0.999302789	2867.57263
Case 4b	-7.923230124	9.69326E-05	0.999465843	3743.216604
Case 5a	-4.378661235	0.003239737	0.997239686	723.5551798
Case 5b	-11.6221785	7.87882E-06	0.999079427	2171.560663
Case 6a	-3.000582337	0.012067273	0.977634948	204.9922142
Case 6b	-3.603516434	0.004144328	0.986584333	344.1853414

Table 4.10 - Summary of Output for Case 1a-b, 2a-b, 3a-b

Model	Output	Intercept	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10
			RMB exchange rate (to USD)	Benchmark Interest Rate (%)	FDI (100 Million USD)	Trade Balance of China (100 Million USD)	Annual Inflation rate in China (%)	Energy Consumption (Million tons of SCE)	Foreign Exchange Reserve (Million USD)	China wages (RMB)	China External Debt (100M USD)	China Consumer Price Index (CPI)
Case 1a	P-value	0.8089081	0.030409682	0.055462468	0.292515586	0.010609982	0.85328869	0.664597604	0.023734405	0.001905048	0.038754311	0.949275414
	t-stat	0.258318484	-3.283180451	2.675934933	1.211099469	-4.525958496	-0.197196498	0.467312661	3.553008264	7.266536348	-3.030689863	-0.06769734
	Coefficient	4504.249513	-419.2223517	40.48930336	0.379380601	-0.169597216	-34.30956394	0.063115618	0.056108874	0.122083463	-0.288984666	-11.59680577
	Adj. R square	0.999709794										
	F-value	4823.756652										
Case 1b	P-value	0.000365844	0.000937226	0.031111603	0.037441628	0.002725236	0.47623162	0.013511185	0.00897081	0.001529924	0.435522401	0.000359389
	t-stat	11.16859163	-8.75722445	3.258950863	-3.06591921	-6.603534207	0.785206615	4.21689569	4.750014074	7.700926562	-0.865633194	-11.21972882
	Coefficient	14015.17561	-922.7764888	51.01954887	-1.01090219	-0.315133859	2.698985138	0.66156778	0.039487746	0.084694776	-0.048177145	-67.18280601
	Adj. R square	0.999937356										
	F-value	22348.19823										
Case 2a	P-value	0.639806078	0.024694948	0.017234822	0.996588821	0.012238743	0.445168603	0.654144569	0.272840091	0.007708832		0.526321706
	t-stat	-0.497703365	-3.174320496	3.502687641	0.00493062	-3.830716985	-0.828408224	0.476001859	1.231658012	4.300904235		0.680661998
	Coefficient	-13271.50013	-590.3476239	68.35363773	0.002097338	-0.214290977	-219.1954361	0.103879534	0.022463	0.116676375		176.4835688
	Adj. R square	0.999234722										
	F-value	2032.110773										
Case 2b	P-value	1.2739E-05	1.8381E-05	0.000636129	0.005429827	8.18205E-05	0.729127308	0.000911544	0.000402948	0.000222307		2.3972E-05
	t-stat	17.03942716	-15.81618222	7.574959175	-4.68077102	-11.65068962	0.366303998	7.008663571	8.350399243	9.465735371		-14.98369622
	Coefficient	14780.914	-994.8787189	62.42452175	-1.18636483	-0.346870831	1.010365178	0.757614892	0.033218716	0.078684365		-70.26788375
	Adj. R square	0.999940497										
	F-value	26141.89378										
Case 3a	P-value	4.19724E-06	0.001755373	0.019607312	0.178017325	7.61183E-05			0.004882103	6.01382E-06	0.006007229	0.000317022
	t-stat	15.72165076	-5.343533123	3.158296756	1.525348288	-9.531034684			4.338719531	14.78700573	-4.150575605	-7.381795319
	Coefficient	7517.154173	-376.66655	40.07111108	0.402996368	-0.155406829			0.056477931	0.129763497	-0.306925849	-44.84893703
	Adj. R square	0.999789882										
	F-value	8327.89169										
Case 3b	P-value	5.37521E-05	0.000636526	0.2748336	0.073039601	0.001829516			0.035108094	2.1715E-05	0.125272475	0.001557867
	t-stat	10.1317334	-6.489835814	1.201481151	2.170221789	-5.300174316			2.70995673	11.86184621	-1.780600472	-5.470032996
	Coefficient	8272.816088	-502.7662538	20.23319767	0.660914298	-0.109355687			0.044997562	0.124385961	-0.172977591	-42.12944879
	Adj. R square	0.99959227										
	F-value	4291.310701										

Table 4.11 - Summary of Output for Case 4a-b, 5a-b, 6a-b

Model	Output	Intercept	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10
			RMB exchange rate (to USD)	Benchmark Interest Rate (%)	FDI (100 Million USD)	Trade Balance of China (100 Million USD)	Annual Inflation rate in China (%)	Energy Consumption (Million tons of SCE)	Foreign Exchange Reserve (Million USD)	China wages (RMB)	China External Debt (100M USD)	China Consumer Price Index (CPI)
Case 4a	P-value	4.06537E-05	0.000592673	0.005453	0.931243	2.44806E-05			0.429086	5.14558E-05		0.01026
	t-stat	9.066772062	-5.911322778	3.961247	-0.089433	-9.797414161			0.839192	8.743692842		-3.480447
	Coefficient	7810.299827	-569.9100867	72.34375	-0.039383	-0.20373048			0.010377	0.136991416		-36.16058
	Adj. R square	0.999302789										
	F-value	2867.57263										
Case 4b	P-value	2.60233E-05	9.69326E-05	0.028287	0.162453	0.00011304			0.093197	1.3843E-05		0.001819
	t-stat	9.706744519	-7.923230124	2.755292	1.561166	-7.734039191			1.942455	10.68008236		-4.867674
	Coefficient	8690.097514	-580.4743362	39.9747	0.52743	-0.134262502			0.020306	0.126961291		-42.85124
	Adj. R square	0.999465843										
	F-value	3743.216604										
Case 5a	P-value	4.51388E-05	0.003239737	0.513442	0.487042	0.001359732		0.007147938	0.056642			0.018396
	t-stat	8.922041395	-4.378661235	0.688263	0.733579	-5.125956604		3.752155484	2.279935			-3.057185
	Coefficient	14178.35644	-1075.14245	21.1106	0.608423	-0.366651045		0.883106855	0.045907			-58.71762
	Adj. R square	0.997239686										
	F-value	723.5551798										
Case 5b	P-value	1.2637E-05	7.87882E-06	0.012686	0.005532	2.78318E-05		9.46584E-05	0.001964			0.000337
	t-stat	10.82761466	-11.6221785	3.324541	-3.950053	-9.607907878		7.952785596	4.801139			-6.490966
	Coefficient	21840.36772	-1515.583499	74.97262	-2.882848	-0.595694947		1.651901779	0.057193			-97.64419
	Adj. R square	0.999079427										
	F-value	2171.560663										
Case 6a	P-value	0.024864262	0.012067273	0.067081	0.010853							
	t-stat	2.596146294	-3.000582337	-2.031469	3.05994							
	Coefficient	9850.511532	-1147.009704	-118.5901	3.32261							
	Adj. R square	0.977634948										
	F-value	204.9922142										
Case 6b	P-value	0.019332807	0.004144328	0.200493	0.000562							
	t-stat	2.737059628	-3.603516434	-1.36182	4.790327							
	Coefficient	7826.099768	-999.2937467	-66.03488	4.487582							
	Adj. R square	0.986584333										
	F-value	344.1853414										