China and Japan: Comparative Analysis of the Asset Bubble

Thesis on how China has avoided an asset bubble after renminbi appreciation while Japan's bubble busted

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Abstract

This thesis examines the potential asset bubble in China in the wake of RMB appreciation by comparing it with the Japanese price asset bubble in the late 1980s. Scholars have extensively discussed the causes of the Japanese asset bubble. This thesis takes these factors as a starting point and uses a mixed methodology focused on theoretical analysis supported by analysis on primary data. It argues that (1) there is no significant association between economic growth and the exchange rate in Japan while such a connection is present in China. (2) The interest rate in Japan was set following the exchange rate while in China there is no association between the two variables. (3) The banking sector in Japan was both growing faster and was overall larger during the growing period. Moreover, banking returns were under more pressure than they were in China. (4) The global financial crisis that followed China's stock market bubble in 2007 interrupted China's period of RMB appreciation. The recovery program might have impacted the comparison, which compares with the too lenient approach of Japan towards the asset bubble. Based on these factors China has reacted differently to exchange rate appreciation, which could explain how China has avoided the asset bubble.

Keywords: China, Japan, asset bubble, US trade dispute.

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Thesis

1. Introduction

Since the reforms in the late 1970s, China has transformed itself from a closed, rudimental economy to a fast-growing economic powerhouse residing at the forefront of innovation and technological development. Along with this economic rise, the Renminbi [RMB] exchange rate and China's trade imbalances have increasingly been at the center of debates over the source of global trade imbalances, facing particular criticism from the United States [US] for being a major driver of its widening trade deficit. This criticism has strengthened in recent years, highlighting the importance of further attention to this issue. At the core of many accusations lies the claim that China kept the RMB exchange rate artificially low by a peg to the US dollar, specifically in the period from 1994 to 2005 where the RMB was pegged to the US dollar. This supposedly stimulated exports to advance China's economic interest at the cost of the US (Slaughter, 2002; Hughes, 2005). Although consensus shows that the RMB exchange rate is not undervalued, several studies in the period previous to around 2011 show significant misalignment between the real RMB-US dollar exchange rate and the equilibrium RMB-US dollar exchange rate (Almås et co., 2017; Bénassy-Quéré et co., 2004).

This dispute revokes memories of an earlier trade controversy between the US and Japan over current account imbalances and, particularly, the yen to US dollar exchange rate. This conflict was resolved with the signing of the plaza accord of 1985 and the Louvre accord in 1987 but turned out to have lasting consequences for the Japanese economy. Japan agreed to appreciate the yen against the US dollar which caused the yen to appreciate strongly against the US dollar in the two years following the plaza accord. Initially, this led to an economic boom in which land asset prices and stock prices increased rapidly, inflating a price asset bubble in the Japanese economy. What followed for Japan was an economic recession proceeded by a long period of economic stagnation better known as the 'lost decade'. Where previously Japan was one of the fastest-growing Asian economies, real GDP growth now slumped into barely 1% in the period 1992 to 2002. The parallels between these two conflicts are unmistakable; Japan found itself under heavy pressure of an assertive US to reduce bilateral trade imbalances and dealing with accusations of unfair trade practices such as government subsidies and unwanted technology transfers, almost the same issues and concerns that played between China and US (Bown & Mcculloch, 2009). Moreover, Japan and China share several important macroeconomic

characteristics, including a persistent current account surplus, large and growing foreign currency-denominated assets, and recurring appreciation pressure (Schnabl, 2017). Consequently, Japan can be used as a case study to assess economic responses by China as it shares with China several important characteristics. Contrary to the Japanese experience, RMB appreciation to the US dollar after 2005 has not yet caused similar economic disruption. Consequently, this raises the question of what China has done differently from Japan. Despite obvious resemblances between Japan and China, outcomes of US conflict were very different. What has China done differently to avoid negative economic consequences as in Japan? What did China learn from the Japanese experience? And what role did the exchange rate play in these conflicts?

Previous research has exhaustively discussed the emergence of a price asset bubble in the second half of the 1980s, the causes behind this bubble and the stagnation of the Japanese economy that followed upon its implosion. Although the existence of an asset bubble in the Chinese economy is disputed by scholars, no significant influence on Chinese economic growth has been observed. Despite these many corresponds, research comparing China and Japan has been limited, often focusing on specific viewpoints like the interest rate or balance of payments. In this thesis, the relevant literature related to the exchange rate and the effect on economic growth will be systematically set out. The causes behind a sharp decline in economic growth and the causes of the prolonged slowdown of the Japanese economy will be discussed. The Japan-US trade conflict and the outcome and effects will be set out in detail to create a valid background for the comparison. It is important to determine the exact situation China is in regarding macro-economic variables to get an accurate analysis. This also matters for the comparison with the Japanese conflict and how it could mean different outcomes in the case of China nowadays. The focus will lie on the period of conflict, for Japan, these were the 1980s up to the Plaza accord in 1985 and for China, this period is from the early 2000s until the beginning of RMB appreciation starting from 2007.

Considering the implications of this issue not only for Japan and China but potentially also for economies that are invulnerable to potential asset bubbles, we know relatively little about how China has avoided the asset bubble inflation that Japan had in the 1980s. Therefore, this thesis hopes to fill this gap by comparing the causes behind the Japanese asset bubble with the period where China faced similar pressure and appreciation of the RMB from 2005 onwards. Within this proposed research scope, the objective of this thesis is to assess how China's response to US pressure was different from Japan concerning the direct causes of the price asset bubble and specifically evaluate how China has avoided these negative economic consequences.

Therefore, this thesis makes two significant contributions to the existing literature by directly assessing the Japanese asset bubble and comparing the key differences between Japan and China in the period of exchange rate appreciation. Within this proposed research scope, the objective of this thesis is to advance our understanding of the causes behind the Japanese stagnation period and foremost it will set out why China has avoided a similar downturn. Specifically, the comparison between Japan and China has not received sufficient attention by scholar and new insights could give different perspectives to the ongoing trade dispute. Likewise, this thesis provides a meaningful contribution to the ongoing scientific debate by resolving the inconsistencies in previous literature.

This thesis bases its results on a variety of methodologies that each apply to individual factors behind the Japanese asset bubble, as defined in the literature review. This approach rests on a combination of theory and statistical analysis for the four factors that will be discussed. Correlation analysis will be utilized to find the impact of different variables with regards to the variables. For this, SPSS by IBM will be used based on a sample of 60 data points. Additionally, the primary data will be reviewed on a descriptive base rather than statistical analysis. The added value of such an analysis may come from the strong explanative power based on statistical significance that is suitable for each factor.

This thesis is organized as follows. First, the literature on causes behind the Japanese stagnation will be discussed, including existing research that compares Japan with China. Next will be the theoretical approach where the main analysis and method further comparison, including main variables, will be set out. This section is followed by the data and methods section where methodology will be further set out. Based on the literature review and theoretical analysis, I have distinguished the channels through which the exchange rate impacts the economy. Following this, the methods and data section will explain the design of the analysis and data gathering, which is based on the data from the China economic yearbook. Next, the analysis will be run on the determined variables. Outcomes show that exchange rate fluctuations do have significant effects on China's economic growth. After this, the discussion section will interpret the results from the analysis and set out the implications for the Chinese economy. Finally, the conclusion will shortly recap the main findings from this thesis.

2. Literature review

The Japanese economy experienced substantial fluctuations from the mid-1980s until the beginning of 1990s, characterized by rapid accelerating asset prices (Okina et co., 2001). This holds especially for land prices in big cities and particularity land prices in the greater Tokio area where prices tripled between 1986 and 1990 (Japan Statistics Bureau). Along with higher land prices the Japanese stock market boomed in the late 1980s with the Nikkei index peaking in 1989. This period of accelerating asset prices followed the signing of the plaza accord in 1985 and ended with a recession in 1991. After the relative recovery from this asset price bubble deflation, the Japanese economy moved into a period of permanent low growth in the 1990s.

In light of these fast-growing asset prices, scholars have pointed to the existence of an asset bubble that developed during this period. Hamada, Kashyap, and Weinstein (2011) evaluated whether the Japanese stock and land prices could plausibly be explained in terms of rational expectations about fundamentals. Although they argue that optimistic beliefs about economic variables were not entirely unjustified, the high growth could not rationally be explained and the outlooks were too optimistic. Hu and Oxley (2018) subjected the asset bubbles to the most recent econometric tests which found sufficient empirical evidence for both the existence of an asset bubble and the contagion effect that transmits crashes in the stock market to land asset market. They argue that Japan experienced two simultaneous bubbles in stock prices and real estate where shocks in the stock market migrated to the real estate market.

Similar to Japan, China appreciated the RMB after US pressure in 2005 allowing it to rise from the previous peg of 8.12 RMB per US dollar to a high of 6.23 RMB per dollar in 2009. However, no recession was seen in China after the RMB appreciation, GDP growth continued to be strong and has only recently slowed down, more than ten years after the first appreciation. This raises important questions about what caused the asset bubble in Japan. Literature suggest the following five factors behind the emergence and expansion of the asset bubble: the plaza accord, misaligned monetary policy by the Bank of Japan [BoJ], aggressive bank behavior, tax distortions, and overconfidence in the Japanese financial sector (Basile & Joyce, 2001; Okina et co., 2001; Nishimura, 1990; Barsky, 2010). Although these factors are to a certain extent mutually interrelated, most scholars highlight the importance of the combination of monetary policy and aggressive bank behavior.

The first factor is the plaza accord signed between the US and Japan that obligated Japan to appreciate the yen against the US dollar (Corbett & Ito, 2010; Mihut, 2014; Hamada & Okada, 2009). Although the accord itself was mostly a catalyzing factor, many scholars have pointed

to the effects of the plaza accord which required a strong appreciation of the yen currency which in return affected other variables such as the interest rate and FDI (Mihut, 2014). Particularly, they argue that the negative economic consequences of yen appreciation incentivized the Japanese government into reacting with policy adjustments. However, Corbett and Ito (2010) argue the exact opposite, namely that the plaza was not the result but the cause but the consequence of policy mistakes. They argue that Japan should allow yen appreciation in the early 1980s which would have avoided

The second factor deemed of importance is monetary policy and is somewhat related to the plaza accord as it is considered a direct reaction to yen appreciation (Okina et co., 2001; Basile & Joyce, 2001; Bernanke and Gertler, 1999; Leigh, 2010). The BoJ gradually lowered the discount rate from 5% in 1986 to 2.5% in 1987, remaining unchanged until 1989. Empirical evidence by Basile and Joyce (2001) shows that the interest rate and asset prices are linked, but results are not robust depending on the variables and specification of the model. The banking sector needed to deal with low profitability and tried to push their profits by fulling speculation on the asset market while the enabled BoJ enabled this through low discount rates. An important point in considering the factor of monetary policy was the expectation that the interest rate would remain low indefinitely as the Japanese economy expanded in the late 1980s (Okina et co., 2001). This expectation strengthened the effects of falling funding costs, expansion of equity financing, and an increase in collateral value of assets that corresponded with inflating land prices. Bernanke and Gertler (1999) calculated that an interest rate in the range from 8% to 10% could have offset the stimulation effects of the bubble. Instead, the lower interest rate around 4% only stimulated the inflation of the land asset prices. Hossain and Rafiq (2011) argue that the specific combination of low-interest rate and speculative behavior was an important cause of the asset bubble.

Aggressive bank behavior has been suggested as the third factor behind the emergence of the bubble (Okina et co., 2001; Shiratsuka, 2003; Demaestri & Masci, 2003; Tomfort, 2017; Hossain & Rafiq, 2011). Financial institutions in Japan had become gradually more aggressive from around 1983 until after 1987-1988 when it had become clear that Japanese institutions were extremely aggressive (Shiratsuka, 2003). Circumstances in Japanese financial environment forced banks to change their lending standard and were a reason for the excessive risk-taking in the financial sector. Okina et co (2001) found that Japanese banks experienced a decline in profitability due to the liberalization of the financial markets. Restrictions and regulations on fund-raising were removed which gave more options for loaners to get funding from the capital market. The implications for banks were that they no longer were the main

source of funding as new alternatives for companies emerged. Consequently, Japanese banks relied on a shrinking customer base with rising costs, putting pressure on the financial results (Demaestri & Masci, 2003). To make up for these negative effects they started to set ambitious performance targets with increased risk. At the beginning of the 1990s, the decrease in land exposed the excessive risk-taking in the previous years and had a significant negative impact on the balance sheets of large financial institutions.

Distortions in the taxing and regulation system are the fourth factor that stimulated the growth the of the asset bubble (Nishimura, 1990; Noguchi, 1991; Okina et co., 2001; Demaestri & Masci, 2003). High transaction taxes meant that many landowners preferred to keep their land in hand in expectation of higher property prices, depressing supply which in turn accelerated the rise of prices (Okina et co., 2001). However, Nishimura (1990) notes that as property value grew faster the prices on which taxation was based did not keep up, lowering the transaction tax as a percentage of the overall land prices. Consequently, expectations of further increases in land prices led to investors to speculate on land rather than put it in production. Additionally, there were regulations in place that incentivized for speculation instead of putting land to use. Noguchi (1991) explains the impact of the land lease law which prevented owners of land and housing to raise the rent. They preferred to leave the land empty and profit from capital gains rather than rent at artificially low prices. Although these regulations on itself did not necessarily cause the asset bubble, the policies did nothing to preventing further accelerating prices and their harmful design came apparent.

The final consideration is the role of overconfidence within Japanese society and the financial markets (Barsky, 2010; Okina et co., 2001; Shiratsuka, 2003; Shiller et al., 1996). Okina et co. (2001) explains that the combination of strong economic growth, the growing importance of Japanese financial markets, and the innovative power of Japanese technology manufacturers led to a euphoric mood among Japanese investors. This overconfidence turned out to be an additional factor in the strengthening of the bubble. Other scholars have observed overconfidence from the perspective of individual misconceptions about the financial markets and the overall economy. Barsky (2010) observes that even at the height of the bubble, many investors did not think the market was overvalued. Optimism about expectations and fair valuation stimulated continued growth in value. Barsky's argumentation is similarly supported by empirical work from Shiller et al. (1996) who find a significant relationship between the Nikkei crash, and price expectations and speculative strategies.

After the implosion of the asset bubble, Japan was unable to revive its economy, leading to a long period of economic stagnation. Numerous theories have been advanced by academics that explain Japan's poor economic performance in the 1990s. Some interpretations focus on macroeconomic factors, with fiscal policy and the liquidity trap being the most prominent. Others suggest looking at microeconomic variables where low productivity growth has been proposed. Finally, literature has pointed to social-demographics factors and the inability to regain economic growth as Japan is facing an aging population. Although these interpretations are not mutually exclusive and the debate continues over the importance of exact determinants, they nonetheless provide a profound insight into the origins of Japan's stagnation, which can allow for further comparison with China (IMF, 2011).

First, scholars have pointed to the effects of misplaced monetary policy and the existence of a liquidity trap that became apparent in the 1990s (Sato, 2007; Okina et co., 2001). This is a situation in which the central bank pushes the interest rate towards zero while the increased money supply has no visible effect on the economy. Monetary policy thus becomes ineffective as the economy falls despite higher interest rates. This happened to Japan after de Heisei recession when economic output slowed down despite interest rate around 0% (Sato, 2007). Second, the literature suggests the stagnant labor productivity as an important brake on growth (Hayashi and Prescott, 2002). As labor productivity rises, less working hours are needed per unit of output, which allows for higher returns per labor hour and thus economic growth. As the Japanese economy grows in the decades previous to the asset bubble, labor productivity grew at a similar trend. At the end of the 1980s, labor productivity leveled out and seized growing altogether in the 1990s. Third, more recent work by scholars has pointed to the aging population for being a factor in the decline in productivity and economic output (Yoshino & Taghizadeh-Hesary, 2017; Aoki, 2013). Yoshino and Taghizadeh-Hesary (2017) suggest that the aging population is an underestimated reason behind stagnant economic output. Despite having one of the highest life expectancies in the world, retirement age is settled at 65 years which in combination with the low birth rates means a rapidly declining population. Moreover, an older workforce meant lower productivity growth and innovation while the growing elder population requirement higher support levels. Alternative explanations have been provided by Horioka (2006) and Werner (2002). Horioka (2006) attributed the economic stagnation to the decline in investment, especially stagnation of private fixed investment. Major shortcomings in policymaking by the Japanese government pronged economic slowdown. Alternatively, Werner (2002) points to the direction of credit controls for creating the economic bubble in the 1980s.

In comparison with China, since the appreciation of the RMB in 2015, there have been warnings of a rising property bubble in China, similar to the one in Japan. Initially, some feared China might undergo a similar pad as Japan after the RMB appreciation began in 2005 (McKinnon, 2005). Although so far a similar economic recession has not taken place, this does not mean that negative implications will not happen in the future. Feng and Wu (2015) employed an equilibrium asset-pricing approach based on 35 major cities in China. Their findings suggest that China's very rapid house price inflation does not necessarily imply a housing price bubble. Based on the equilibrium price model, fast-growing prices are largely justified by China's strong economic growth and fast urbanization. Although the authors that this does not mean that on local housing markets bubbles might exist, their findings can be disputed by other articles. Zhang et co. compare China's housing situation in 2014 with other bubble crises in the US, Hong Kong, and Japan. They find that given a sharp rise in property prices, the bubble should already have imploded. However, due to the unique power of the government to control the market a sharp downturn in property prices has been prevented. Although the property bubble has not had a visible effect on China's economic performance, empirical data do suggest, as highlighted by the collapse of the Chinese stock market during the worldwide financial crisis.

In the process of assessing literature, I find that extant literature provides sufficient answers to a number of questions. First, there are many similarities between Japan in the late 1980s and China in the period from 2005 to 2011. Scholars have noted the potential dangers to China from this comparison and have taken Japan as a framework to see the Chinese case. Second, the literature indicates the presence of an asset bubble in the Japanese economy that imploded in 1992 and was followed by a period of economic stagnation. The causes behind this bubble have been covered extensively, with monetary policy and aggressive bank behavior as two important causes. Furthermore, the literature suggests a number of important clarifications that explain the economic stagnation: monetary policy and the liquidity trap, stagnant productivity growth, and demographic decline. However, there remain a number of unresolved issues, which will be addressed in the remainder of this study. Scholars have failed to provide clarity on why China did not undergo a similar pattern as Japan did. Literature has pointed to the plaza accord as the start of the asset bubble and recession, but have not explained why this did not happen with China after RMB appreciation from 2005 onwards. Despite the many similarities between China so far has avoided an economic breakdown as has happened with Japan. This begets an important question: What has China done right to avoid an economic downturn?

3. Theoretical Approach

The literature review suggests that the settlement of the dispute between Japan and the US had direct implications in the asset bubble and its consequent implosion, and indirect implications when the settlement of this bubble inaugurated a long period of economic stagnation (Okina et co., 2001). The remainder of this thesis will focus on answering the research question as to what China has done differently to Japan to avoid negative economic consequences of the asset bubble in light of comprehensive disputes with the US. Consequently, this thesis will focus on the direct causes of the asset bubble with the analysis focusing on the assessment of the factors behind the Japanese bubble that were determined in the literature review. The theoretical approach touches upon three important aspects that need to be addressed further. First, since Japan and China are two different countries with distinct institutional settings, policy preferences, and stage of economic development, it is not plausible to create a detailed comparison of direct factors. Instead, this thesis focuses broadly on the individual factors that accelerated Japan's asset bubble as determined in the literature review, by comparing these to how these elements were displayed in China. Second, the choice of a methodology that is suitable for answering the research question with a focus on the specific factors that were present in the Japanese asset bubble. Third, not all of these factors are suitable for further analysis. Therefore, the two factors of taxation and overconfidence will not be further investigated due to their complexity and lack of data. The thesis concentrates on assessing how each specific factor differed in China or, instead, is effectively the same.

The foremost important assumption of this theoretical approach is the basic validation of the assumptions of the asset bubble in Japan as discussed in the literature review. Where the literature review suggested that such a bubble was present, a closer look at primary data also suggests this. Figure 1 and 2 show respectively the land prices in the Tokio area and the Nikkei stock market prices index from the period 1982 to 1996. In the period 1985 to 1989 that was described as the period of bubble growth, there is a sharp peak observable followed by a fast decline in prices. Meanwhile, table 3 depicts the quarterly GDP growth of Japan where a strong economy can be seen up till the 1990s from where a downturn can be observed which shows no further recovery in the 1990s. Thus, primary data are in line with the theoretical background, which strengthens the proposal for further analysis on the basis of strong evidence.

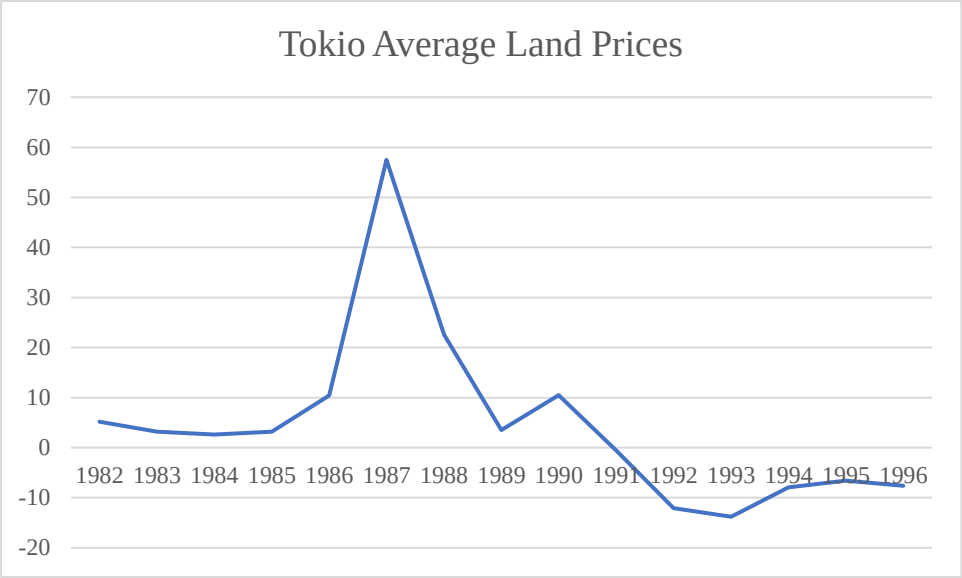

Figure 1: Tokio metropolitan area average land prices, 1982 to 1996.
Source: Statistics Bureau, Historical Statistics of Japan.

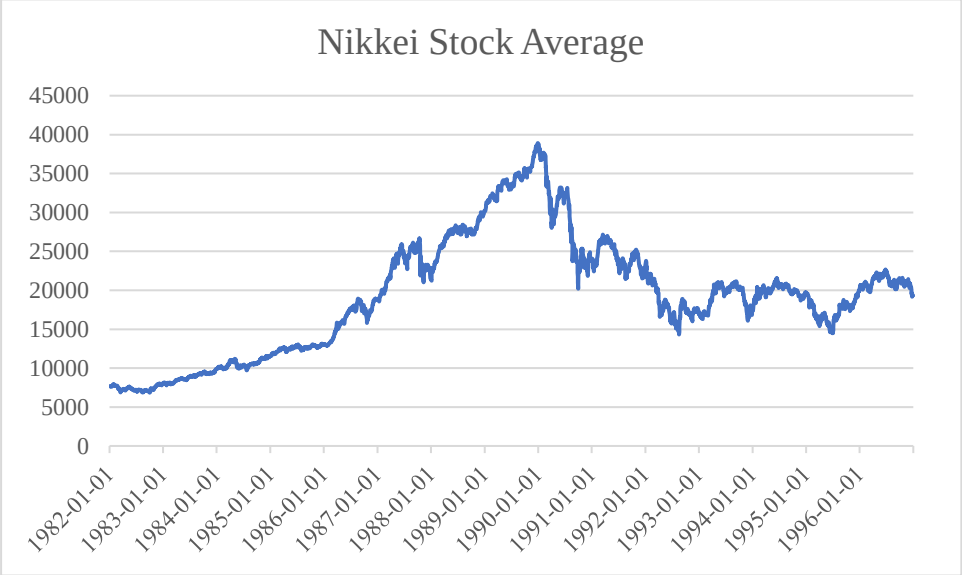

Figure 2: Nikkei average stock price, 1982 to 1996.
Source: Nikkei Industry Research Institute.

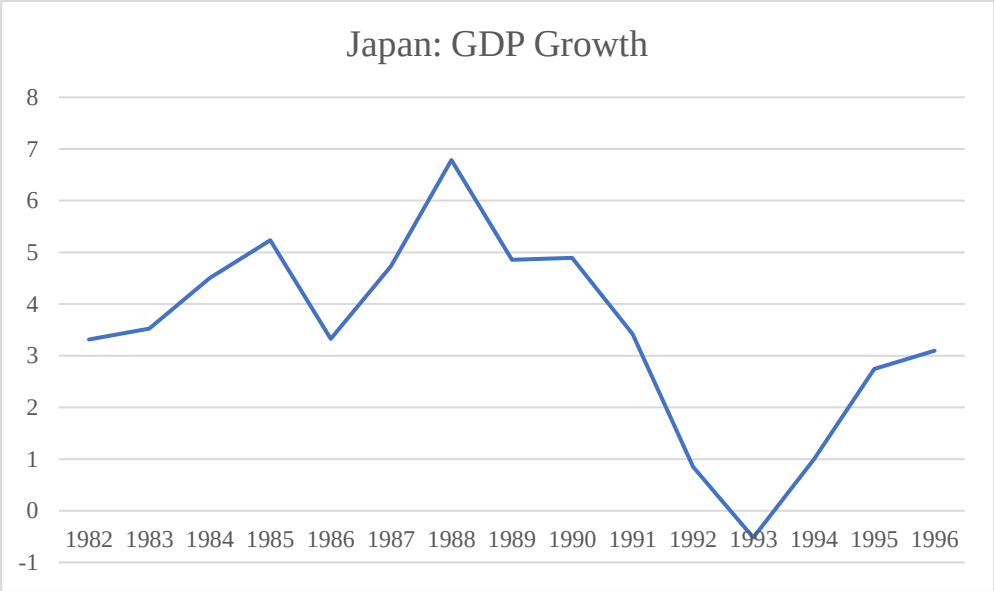

Figure 3: Japan GDP growth, 1982 to 1996.
Source: World Bank Data.

Figure 4: China national stock price average index 2015 base year, 2002 to 2014.
Source: OECD data.

Additional challenges arise from the lack of available data on the topic, which concerns mainly two difficulties. First, although the extended literature provides sufficient affirmation for each factor in the asset bubble, some factors are less favorable for comparative analysis. Although the literature suggested five central factors for Japan, the analysis will extend to only three of these elements and an additional factor that I propose to be important in explaining why China was different. The factors proposed in the literature review include the misaligned monetary policy, aggressive bank behavior, and misplaced tax policies and regulations and the

additional factor of how China has handled the financial crisis. By comparing them to what China has done differently it will be possible to get further inside into what China has learned from the Japanese experience.

The strong variance between the different factors does not allow the use of a single method in the assessment thus each factor will be analyzed by the most suitable way that satisfies its individual requisites. The factors simply do not allow to be captured into a single standardized methodology so I instead deploy different method of analysis for each factor. The five factors that were exhibited in Japan were the plaza accord, monetary policy, aggressive bank behavior, taxing and regulation, and overconfidence. Two of those, taxing and regulations, and overconfidence will not be further assessed in the remainder of this thesis. The reason for this lies in the inherent difficulty of analyzing these factors as there are no obvious measurements or comparative methods available to assess differences between Japan and China. The exact impact of specific taxes or regulations is on itself a difficult subject and would need extensive research, making it unsuitable for use under the relative constraints of this thesis. Overconfidence falls mainly under the same conditions albeit there are more obvious measurements for this factor. For example, consumption patterns and investment, and levels of consumer confidence are suitable quantifiers for measuring overconfidence. However, data are difficult to obtain and substantial background theory would be required for an accurate comparison, which would greatly restrain the impact of analysis. Therefore, both taxation and overconfidence will not be further addressed in the remainder of this thesis. The theoretical approach to the remaining three factors will be further described. Additionally, a fourth factor will be introduced that can provide a new viewpoint on the Japan and China comparison. This factor focuses on the impact of the financial crisis on the Chinese economy. Particularly the role of the stock market bubble in 2007 is important here, as this event was similar to the Nikkei stock market bubble of the late 1980s. This factor is taken from the viewpoint of China instead of based on Japan asset bubble factors, but can nonetheless greatly enhance our understanding of how Japan and China compare to each other.

4. Methodology and Data

Although the theoretical approach is one of direct comparison between the different factors, the four selected factors will each be analyzed with a specific methodology. This assessment will be done in the time frame that is used will be the periods where Japan and China experienced a

period of currency appreciation against the dollar. For Japan, this is around 1985 where the period from 1982 to 1996 will be taken as the reference period. This is the period that scholars generally consider the beginning of the currency conflict until the end of the 1990s were the direct effects of the asset bubble have stopped and Japan still is in the period of stagnation. For China, the start of RMB appreciation was 2005 and the focus will be on the period from 2000 to 2014. Since the data are based on quarterly interval this means that for both Japan and China a total of 60 data points are distinguished. This time frame will be used for all of the following analysis in order to make the conclusions as accurate as possible for comparison.

Plaza accord. The plaza accord factor focusses on the influence of the exchange rate on the domestic economy and the role this interaction played in incentivizing further adjustment on the main variables. This factor hypothesizes a relationship between exchange rate movements and the economy such that currency appreciation leads to lower overall growth in both Japan and China. To assess this hypothesis, correlation analysis will be performed on yen and RMB movement, GDP growth, and export. Since both Japan and China were export-oriented economies, the impact of the exchange rate on exports is particularity important. The correlation will be tested by bivariate Pearson correlation in the SPSS program by IBM. Data are obtained from the Organization for Economic Corporation and Development and the Board of Governors of the Federal Reserve System.

Monetary policy. Monetary policy will be assessed by reviewing the relationship between the interest rate and exchange rate in Japan and China. Since the dispute of both countries was with the US and for both countries were very important, this allows for suitable comparison. The hypothesis is that for Japan there is a positive relationship between the exchange rate and interest rate while for China there is no association whatsoever. The correlation will be tested by bivariate Pearson correlation in the SPSS program by IBM. Since these data are measured as time series, they will not be normally distributed what makes the analysis less powerful. Nonetheless, it can give sufficient insight into the direction and strength of the association. Data are collected through several sources. Exchange rate data were retrieved from the US federal reserve bank for both Japan and China. Data are obtained from the Organization for Economic Corporation and Development and the Board of Governors of the Federal Reserve System.

Aggressive bank behavior. This factor will be reviewed by analyzing descriptive statistics of banking indicators that can measure bank behavior and risk-taking. The selected variables are bank asset to GDP ratio, loans as a percentage of GDP, and something else. Additionally, the argument will be supported by relevant scientific research that has been conducted on the relevant issue. This is especially important since there are structural data limitations for

Japanese banks. Primary data about banking profitability in 1980s Japan were not found so will instead be replaced by secondary data on this issue in order to still get some further insights. Since the liberalization of the financial system in Japan already begin prior to 1980s, the selected period will begin slightly earlier around 1975. Data for the return of assets and return on equity are available for the relevant period in China but are absent for Japan. The analysis will, therefore, be based on secondary literature based on these data for Japan. For China, is more difficult to estimate the period in which potential liberalizations occurred so the analysis will be conducted in a similar fashion and the relevant period beginning in the late 1990s up to early 2010s.

Financial crisis. The methodology for this factor will be twofold. First, the analysis will focus on the secondary literature that describes how China has reacted to the global financial crisis. Specifically, the stimulus package that was introduced in 2008 will be assessed for its potential impact on the settlement of the asset bubble. Second, to support the argumentation data on the Chinese stock market and property market will be utilized. The methodology of this argument will thus focus on the analytical conception of descriptive measures. Data are retrieved from OECD and the Bank for International Settlements.

5. Argumentation

Economic Growth and Export

The main aim of the plaza accord was to reduce the perceived trade imbalances and the growing US current account by devaluating the strong US dollar. To reach this goal Japan had to appreciate its currency against the US dollar, which it did in 1985 and 1986. Although most scholars agree that the yen appreciation itself was not necessarily the cause behind the growing asset bubble, it did serve as the starting point and incentive of other measures, of which the interest rate was the most significant one (Corbett & Ito, 2010; Mihut, 2014). The significance of the exchange rate lies thus in the negative consequences for the economy. If the yen appreciation had not led to a recession in 1985, other factors might not have been affected as much which could have lessened the asset bubble growth. Accordingly, if RMB appreciation would have no strong influence on the Chinese economy, there would no further action needed for China to mitigate the negative effects on its domestic economy. By further exploring this relationship between the exchange rate and economic growth we can enhance greater

understanding on the effect of the exchange range of the Japanese and Chinese economy which could explain the incentive behind the choice monetary policy.

The link between a country's exchange rate and economic performance has been covered extensively in the existing academic literature. Several key aspects are central in the determination of this issue. First, the causal relationship between the exchange rate and the economy. Do exchange rate fluctuations affect economic output or does economic output affect the exchange rate? Scholars argue that this largely depends on the type of exchange rate (Edwards, 1988; Mills & Wood 1993). Second, the direction of this relationship. Does currency depreciation increase output or does currency appreciation increase it? The effect of currency movements depends on the circumstances, but for Japan and China strong appreciation is not favorable as they are export-oriented countries. Third, the impact of different exchange rate regimes on economic growth. In the case of Japan and China, Japan has frequently interfered in the exchange market, making it an effective mixed regime. China had a fixed peg against the US dollar until 2005 after which it liberalized the RMB exchange rate.

For the causality between the exchange rate and economic output, research outcomes suggest the interaction largely depends on the type of exchange rate regime. Edwards (1988) maintains that in open economies the short-run macroeconomic disequilibria affect the real exchange. In the long run discrepancies between actual and the equilibrium exchange rate will disappear if there is no outside intervention. Mills and Wood (1993) conducted empirical research on the United Kingdom, arguing that different exchange rate regimes did not affect real economic performance. Their result suggests similar conclusions could be true for other advanced economies. Empirical evidence from Mexico by Kamin and Rogers (2000) showed that depreciation of the currency led to economic contraction and persistent higher inflation. Thus, the causality issue might be considered in light of the development stage of the economy. The choice of exchange regime for a country is arguably one of the most controversial topics in macro-economic policy. Research on the impact of different currency regimes on the economy has been contradicting with varying conclusions depending on the level of development and state of the economy. Ghosh et al (1997) found that stronger growth rates under a pegged currency are marginal, but findings showed strong anti-inflationary benefits for a country with a fixed exchange rate. Levy-Yeyati and Sturnzenegger (2003) found that for a sample of 183 countries less exchange rate flexibility is positively associated with economic performance in developing countries while developed countries fare better in more flexible exchange regimes. Similar conclusions are reached by Sokolov et al, (2011) who showed that floating currencies have higher inflation rates and lower growth rates in developing countries.

Rogoff et al (2003) focused on the correlation between exchange rate rigidity and economic performance. Their study showed that for lower developed countries, a pegged currency is more beneficial as it comes with low inflation and less economic crises. Emerging markets would fare better with a more flexible exchange rate due to their higher exposure to international capital markets and better institutions. For advanced economies, a free-floating exchange rate regime is associated with stronger economic performance. A crucial source of disparity could be the different levels of economic development.

Research specified on the impact of RMB fluctuations on the Chinese economy is relatively limited. Several studies have been done on the relationship between the RMB and GDP but near nothing on other economic parameters. Su and Wu (2017) analyzed the relationship between China's GDP showing that prior to 1979 there was no relationship while the period 1979 to 1996 there was a positive association. After 1994 this relationship becomes negative so that appreciation coincidences with increased economic output. Tang (2014) investigated the relationship between the real exchange rate and economic growth by utilizing a cointegrated VAR model. Contrary to earlier research, findings showed that the Chinese economy did not benefit from a lower RMB exchange rate. Policies reforms of a fixed rate to a more floating regime in 2005 also did not have a significant impact on China's economic performance. In comparison to the primary data these. Consequently, the hypothesis for both Japan and China is that for both countries there is a negative association between the exchange rate and GDP growth such that when the exchange rate goes up, exports and GDP growth goes down. The focus of this analysis lies on the GDP growth with exports as an additional control variable.

Table 1 represents the inter-correlations among the variables of exchange rate, exports, and GDP growth in Japan. The bivariate correlations indicate that there is no significant correlation between any of the variables. However, the exchange rate and GDP growth are negatively correlated which is expected in the hypothesis ($r = .-163$, $p<.1$). This relationship is weak and, again, not significant which suggests that there is no association between the exchange rate and economic growth.

Table 2 represents the inter-correlations among the variables of exchange rate, exports, and GDP growth in China. The bivariate correlations indicate that there is a significant correlation between all of the variables. These results are not in line with the hypothesis as the relationship between the exchange rate and GDP growth was expected to be positive. Particularly the relative strength between GDP growth and the exchange is notable which

indicated a strong, positive relationship between exchange rate and GDP growth (r = .518, p<.001).

Table 1. Correlations Japan exchange rate, exports & GDP growth

		Exchange Rate	*Exports*	*GDP Growth*
Exchange Rate	Pearson Correlation	1	.203	–.163
	Sig. (2-tailed)		.120	.213
	N	60	60	60
Exports	Pearson Correlation	.203	1	.061
	Sig. (2-tailed)	.120		.644
	N	60	60	60
GDP Growth	Pearson Correlation	–.163	.061	1
	Sig. (2-tailed)	.213	.644	
	N	60	60	60

Table 2. Correlations China exchange rate, exports & GDP growth

		Exchange Rate	*Exports*	*GDP Growth*
Exchange Rate	Pearson Correlation	1	.518**	.357**
	Sig. (2-tailed)		.000	.005
	N	60	60	60
Exports	Pearson Correlation	.518**	1	.498**
	Sig. (2-tailed)	.000		.000
	N	60	60	60
GDP Growth	Pearson Correlation	.357**	.498**	1
	Sig. (2-tailed)	.005	.000	
	N	60	60	60

** Correlation is significant at the 0.01 level (2-tailed).

Monetary Policy and the Exchange Rate

The findings of the literature review suggest that aggressive monetary policy by the BoJ was an important reason behind the price asset bubble (Okina et co., 2001; Basile & Joyce, 2001; Bernanke and Gertler, 1999; Leigh, 2010). Moreover, multiple scholars have pointed to the lowered interest rate in the late 1980s as one of the prime factors that fueled the growth of the asset prices. Although this argumentation is mainly focused on the impact of monetary

policy as a distinct event, it even more important to determine whether the monetary policy was related to the plaza accord as a result of the appreciating yen since this can provide the insight necessary for comparison with China. The policy responses by the BoJ can be seen in reaction to the implementation of the plaza accord (Okina et co., 2001). In 1985 the yen appreciated strongly against the US dollar, which harmed Japan's export and caused a recession lasting from 1985 to 1986. To mitigate the negative effects on the domestic economy the BoJ cut the interest rate from 5 to 2.5% in the two years after the implementation of the Plaza accord (FRED data). From 1987 the BoJ that the increase in money supply led to overheating of the economy and pressed forward its desire to increase the interest rate (Okina et co., 2001). This happened finally in 1989 when the discount rate was increased for the first time. To stop further inflation of asset prices the BoJ increased interest rates to a maximum of 6.2% in 1991. However, the effects were crashing land prices and the implosion of the bubble in the land and stock prices.

To compare this policy with China a very different approach can be observed. Contrary to Japan, when the peg of the RMB to the US dollar was loosened in 2005 the PBC did not change the interest rate. In fact, the interest rate increased to 4.14 percent in 2007 when the RMB experienced a period of stronger appreciation. It is important that the RMB did not appreciate nearly as fast as the Yen did in the late 1980s. The RMB reached 6.8 RMB per dollar in 2008, not much below the initial 8.3 RMB per dollar in 2005. It is important to emphasize that Japan and China were in a somewhat different geopolitical position. Japan had signed the plaza accord which required international coordination to interfere in the foreign exchange market. In fact, the first decrease in interest rate was coordinated with the other constituents of the plaza accord (Okina et co., 2001).

The lower interest rate coinciding with yen appreciation suggests that there is an association between the interest rate and exchange rate in Japan during the 1980s and beginning of 1990s. McKinnon and Ohno (1997) even go so far as see the yen to the dollar exchange rate as a forcing variable for monetary policy by Japan rather than the assumption of an independent determination of the interest rate. Since the interest rate policy is seen as one of the prime causes of the asset bubble the comparison with China's reaction to RMB appreciation can give a key insight in how China has prevented an asset bubble. China has been well aware of the Japanese mistakes, which could explain the relatively modest rate of RMB appreciation against the dollar (South China Morning Post, 2019). Furthermore, the Japanese asset bubble was one of the primary concerns that caused China to resist US pressure for currency appreciation (McKinnon, 2006). I would thus expect to see different policy response by the PBC and expect no significant association between the interest rate and exchange rate in China. These different policy

reactions by Japan and China suggests that the interest rate could be an important point of difference that explains how China has avoided the growth of the asset bubble. Nonetheless, while in Japan the exchange rate and interest seem closely associated, no such association can be observed in China.

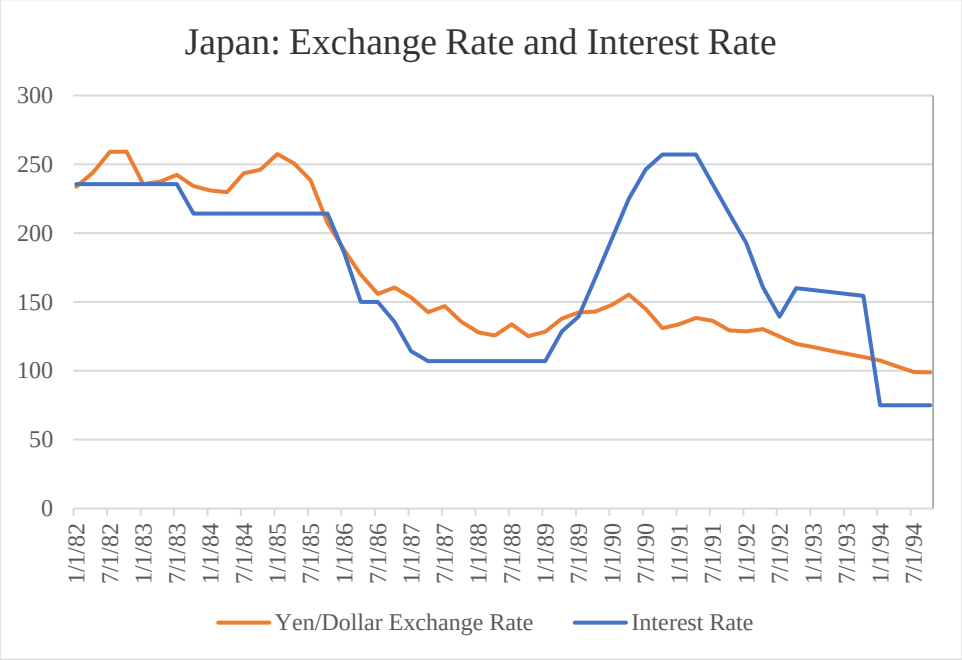

Figure 5: Yen to Dollar exchange rate and Japan interest rate, 1976 to 2002.
Source: FRED Data.

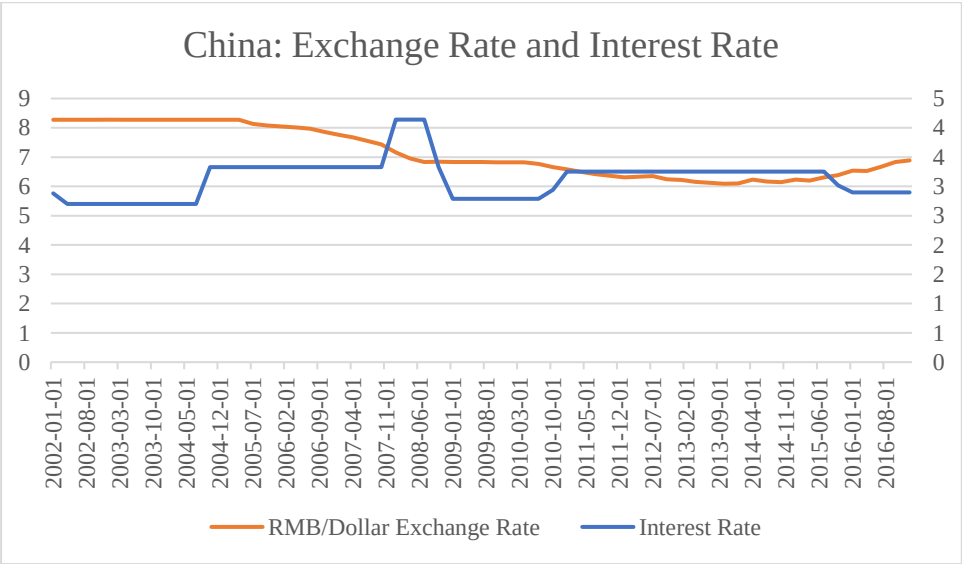

Figure 6: RMB to Dollar exchange rate and China interest rate, 2002 to 2016.
Source: FRED Data.

Taking all of this together, I make the proposal that the policies by the central bank are an important difference between Japan and China as China did not adjust the discount rate in reaction to exchange rate fluctuation while the BoJ reacts directly upon yen fluctuations. Subsequently, this leads to the first hypothesis that proposes that the interest rate and yen to US dollar exchange rate are positively associated such that exchange rate appreciation will correspond with a lower discount rate. In the case of China, this association would not exist which leads to the second hypothesis. Consequently, hypothesis 2 states that that the RMB to US dollar exchange rate is not related to the interest rate such that appreciation of the RMB exchange rate will not correspond with a lower discount rate.

Table 3 represents the inter-correlations among the variables of the exchange rate and interest rate in Japan. The bivariate correlations indicate that the Yen to dollar exchange rate has a strong, positive association with the interest rate ($r = .701$, $p<.01$), which was expected as hypothesis 1 which states that the yen exchange rate and Japanese interest rate are associated. Especially important is the high significance level of the correlation, which suggests that the relationship between the exchange rate and interest rate in Japan is strong during the relevant period.

Table 4 represents the inter-correlations among the variables of the exchange rate and the interest rate in China during the period 2000 to 2014. The bivariate correlations indicate that the RMB to dollar exchange rate and the interest rate have a weak negative correlation that is not significant ($r = -.221$, $p<.1$). This was expected as hypothesis 1 states that the RMB exchange rate and China interest rate are not related to each other. Moreover, general observation on the graph already suggested that there is no substantial association between the two variables. Consequently, the statistical results confirm that there is no connection between exchange rate changes and alteration of the interest rate.

Table 3. Correlations Japan

		Exchange Rate	*Interest Rate*
Exchange Rate	Pearson Correlation	1	.701**
	Sig. (2-tailed)		.000
	N	60	60
Interest Rate	Pearson Correlation	.701**	1
	Sig. (2-tailed)	.000	
	N	60	60

** Correlation is significant at the 0.01 level (2-tailed).

Table 4. Correlations China

		Exchange Rate	*Interest Rate*
Exchange Rate	Pearson Correlation	1	–.221
	Sig. (2-tailed)		.090
	N	60	60
Interest Rate	Pearson Correlation	–.221	1
	Sig. (2-tailed)	.090	
	N	60	60

The outcomes of the theoretical analysis and the following examination suggest that there is an important difference in the connection between the exchange rate and interest rate in Japan and China. Since theoretical analysis complements the statistical findings from which thus can be concluded that the interest rate as decided by the BoJ was heavily influenced by the exchange rate fluctuations. Particularly, the BoJ reacted directly upon yen appreciation in the second half of the 1980s when it gradually lowered the interest rate to mitigate the economic effects of a strong yen currency. Meanwhile, in China, there is no connection which suggests that the PBC does not particular reacts on change in the RMB exchange rate. As the statistical analysis is only based on simple regression, no causal conclusions can be inferred. Regardless of this, the statistical significance in one way or another there is an important association between the interest rate and exchange rate in Japan while such connection is absent in China. In combination with the profound theoretical analysis, this provided evidence of a principal difference between Japan and China.

Aggressive Bank Behavior

In Japan's financial system of the decades previous to the 1980s, banks played a crucial role in providing credit to the fast-growing industry (Aoki and Patrick, 1994; Kang, 2018). During this time foreign capital was limited to repress speculative short term capital inflows that could destabilize the country. Sequentially, these restrictions accelerated the importance of domestic banks and effectively separated Japan from the international financial system (Kang, 2018). These limitations on funding were gradually removed from the early 1980s which started a period of deregulations and liberalization that allowed firms funding from alternative sources (Tsuruta and Miyasaka 1999). Additionally, restrictions on the corporate bond markets were gradually removed, proving additional financing opportunities. These changes led increased opportunities for Japanese firms and restructuring of liabilities (Kang, 2018). Foreign capital

raised in 1981 was almost three times the amount annual average in the previous five years (IMF, financial yearbook). At its height, foreign asset accounted for almost 65% of total and foreign liabilities well over 50% in 1990.

These financial deregulations had profound consequences for the banking sector that previously occupied a crucial role of capital access for Japanese firms (Kang, 2018). As alternative sources of funding became available, banks were faced with a shrinking customer base which led to lower profitability and threatened the overall financial health of these institutions. In this new, more competitive financial landscape profits were squeezed and Japanese banks faced the daunting task of finding alternative sources of income. Alternative sources of income were not readily available as strong demand for bank loans was absent (Kang, 2018). Moreover, despite the liberalization of the financial system, banks were still restricted in participating in potential sources of income such as the securities businesses or short term government bond market, which limited the income possibilities for banks (Okazaki & Hoshi, 2003). Specifically this combination of deregulation on the one hand but as it diminished opportunities for developing new sources of profitability (Aoki & Patrick, 1994). Consequently, to remain profitable Japanese banks became more aggressive in lending practices. This trend of declining profitability forced banks to engage in speculative behavior that fueled asset bubble inflation (Hossain & Rafiq, 2011). The foundation of this was that land was used as collateral so when prices increased, more money was lend creating a vicious circle.

Similar to Japan, China has consolidated its financial system around the banking sector (Huang et al., 2013; Kang, 2018). A major point of disparity, however, is the role of state-owned banks in China. Although banks in China have gained more autonomy in recent decades, the banking sector remains in government hands (Lin & Zhang, 2009). This despite After joining the World Trade Organization in 2001, China began allowing foreign banks access to the Chinese market. Further liberalizations accelerated presence of foreign banks with 193 banks having representative offices in China by the end of 2009 (Zhang, 2012). Despite this gradual opening up of the financial sector, the state remains a central player for credit supply.

To assess how bank behavior in Japan compares with China, I propose several variables that can be used to amplify potential differences between the two countries. This assessment will focus on two key aspects of growth and size, and profitability. First, the overall size and growth of balance sheets and lending gives information about how assertive banks have been in their operations. This will be done by looking at bank deposit to GDP ratio and domestic credit to private sector. Second, as banking aggressiveness in Japan coincided with decreased profitability prior to the asset bubble, looking at profitability of banks can provide further

insights in the financial health of financial institutions. Consequently, the variables for analysis are the returns the banking sector makes on assets and equity. These measurements provide more insightful information then the nominal returns as it ignores differences in size and accounting standards. Additionally, there are risks for China in shadow banking that are somewhat outside the formal banking sector. This could provide additional difficulties for an asset bubble

Comparing the size of banks to the overall economy, there is a distinct difference between Japan and China. Japan's bank deposit to GDP ratio was around 130% in 1980 but had grown to over 170% by 1990 [Table 3.5]. In contrast to Japan, China's ratio remained almost unchanged in the period 2003 to 2008 and reached a high of just over 50% in 2010. An important notion hereby is that bank deposits to GDP ratio tends to vary positively with the income level of countries (Beck & Demirgüç-Kunt, 2010). As Japan in the late 1980s was per capita GDP higher then China in the mid-2000s this could explain some of the variability It does not, however, explain the strong growth in Japan while China's ratio has remained almost flat.

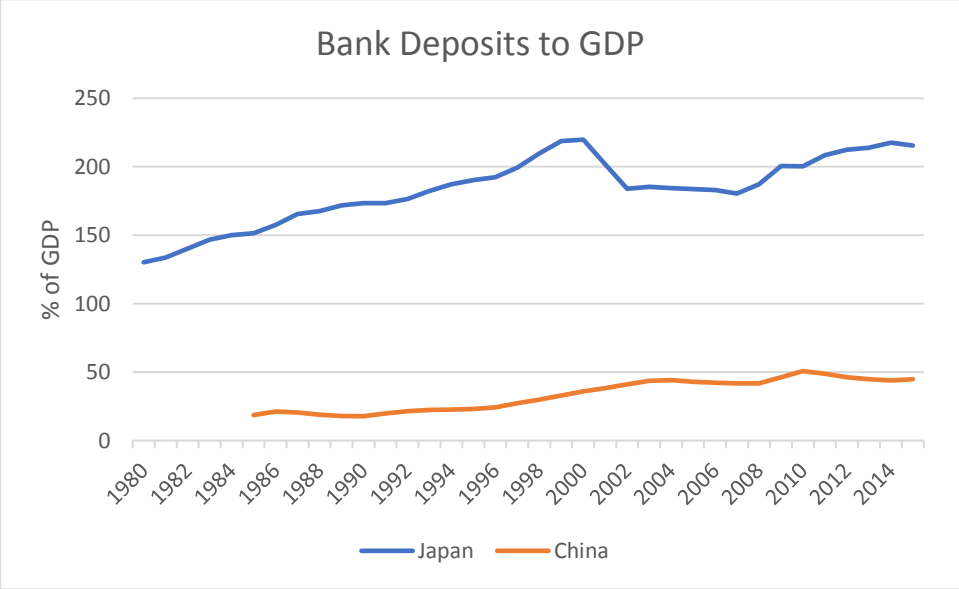

Figure 7. Bank deposits to GDP ratio, 1980-2015 .
Source: World Bank, Economic Indicators.

Other measures show the same difference. In particularity, the domestic credit to private sector shows that Japan has remained this ratio well over 150% since the beginning of the asset bubble while China was only just over 130% in 2012. This variable measures as percentage how much of financial recourses is provided to the private sector by financial corporations. A

sharp growth can be observed from around 1985 to 1990 in Japan while in China this percentage has actually been decreasing from around 2003 to 2008.

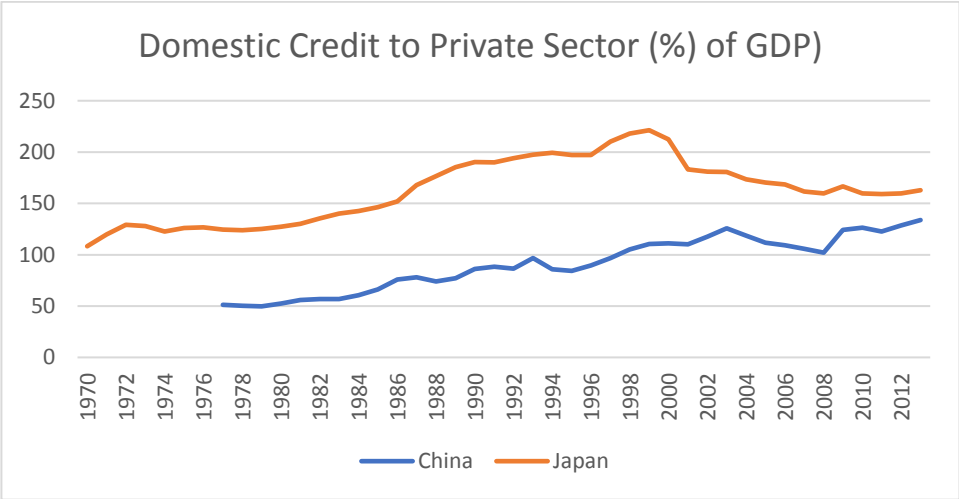

Figure 8. Domestic credit to private sector percentage, 1975-2012 .
Source: World Bank, Economic Indicators.

The second factor is the profitability of banks. Already since the early 1970s, Japanese banks were faced with declining profit margins (Okina et co., 2001). Japanese banks return on assets [RoA], which is measured by yearly profits divided by total assets, was over 0.6% in 1996 where after a steady decline occurred reaching just over 0.2% in 1979 and remaining at this level until 1984 (Japanese Banker Association). From that point, the RoA increased slightly reaching 0.38 in 1988 and dropping again becoming negative in 1993. The return on equity [RoE], measured as the yearly profits divided by total stockholders' equity, shows a similar trend. The lowest point was in 1979 with 7.5% before climbing to 12.5% in 1988 after which a sharp drop occurred and the RoE becomes negative as well. Thus, overall the profitability declined significantly in the prequel to 1985 as banks were struggling to cope with changes in the financial sector.

In China, such changes cannot be observed (Table 11). Both RoA and RoE remain higher than Japanese banks during the observed period. A sharp drop can be observed in 2004 but the returns recover in the year afterward, which would make it unlikely to have a serious effect on bank behavior. During the period of assessment, from 2005 to around 2010 the returns remain high and only decline after the global financial crisis occurred. In comparison with Japan there is no trend of declining profitability, rather the opposite with increased profitability of Chinese banks. which suggests that the financial performance

Figure 9. Financial returns Chinese banks, 2000-2012 .
Source: World Bank.

Overall, growth and balance sheet size of Chinese banks were not near the levels observed in Japan. Furthermore, where Japanese profitability margins show a drop in the decade before the asset bubble implosion, no such trend can be observed in China. However, there are additional risks that could counterweight the observed results of the analysis. Particularity the Chinese feature of 'shadow banking' that is closely related to fast-growing debt levels through loans provided outside the official banking sector (Kang, 2018). However, it is beyond the scope of this thesis to further examine the effects of such additional influences. Based on the results presented in this section, there is a distinct difference between both the relative size of banks and the profitability.

China and the Global Financial Crisis

The previous three factors focus on a one-to one comparison between Japan and China based on factors suggested in the literature review. In this section the factor of China's response to the financial crisis is introduced as the fourth element of the comparative analysis. This section will focus specifically on the response on policy reactions of the government to reduce the impact of the global financial crisis. The rationale behind this idea is that the introduced stimulus packaged prevented not only further economic decline, but also the potential risk of a Japan-like asset bubble (Yang, 2012). Although this is not necessarily a direct comparison with

Japan, similar features can still be observed that underline this validity of this argument. For example, the stock market bubble and the

In the background of the global financial crisis China's economy was under severe pressure. As exports were of great importance to China, the worldwide decline in demand for goods was felt particularly hard to China where exports fell 8.8% in the fourth quarter of 2008 (Li & Hu, 2011). Further affected by the financial crisis, industrial growth contracted sharply and unemployment began to rise. Consequently, economic growth declined rapidly. Where in the year previous to the crisis economic growth had been well over 10% annually, growth fell to 9% in 2008 dropping four percentage points. To alleviate the impact of this economic crisis the Chinese government introduced a comprehensive stimulus packaged of over 4 trillion RMB. An important part of this package found its way to the property market.

The relevance for the asset bubble is profound. The stock prices increased over four times from the end of 2006 to end of 2007. The stock market plunge happened after rumors that the government would increase the interest rate to avoid further speculation (Forbes, 2007). At the same time a strong increase in housing prices can be observed (table 12). This observation is important since the Japanese asset bubble imploded when the BoJ started to raise the interest rate. In fact, many features that were present in Japan are occurring in China in 2007. Although there is no conclusive evidence of a property bubble, a short period of rapid increase is visible (Glaeser et co., 2017). This cannot be said for the stock market, the Chinese bubble was even more dramatic then Japan, both in speed and size. The Chinese stock market tripled in value in less than a year and at its height the stock value to GDP ratio exceeded 222%, twice the ratio of Japan (Kang, 2018). Consequently, the question can be asked whether this period was in fact the implosion of an asset bubble as happened in Japan from 1989 to 1992. If so, the reaction by the Chinese government could explain how China has avoided a recession and further economic downturn. This literature review suggested that the existence of an asset bubble in the 2000s is still very much debated. Therefore, these limitations implicate that a greater focus on the effects of Although the stock market and housing prices started to drop, no significant impact on real economic growth can be observed, aside from a drop in growth during the height of the financial crisis in 2008 and 2009.

Figure 10: China national stock price average index 2015 base year, 2002 to 2014.
Source: OECD data.

Figure 11: China real residential property prices in 70 cities index, 2015 base year, 2005 to 2016.
Source: Bank for International Settlements.

6. Discussion

The central aim of this thesis is to assess how China has avoided the negative consequences of an asset bubble after the trade and currency disputes with the US. The total assessment of the factors show mixed results but do explain to a great extent how China has avoided an asset bubble in the aftermath of exchange rate appreciation. Responding to pressure by the US, Japan allowed the yen to appreciate in 1985 while China began a similar process of appreciation in 2005. Although it has avoided a similar stagnation as with Japan, problems of the 2000s continue to be present up till today. Capital controls like in Japan of the 1980s are still present in China today, needs to be corrected to avoid a crash.

The first factor assessed the interaction of the exchange rate on the domestic economy. Surprisingly, the test results on the exchange rate, GDP growth, and export, showed no significant effect between exchange rate appreciation and economic growth. An important consequence of this is that this means that there was no direct necessity for the BoJ to alter the interest rate or for the Japanese government to interfere directly in the domestic economy. This would thus emphasize the role of the policy mistakes in creating the bubble since it highlights the importance of the other factors. The decreasing interest. However, these conclusions need to be taken with caution. Correlation does not show causation, it simply means that the two variables coincided, they could be explained by other factors not reviewed in the analysis. Nonetheless, it raises important questions over the role of the Japanese government in fueling the asset bubble.

The second factor focused on the monetary policy that led to cheap capital and played a central role in the inflating asset bubble. The argument behind this was that the BoJ did this to mitigate the negative effects of the plaza accord on the economy, thus a correlation between the exchange rate and interest rate should be present. The results of the analysis confirmed that there was indeed a significant correlation between the two variables. Meanwhile, in China, no such connection can be observed. The extant literature suggested that this association in Japan was one of the main causes of the asset bubble. Thus this signifies one important point, namely that there was indeed an association between the exchange rate and interest rate in Japan while there was none in China. From this can be inferred that the reaction to currency appreciation of the PBC was fundamentally different from the BoJ. Whether this was because of conscious decisions by the PBC or merely coincidence is not relevant, the fact that China did not lower the discount rate is an important point of divergence with Japan.

Aggressive bank behavior was assessed as the third feature in the comparison between Japan and China. The analysis clearly distinguished several important differences between Japan and China. First, the relative size of the banking sector is much bigger in Japan compared to China. Second, the profitability margins of Japanese banks are systematically lower than in China. The incentive for Chinese banks to engage in more aggressive banking behavior was thus much less present than in Japan. Particular important was the trend of financial deregulation that started a few years before the plaza accord and after signing coincided with the lowering interest rates.

These results give important points of difference between both policy differences and economic variance that can explain why China has avoided Japan's faith. In retrospect, the mistakes of Japanese policymakers seem more obvious, particularity the decreasing interest rate and aggressive bank behavior, which could explain how China has avoided a housing bubble crash similar to the asset bubble. Does this mean that China has learned from the Japanese experienced and avoided an asset bubble after exchange rate appreciation? Not necessarily. Although most factors clearly show key differences between Japan and China, the stock market bubble in 2007 showed that China did go through an asset bubble in the stock market. Moreover, China continues to struggle with high housing prices in especially large cities like Beijing, Shanghai, and Shenzhen. There is no economic imperative that dictates the asset bubble China experienced has passed. This also does not have to mean that an economic crisis is imminent, so far China has managed and nothing suggests it could continue for a period longer. Specifically, the uncertainty of there not even being an asset bubble contributes to these uncertainties. All of this suggests that, although so far this has had no significant implications to the overall economy, China could still face imploding bubble similar to Japan. Especially the high debt level could, what would be a great danger to the Chinese economy. However, these possible future developments are not within the research scope of this thesis, which has only focused on the specific comparison between Japan and China in the period following yen and RMB appreciation against the US dollar. Thus, to give a final answer to the research question of what China has done differently, Monetary policy in Japan was mostly supportive of further bubble growth while in China this remained flat.

This research contributes to the existing empirical literature as it shows to have a meaningful addition to the ongoing scientific debate of a potential housing bubble in China and the causes of the Japanese asset bubble and the following economic stagnation. Scholars determined five important caused behind the Japanese asset bubble, the plaza accord, misaligned monetary policy, aggressive bank behavior, misplaced tax policies and

regulations and overconfidence (Okina et co., 2001; Basile & Joyce, 2001; Bernanke and Gertler, 1999; Leigh, 2010; Tomfort, 2017; Hossain & Rafiq, 2011). The comparative studies on Japan and China have so far not been able to explain how China has avoided economic stagnation in response to bubble implosion. By comparing China with the Furthermore, this thesis provides important implications for other countries dealing with potential asset bubbles. The role of the interest rate and financial sector are all important factors in the creation of a bubble.

The findings of this study should be considered in light of several key limitations. This study used varying methods to assess the individual factors which make it difficult to reach verifiable and valid conclusions on the thesis as a whole. Moreover, the statistical analysis is based on correlation and not causation, implicating that no predictive power can be derived from the research outcomes.

The present outcomes of this thesis suggest additional directions for future research on the topic. First, as mentioned earlier, continued research needs to be done on the question of whether China has simply not yet imploded and whether this could still happen in the near future. The stock market bubble is comparable to the Japanese stock market bubble. However, concerns remain about the extent of overheating in the Chinese housing market that could still implode in the future. Moreover, in combination with high debt levels, it is far from certain that a potential bubble in the Chinese economy could implode. Continued research on this topic needs to be done with the introduction of new variables and standpoint, perhaps with a specific focus on China. An important reason for this could be that China was already well aware of the need to avoid the Japanese case and thus opted for a more careful and guided approach. This is also illustrated in the manner in which Japan and China allowed greater currency exchange rate movement. Japan was forced to cut the interest rate, which almost halved within two years, while China used a guided appreciation that was much longer and less severe. Second, this thesis has focused on a broad comparison. The analysis only looked at the isolated effects of factors that were important in Japan, excluding other potential variables.

7. Conclusion

During the previous decade China has been exposed to significant pressure, especially from the US, to resolve external trade imbalances and adopt more a competitive exchange rate. As in Japan, China has responded by allowing slow appreciation of the RMB currency. However, where the implosion of the asset bubble in Japan had a deep economic impact, China has not faced a similar dramatic bubble. This thesis has shown that the principal factors behind the Japanese asset bubble were mostly different from China with an emphasize on the interest rate and aggressive bank behavior.

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Appendix

Japan:

Correlations

Double-click to activate

Correlations

		ExchangeRate	GDP_growth	Export
ExchangeRate	Pearson Correlation	1	,203	-,163
	Sig. (2-tailed)		,120	,213
	N	60	60	60
GDP_growth	Pearson Correlation	,203	1	,061
	Sig. (2-tailed)	,120		,644
	N	60	60	60
Export	Pearson Correlation	-,163	,061	1
	Sig. (2-tailed)	,213	,644	
	N	60	60	60

China:

Correlations

Correlations

		ExchangeRate	Export	EconGrowth
ExchangeRate	Pearson Correlation	1	,518**	,357**
	Sig. (2-tailed)		,000	,005
	N	60	60	60
Export	Pearson Correlation	,518**	1	,498**
	Sig. (2-tailed)	,000		,000
	N	60	60	60
EconGrowth	Pearson Correlation	,357**	,498**	1
	Sig. (2-tailed)	,005	,000	
	N	60	60	60

**. Correlation is significant at the 0.01 level (2-tailed).

Japan:

Correlations

Correlations

		ExchangeRate	InterestRate
ExchangeRate	Pearson Correlation	1	,701**
	Sig. (2-tailed)		,000
	N	60	60
InterestRate	Pearson Correlation	,701**	1
	Sig. (2-tailed)	,000	
	N	60	60

**. Correlation is significant at the 0.01 level (2-tailed).

China:

Correlations

Correlations

		InterestRate	ExchangeRate
InterestRate	Pearson Correlation	1	-,221
	Sig. (2-tailed)		,090
	N	60	60
ExchangeRate	Pearson Correlation	-,221	1
	Sig. (2-tailed)	,090	
	N	60	60