# ANALYSING THE DEMAND FACTORS AFFECTING HOUSING PRICE INDEX IN CHINA

**By**

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**Thesis Submitted to**
**Othman Yeop Abdullah Graduate School of Business,**
**Universiti Utara Malaysia,**
**in Partial Fulfillment of the Requirement for the Master of Science (Finance)**

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## ABSTRAK

Harga rumah di China telah mengalami kenaikan yang ketara melambung tinggi sejak beberapa tahun lalu terutamanya di bandar-bandar besar seperti Shanghai dan Beijing. Ini adalah trend yang membimbangkan kepada pembeli dan pelabur di China. Kajian ini cuba mengenal pasti faktor-faktor yang mempengaruhi harga rumah indeks China, dari tahun 2010 hingga tahun 2014. Kajian ini menggunakan enam pemboleh ubah bebas yang terdiri daripada kadar inflasi, kadar pertumbuhan KDNK, kadar faedah, kadar gadai janji, bekalan wang M1 dan kadar pertukaran wang RMB. Pelbagai kaedah telah digunakan dalam kajian untuk menganalisis data sekunder bulanan dari tahun 2010 hingga tahun 2014. Tiga model telah dibentuk termasuk Asas Makroekonomi Model, Peningkatan Makroekonomi Model dan Penggabungan Makroekonomi Model, dan di analisis dengan teknik Analisis Deskriptif, teknik Pearson Korelasi dan teknik Pelbagai Analisis Regresi untuk meneroka hubungan, kesan dan urutan dari pembolehubah bebas terhadap pembolehubah bersandar. Hasil empirikal menunjukkan bahawa kadar faedah, kadar gadai janji, bekalan wang M1 dan kadar pertukaran RMB mendapati pengaruh yang signifikasi kepada Indeks Harga Perumahan di China. Hasil empirikal juga menunjukkan bahawa bekalan wang M1 adalah mempunyai pengaruh yang terbesar kepada Indeks Harga Perumahan China, diikuti dengan kadar pertukaran wang RMB, kadar gadai janji dan akhir sekali adalah kadar faedah. Kajian ini telah membuktikan bahawa Indeks Harga Perumahan China memang dipengaruhi oleh pelbagai Pembolehubah Makroekonomi.

## ABSTRACT

House prices in China has experienced significant price soaring over the past few year especially in large cities such as Shanghai and Beijing. This is a worrying trend for buyers and investors in China. This research attempts to identify factors that influence on China's house prices index, from year 2010 until year 2014. The study used six independent variables which comprise of inflation rates, GDP growth rates, interest rates, mortgage rate, and money supply of M1 and RMB exchange rate. Various methods had employed for this study comprising the monthly secondary data which range from year 2010 until year 2014. The models are categorized into three categories like Common Macroeconomics Model, Enhanced Macroeconomics Model and Combine Macroeconomics Model. All of these models are analyzed by using technique of Descriptive Analysis, technique of Pearson Correlation and technique of Multiple Regression Analysis. This is used to explore the relationships and the impact of the independent variables towards the dependent variables. Empirical result shows that only interest rate, mortgage rate, money supply of M1 and RMB exchange rate are having influences on China's Housing Price Index. Empirical result also shows that money supply of M1 is having the greatest impact on China's Housing Price Index, followed by RMB exchange rate, mortgage rate and lastly interest rate. This research has proven that China's Housing Price Index indeed influencing by various Macroeconomics Variables.

## ACKNOWLEDGEMENT

First and foremost, Alhamdulillah, thanks to Allah S.W.T for ALL the blessings upon me and for providing me the guidance and chance to complete this dissertation to fulfill the requirement of Master of Science Finance at Universiti Utara Malaysia.

I would like to express my sincere gratitude and appreciation to my supervisor Dr. Zaemah bt Zainuddin for the continuous support of my masters study and dissertation, for her patience, guidance, advices, motivation, enthusiasm, and immense knowledge. Her guidance helped me in all the time of research and writing of this dissertation. I could not have imagined having a better advisor and mentor for my master's study. I would also like to thank her for her feedbacks. Their commitment and time spent for this dissertation is most appreciated.

Last but not least, I would like to thanks to my parents for their utmost assistance and prayers. My heartfelt thanks go to all my family members for their source of inspiration and motivation. To them I dedicated this dissertation.

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# CHAPTER 1

# INTRODUCTION

## 1.0 Research Background

Real estate is defined as a significant role couldn't be neglected in several important macroeconomics considerations due to its function of future creation and also contribution to the economic growth (Bell & Mulligan 2006). This issue is relevant not only to the developing country but also to highly developed country. Fisher (2011) stated that there are two categories of real estate, which can be grouped into real-estate of residential and real estate of non-residential. Residential real estate consists of apartment, properties of single-family and properties of multi-family like blocks of an apartment (Burman & Maya, 2011). Besides, the real estate of non-residential can be classified further into two subsectors which are; 1) commercial real estate which include factories, workplace, store, retail buildings and hotels, land and; 2) commercial real estate which include campus, colleges and hospitals as well as agricultural real estate (Fisher & Wilson, 2011).

Housing has played a significant character in generating the business cycles of some advance countries such as USA, Britain, Australia, New Zealand, Canada and China (Hale & Anne, 2012). For example, the change in house's price will influence the home buyer fortune and spending. This is due to housing is the major component in real estate market. Zhu (2011) observed that as the performance of properties prices

influences expenditure of an individual, the total expenditure is also being influenced. Hence, investing in different assets classes such as business capital and residential structures tend to have positive correlation (Davis and Heathcote, 2003). The residential investment is more volatile than business environment as it leads the business cycles of a country's economy (Davis and Heathcote, 2003).

Apart from this, in Australia, the term "affordable housing" reflects common community practice while also being compatible with appropriate strategy goals. This implies accommodation that is reasonably priced for home in lower or middle parts of the income level. It includes owner-occupied housing as well as leasing housing that is owned by governments, non-profit organisations, corporations or individuals (Julian, 2007). In Canada, the range of reasonable housing includes market like reasonably priced rental housing, affordable home ownership and non-market which including affordable rental housing as well as reasonable home possession (Gaetz, 2010). Furthermore, in the United Kingdom, the term 'affordable housing' refers to both 'social rented and intermediary housing, given to particular qualified home whose needs are not met by the market' (Andrew, 2011).

Next, affordable housing in Japan includes contemporary and conventional approaches. Two patterns of residences are mainly representing in Japan: the single-family detached house and the multiple-unit building, either owned by a person or corporation and lent as apartments to occupant, or owned by occupants. Other kinds of housing, especially for single people, include houses of boarding (which are popular among college students), dormitories (common in companies), and barracks which is for members of the Self-Defence Forces, police force and some other community

employees). An extraordinary attribute of Japanese housing is that houses are supposed to have a restricted duration, and are in general torn down and reconstruct after a few decades, usually twenty years for made of wood buildings and thirty years for material buildings – see regulations for information (Nihon-Mika, 2006). In Europe, the concept 'affordable housing' is normally defined as accommodation that is obtainable for buying or rent out at a marketplace value reasonable to the popular of the populations (Norris, 2004).

This research seeks to examine and determine the factors that influence housing prices index in China. This research topic is important because the development of housing market in China has been part of the major industries which contributed to the economy of Chinese in China (JingWu, 2012). Increasing real estate price in China is contributed by the sustained growth of China's economic such as urban economic openness, the ratio of trade volume and urban real estate prices (Wong, 2011). Furthermore, China's real estate market has become the center of attention due to the major influence it has on trades, the fast developing market and amazing size of its population, which ranked the first in the world. Accordingly, this study will look into the factors which influence the housing price index in China such as rates of inflation, interest rate, Gross Domestic Product (GDP) growth rate, mortgage rates or lending rates, money supply of M1 and RMB exchange rate.

According to Australia and New Zealand Banking Group Ltd, China is facing a rising jeopardy of a property. Li-Gang (2013) pointed that house prices were raging, particularly in China's big cities such as Beijing, Shanghai and Hong Kong. Prices of houses in the 100 Chinese cities surveyed increased again in October 2014, the eighteen

repeated monthly rise, by 1.24 per cent to a regular of RMB 10685 (US$1742) per square meter, based on figures unconstrained by China Real Estate Index System (CREIS). This was increase of 10.7 per cent as compared to the similar time in preceding year. Out of the 100 cities in China, 93 cities had been facing annual raise in house price (Li-Gang, 2013).

China's top 10 cities which comprise of Beijing and Shanghai also rose by approximately 2 per cent from the preceding month and were up by 15.7 per cent throughout the year to October 2014. According to the Ehomeday (2014), Shanghai's second-hand house price index rose by 11.6% year over year which is 8.1 per cent as compared to the 0.2 per cent turn down in October 2013. Beijing has also been facing enormous price increase in year 2014, since prices of second hand housing buildings rose by around 14.7 per cent, during the year to July 2014. It had a monthly regular growth rate of 5.14 per cent from January to July 2014, which is based on the figures from National Bureau of Statistics of China (NBSC).

The above statistic has proved that housing price index in China, during the period of 2010 to 2014 has experienced a significant increase in price. China Deputy Finance Minister (2014) cited that the standard housing prices index in China raise up to average 20 per cent per year after year 2007. In some cities, average housing price index growth was as high as 34 per cent per year. Even though strong income growth and ongoing urbanization trends justify rapidly rising prices, the latest momentum of increase in house price has been too strong to justify. This in turn has created tormenting tendency for lenders and result in a bigger concern to the market of housing in China.

As stated previously, China's housing price index is being driven by the development of economic in China. Consequently, this study will emphasizes on macroeconomic factors which affect house price index. These factors can help support appropriate parties in handling the circumstances and stabilizing the housing prices index before the situation become worse.

## 1.1 Motivation of the Study

The main motivation of the research is to find out the issues which affect the housing price index in China. The finding from this study will benefit the investors, policy-makers and the developer companies through the analysis done on the house price index in China. By understanding the factors affecting house price index, investors can find the appropriate time to make an investment in housing market in China.

In China, the main sources of house price information are from the National Bureau of Statistics of China (NBS) and the figures are announced by the China Real Estate Index System (CREIS). Each of these sources provides housing price index of the private housing market at local and countrywide levels. The NBS is an organization within the State Council of the People's Republic of China, which in charged with the assortment and periodical of statistics connected to the economy, residents and society of the People's Republic of China at national and local levels. Therefore, the NBS information is to be expected to be affected by the diversity in housing distinctiveness and location element and thus they are not constant characteristic. Thus, this study

contributes to the housing development in China to provide more local information to be included in the construction of house price index in China.

## 1.2 Problem Statement

Over the past few decades, the housing prices index in China have been showing increasing trend (Zhang, 2009). This research topic is important because the development of housing market in China has been part of the major industries which contributed to the economy of Chinese in China (JingWu, 2012). Increasing in China's housing price index is contributed by the sustained growth of China's economic such as urban economic openness, the ratio of trade volume and urban real estate prices (Wong, 2011). It is no hesitation that the longer the period of time, the higher the index of housing price and this is definitely affecting the buying power and the demands of housing in China. This is one of the big issues which must be taken into consideration.

Another focal point of this research is also to look into that how useful of the measures taken by the authorities after define the factors of increasing housing prices index in China. This study also is to inspect whether there is connection between factors towards housing price index in China. Therefore, being concerned about the housing price index is an essential and the factors that contribute to the increase of housing price index need to be determined.

## 1.3 Research Questions

This study attempts to investigate the research questions as per below:-

1. What macroeconomic factors affecting on China's housing price index?
2. What is the significant impact of macroeconomic variables on China's housing price index?
3. What are the common macroeconomic factors which influence the China's housing price index?

## 1.4 Research Aims and Objectives

The aim of the research is to analyze the factors affecting the China's housing price index. The objectives of this study are as below.

1. To identify the macroeconomic factors which influence China's housing price index.
2. To analyze the impact of macroeconomic variables on China's housing price index.
3. To determine the greatest impact sequences of macroeconomic factors on China's housing price index.

## 1.5 Significance of the Research

One main important and realistic involvement of this thesis is the structure of housing price index for the China housing market. Due to the vital role properties play in the economic growth of a country, the accessibility of a vigorous and dependable properties price index is fundamental.

This research contributes to the structure of housing price index for the China housing market. Based on this, the China Properties Market Report (CPMR) is published on periodical basis which the practitioners and universities can use for housing market study. This paper also examines the connection between housing prices and start of housing. Approximately all the study is about the contributions of housing are conducted at the nationwide levels and in some limited cases at the district and nationwide levels.

This study gives to the previously existing journalism by employing time series data and at the restricted housing market level. This is also one relevant that helps our perceptive of the housing market.

## 1.6 Contributions of the Research

This research will find out the relationship based on the factors that presently influencing the soaring of housing prices index in China. This study will understand the factors affecting China Housing Price Index. Also, it is also to decide on which one of the determinants has the most effect on housing prices index.

Due to this research focus specifically to the housing price index, it will make suggestion to China which factors to be emphasized in order to have better control on China's Housing Price Index. This research will also act as a medium for the investor to

evaluate the appropriate timing from those factors to make a decision on buying a property as one of the elements of their investment planning.

As a result, the whole study plans to contribute to enhance of both governments and investors implementations on situation planning that will be having a great relationship on the unexpected rise of properties price in present and the future.

## 1.7 Scope of the Research

Normally, this study focuses on the factors influencing on housing price index variation in China. Areas of the study are located about city areas in China. The factors and criterion which will influence the choice on buying power on the housing will be taking into consideration. Thus, this study is carried out to give a clearer view on the issues those are probable in influencing on housing price index variation in China and buying decision of customers.

## 1.8 Summary and Organization of Research

This study is prepared in five chapters. This first chapter is introduction to this study. It contains the background of study, research aims and objectives, as well as significance of the research.

Chapter two is the literature review, which refers to the preceding assessment of connected study topics based on the factors influencing on housing price fluctuation in China. It also examined the relationships between the factors that influence the buying

decision of a customer. It also further discussed about the practice of investors and buyers in purchasing the real estate in China.

Chapter three consists of the research methodology of this study. This chapter covers the perception in carrying out the factors influencing on housing price index in China. It includes the theoretical framework, hypotheses, data collections technique, and technique chosen for particular analysis.

Chapter four comprises of the figure of the study, data collection from various resources which is used to study the factors influencing on properties price fluctuation in China the effects will be come out after executing this approach. Last but not least, the last chapter is the conclusions are given for the additional researcher.

# CHAPTER 2

# LITERATURE REVIEW

## 2.0 Introduction

In Chapter 1, research background, problem statement, research objectives and other relevant topic whichever related to this research had been discussed. Hence, Chapter 2 will continue with further study of the factors affecting on China's housing price index. It discusses the conceptions which related to housing market in China. In this manner, it examines the factors that influence the buyers and their decision in buying the houses in China. It studies the practice of buyers in purchasing and investing in housing. Apart from that, when the factors that result in the housing prices index fluctuations are discovered, it will help to be understanding well into the housing prices index changes.

Accordingly, the factors that may result in the changes in housing prices may also be due to the transforms in the associations between demand and supply in the market of China (Tsai & Chunyu 2011). The study of housing markets in China can be at nationwide, provincial or even local level which depending on the statistics and information required. In other word, housing development or real estate development has been considered as one of the pillar sector in the economy of Chinese in China (Yali, 2011). Ellen (2014) cited that the housing industry in China has been facing strong competition and further development nowadays. Intense competition amongst

developers in the market of housing expansion in China forced them to increase their competitiveness (HengLi, 2012). China's Premier Li Keqiang have mentioned in public statements, Chinese housing companies will become internationally aggressive only through increasing fair and tough competition in China's housing market.

In current years, the housing prices are a critical factor in consumer spending and play a vital role for housing prices in China (Man, 2013). Joseph (2015) stated that nearly all major associations such as China Central Bank, the International Monetary Fund and the Chinese Commission are fully focused on the dynamics of housing prices and their significant factors. Consequently, competitiveness has been considered as a major factor for the achievement and sustainable development of the properties in China (JuJian, 2010).

## 2.1 Defining Housing

Generally, a unit of housing is referring to a home, accommodation, collection of rooms or single room, occupied or intended for occupancy as divide living lodgings (Robert & Pryce 2012). Obviously, housing industry represented an important section of the most people's prosperity and this is particularly factual for many owners and purchasers in China. Joseph (2015) cited that the range and extent of the housing market make it a commercial and profitable industry for many investors. Likewise, housing forms a main element of the real estate market. During year 2009, housing prices in China are high-ceilinged greatly specifically in big cities like Shanghai and Beijing (JingWu, 2012). HaoCheng (2011) cited that housing has a set of typical character with

consider to position, structural composition as well as neighborhood and ecological feature; therefore there is not an easy way to measure the price of housing.

## 2.2 China Economic Overviews

It is renowned that reformation of China's housing market in year 1998 has increased housing market developments. Housing price has been increasing dramatically in China lately (Peng & Cheung, 2009). Subsequently, China's economy has been experiencing surprising increase in the last few decades that made the nation to turn into the second largest economy of the world (Suqing, 2012). Ralph (2013) mentioned that in December 1978, the Chinese Economic Reform was commenced by reformists within the Communist Party of China which directed by Deng Xiaoping. The Chinese Economic Reform refers to the program of economic reforms which called "Socialism with Chinese characteristics" in the People's Republic of China (PRC). As a result, China had become one of the generally sophisticated economies countries prior to the 19$^{th}$ century. In the 18$^{th}$ century, China had been proven as one of the wealthy, abundant, most productive, best cultivated, the wealthiest and most urbanised countries in the world (Adam, 2010). Evidence can be proven like in 1978, when the program of economic reformations started by China, the country categorised ninth in insignificant gross domestic product (GDP) with USD 214 billion; it soared up to second place with a nominal gross domestic product (GDP) with USD 9.2 trillion 35 years later (QingWu, 2013).

In year 1978, as the executing of the program of economic reformations, China has signified as the manufacturing core of the world where the industry segment and construction sector became the largest share of GDP (Tze, 2013). Nevertheless, in current years, alteration of China pushes the tertiary segment and, in year 2013, it became GDP's largest grouping with a share of 46.1% (YuJian, 2011). On the other hand, China carried on the worldwide economic crisis better than most of other countries. Therefore, Wilgren (2009) cited that the substantial spur program motivated economic development mainly throughout enormous investment projects, which cause concerns that the country could have been building up asset bubbles, excess capacity and over investment in certain industries.

Besides, in year 2014, economy of China has growing at its slowest pace in 24 years. This is due to the companies, local governments and housing prices face under heavy debt burdens, keeping force on China's governments to take intensive measures to prevent a sharper downturn (Wengao, 2012). In fact, China exited the economic crisis in good form, with growing of GDP more than nine per cent. On the contrary, the policies executed during the economic predicament to support growth of economic worsen the country's macroeconomic inequity. Predominantly, the program has been reinforcement speculation, while households' spending stayed behind restricted (Fushan, 2011). In order to deal with these imbalances, President Xi Jin Ping, the new administration and Premier Li Ke Qiang started to execute various methods to overcome the worst of the downturn to expose economic measures goals at increasing a more balanced economic model at the spending of rapid economic growth in China.

In addition, the China's governments have implemented a series of schemes to sustain the growth, investment of communications and housing market situation in order to accelerate to meet the needs of urbanisation (Yee, 2013). Therefore, China will persevere to be one of the top countries among the main worldwide economies, although the circumstances of economy will slowly become slow in the approaching years in line with the government's scheme to develop more unbiased growth of economic. On the other hand, jeopardy of a sharp amendment in the housing market and the high-ceilinged stage of limited government liability persist to come out over the economy (Liu, 2013). According to a weighted standard index calculated by Thomson Reuters from information issued by the National Bureau of Statistics (NBS), housing prices in 70 huge and standard sized cities in China have fallen 0.4% in February 2015 over the preceding month.

Gregory (2002) stated that China's economic transformation toward a market-oriented financial system began in 1978 and has been recognised as effectively successful. In year 1978 that China started to dispose of the preparation system steadily and return to a more market-oriented economy. This is because the previous year's planning system was not success and the regime had to change the direction in order to get support from the people of China. Due to the few reasons brought to the failure of the system, economic reform in 1978 seemed predictable. Beginning in 1978 several main institutional reforms have been undertaken. First is the implementation of the household accountability system in farming. In 1978, Deng recognised its useful effects and adopted it as a nationwide strategy and called it the "household accountability system". Farming output increased speedily in China and farmers became richer.

Therefore, this is one of the reasons that result in the increasing of housing index in China due to the economic conditions of the people is increased.

Next step was taken by the government was to give country enterprises some right in manufacture, advertising and speculation decisions rather than purely carrying out the decisions under a scheme of central planning (Yee, 2013). After paying a fixed tax to the government having authority over it, each status scheme was allowed to keep the outstanding revenues for distribution to its staff and workers and for principal speculation. Under this circumstance, the personal incomes of the workers are increased and the buying power of them became high. Therefore, they are able to afford the high price housing and which resulted the housing price increased in China.

Additionally, China examined the 2008 Olympics as a policy for its current economy and a launch pad for prospect growth of economic (Yee, 2013). Hosting the Olympics is signifies as a turning aim in its economic growth for Chin's government. Through the triumphant of the Olympics, it was attracted more tourists, businesses, and even investors to China and promote prospect economic expansion in China. This mega-event was affected the stability of the housing price in China and generated the greater economic effect in the country. According to Zhang (2007), apart from its implication as a impressive community assembly, hosting the Olympic Games will greatly promote investment and consumption. As a result, China's housing deals shows that in history have been crowded with purchasers have seen accept in presence. Consequently, the Olympics in 2008 were beneficial to China especially in housing market.

## 2.3 Recent Development in China's Housing Market

In recent years, many economists in China has been defined that Chinese real estate market has experienced a surprising growth and to be manipulated by a bubble (Shen, 2005). Therefore, it has been come together by significant increases in residential property prices. In year 1998, when market-driven reforms in the real estate field implemented, the property market in China itself is comparatively new and not so well established. Thus, the data can be collected is rather limited if comparing with other field (Shen, 2005). For instance, the data of house price indices of thirty five main cities in China from year 1998 to year 2009 is provided by China Statistical Year Books. The housing price index is estimated with respect to the preceding year such as only the house prices' growth rates are being analyze but not the levels of price themselves are being counted.

## 2.4 Current Status of the Housing System

Presently, there are divided into three categories of housing for Chinese households. It is comprises of commodity houses, economically affordable houses and rental houses (Pollock, 2010). For instance, there are economically affordable houses reported for only three per cent of all homes built which compared to almost twenty-five per cent at its climax in the late of 1990s. Under this circumstance, municipal households can make a decision to buy either affordable houses or commodity houses. For example, a buyer is qualified to purchase the lower cost house, buyers must have "hukou" which is a system of household registration being used in China and fulfill the requirements stated which including those applicants related to common living area,

standard of household income and net assets of household. There is stated that once bought the economically affordable house, the owner cannot sell the house for first five years. Until lately, there have been come out with few new limitations on the buying of commodity houses.

Nevertheless, Sun (2004) cited that since year 2010, urban governments have restrained the buying of homes by investors or non-residents to restrain over speculation by those investors. Presently, in China there are more than eighty per cent of houses which are privately owned by the buyers. This is successful evidence on the policies of privatization during the 1980s and 1990s. According to the latest data which provided by officials at the Chinese National Bureau of Statistics, the homeownership rate is about eighty per cent. It showed that China has a greater rate than many more established economies circumstances.

## 2.5 Housing Affordability Measurement

One of the significance fundamentals to determine affordability of housing is namely income. Currently, the most important elements in China's affordable housing schemes ranges are two plans: Economically Affordable Houses and Housing Provident Funds (Wong, 2010). Firstly, price-to-income ratio is being implemented to evaluate the affordability of a house. Price-to-income-ratio is the proportion of the average of housing prices over the average of personal income. These measures are being applied to indicate whether housing is affordable for the typical resident in China. If housing prices

start rising greatly and housing becomes unaffordable, this will be determined as "overpriced of housing".

Information provided in Figure 2.1 below is about the development of the price-to-income ratio for big cities in China like Shanghai, Shenzhen and Tianjin (Wu, 2010). From the information provided, it can identify an obvious increase of the ratio in all three cities in China and generally for Shenzhen. This would involve a prospective housing overvaluation during that duration of time. As a result, it is one of the reasons that will be affecting the increasing of housing price index and it able to tell that housing bubble will be happening under this situation.

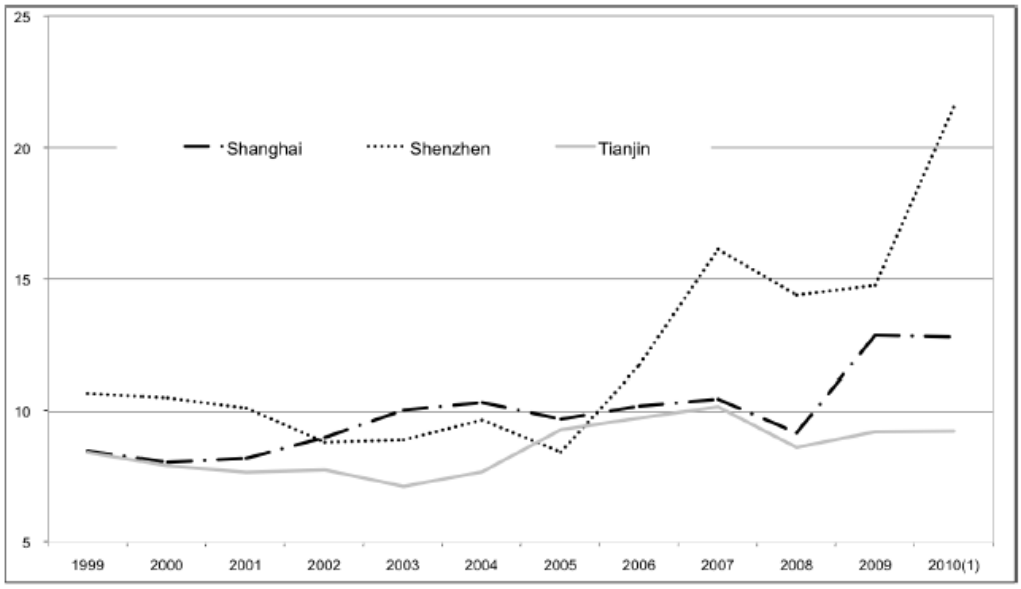


**Figure 2.1 Price-to-Income Ratios for Shanghai, Shenzhen and Tianjin**

**Sources: China National Bureau of Statistics, 2015**

## 2.6 Housing Debt Measurement

Housing debt measures are being applied to evaluate how obliged average households become when buying a house. One side of the interest rate will be captured by these measurements if the mortgages are used on purchasing the house yet on another side also the coverage of the banks to the housing market (Rothman, 2011). Besides, they also consist of the anticipations of the buyers such as they can ultimately inform whether there would be speculative behavior in the market. There are divided into two categories of housing debt measures. First is housing-debt-to-income-ratio and another one is housing-debt-to-equity-ratio. First and foremost, the housing-debt-to-income ratio is defined as the ratio of payments' mortgage to obtainable earnings.

According to Wong (2013), this is one of the important determinants to affect the housing price index in China. For instance, when the ratio rises, the buyers will depend more on a rising housing value in order to be able to examine their personal debt. However, this increment will become dangerous and risky for the situation of economy in China when the housing prices in the market is starting to increase drastically and the home buyers are unable to pay back their mortgage at the time. In fact, in China, practice of mortgage is comparatively new and uncommon. Rothman (2011) cited that there is a greater low influence among housing purchaser as thirty three percent in year 2007 of all purchasers paid all money and for those who do apply mortgages, the influence is comparatively lower. For example, the purchaser's equity risk is high and this can result in great decreases in prices of housing if the prices start to drop drastically.

According to Rothman (2011), the average cash down-payment was forty four per cent in year 2011. He argues that in China, subprime mortgages and option

adjustable-rate-mortgages are not allowed to implement. Secondly is housing-debt-to-equity-ratio which is called loan-to-value ratio (LTV) and it explains the financial control. For example, if the ratio is obtained exactly one, it means that it has one hundred per cent control on that; if a ratio of more than one means that the asset is negative. This ratio is particularly beneficial in estimating the risk exposure of the banks. If the LTV becomes larger than one hundred per cent, there will be risky for the banks. Previously, the private investors have to stand the costs of a price decline themselves.

## 2.7 Housing Ownership and Rent Ratio

Housing Ownership ratio can be implemented to evaluate whether the housing market is driven by speculative investors' demand. The ownership ratio is the amount of households who have their own houses and do not rent to others (Sun, 2011). This is because through different channels, the government of China encouraged ownership of house. The rate in China is relatively high if comparing to other field of economies. For example, Rothman (2011) stated that overall rate of home ownership in China was eighty two per cent which compared to for example sixty eight per cent in US.

Furthermore, according to Rothman (2011) not only the richer Chinese possess the home owner segment but also those poorer residents as also can be seen as the home owner in China. This is because of the housing prices in China seem to be majorly driven by an actual rise in demand from newly home owners and not mainly by investors. This is significantly to signify that high ratio of home ownership is only a symptom for a stable demand in housing market; it is given that the LTV is still low.

Consequently, it is vital to take several steps into account when evaluating the risk in the housing market in future. Another one is price-to-rent ratio which is defined as the housing price which divided by the sum of the annual rents given. This value evaluates how much the purchasers pay for the house for every unit of received the rent of house (Rothman, 2011). Rents are very significantly related to demand and supply in housing market and supposed to be rather constant. For instance, if price-to-rent ratios start rising up and housing rents remain stable, this can be a consistent signal for the beginning of a housing bubble. Wu (2010) presents price-to-rent ratio data for big cities in China like Shanghai, Shenzhen and Tianjin. Figure 2.2 showed that a stable rise of the price-to-rent ratios for all three cities: Shanghai, Shenzhen and Tianjin.

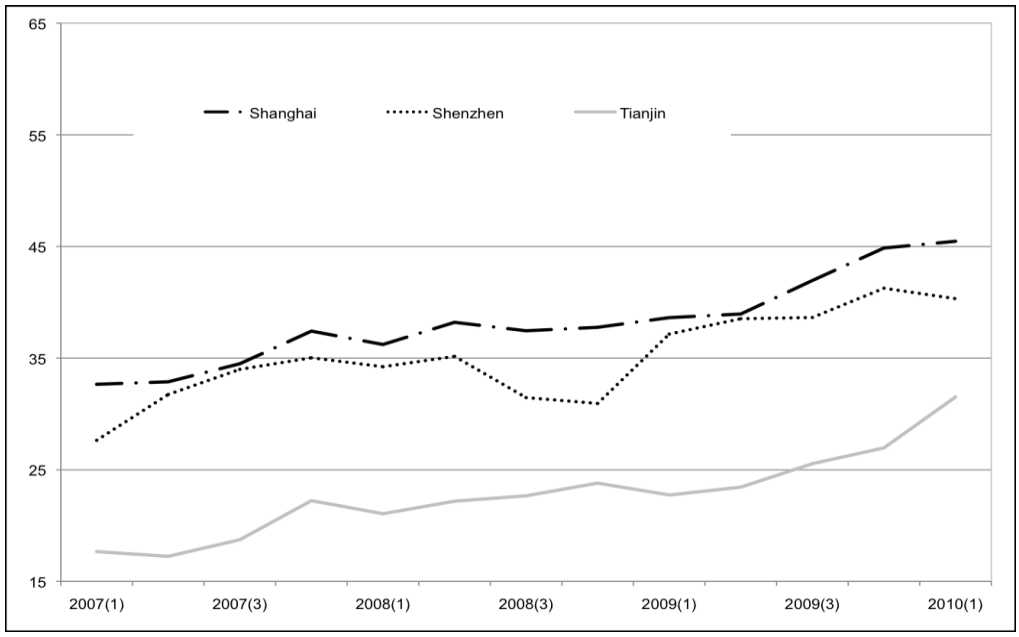


**Figure 2.2 Price-to-Rent Ratios for Shanghai, Shenzhen and Tianjin**
**Source: China National Bureau of Statistics, 2015**

## 2.8 Urban Housing Market in China

Urban housing market in China is the most crucial factor in determining economic slowdown of China. And given the extent of the economy in China, urban housing market presentation is itself inexplicably imperative to global growth (Xu, 2011). Since the 1990s, in most cities in China, there has only been a really private housing market. Formerly, the China's urban housing market was controlled by the stipulation system of housing which approximately all urban housing units were built and possessed by the units of work, and distributed to personality households at low rate of rent. This is because confidential housing markets did not present during that period. In the early 1980s, the administration of China initiated on the housing reformation which developed and advanced step by step during the next twenty years. Eventually, the State Council issued the 23rd judgment in year 1998, according to which work units were no longer permitted to build up new housing units for their workers in any type. Instead of that, they had to combine all hidden housing reimbursements into wages of workers and the households had to purchase or rent out their housing units in the personal housing markets or public housing system for low-income family units (Wong, 2011).

Throughout the latest decade, the total size of developed urban area at the nationwide rank increased from 22,439 square kilometers in 2000 to 40,058 square kilometers in 2010, or an standard yearly development rate of about 5.96 per cent, as the total region of developed housing land parcels also grew at a comparable rate, from 7,122 square kilometers in 2000 to 12,404 square kilometers in 2010 (5.71 per cent yearly). Since China's large urban housing privatization of year1998 till year 2003,

urban housing market is became a benefit category for investors, fueling tentative housing demand and price bubbles. As an outcome of the approach most of urban housing market in China was privatized between year 1998 and year 2003. By conveying ownership from the status to residents at unnaturally low prices, around year 2002, speculative house buying became general when preliminary ownership restrictions expired.

Additionally, the most recent bubble came out in year 2009 when as unplanned significance of China's substantial spur program, which has much additional credit ended up in extra housing supply and demand (Xu & Yeh, 2014). For instance, China's government has put much effort to control the emerging housing bubbles in urban area like house-buying limitations in China. As an outcome of China's efforts, urban housing markets began to stabilize and then turn down in the last part of year 2011, before increasing again in early year 2013 and dropping further in year 2014 (Xu & Yeh,2014). In the last few months, prices have begun to stabilize. Some of the economists judge that the recession has already bottomed out, while others estimate worse to come.

## 2.9 Housing Price Index (HPI) in China

Housing Price Index (HPI) is assessed by year over year alteration in prices of house in seventy standard and large cities in China (Chau, 2005). A Housing Price Index evaluates the changes of prices of residential housing in an area. Methodologies generally being implemented to evaluate HPI are the repeat-sales regression (RSR), hedonic regression (HR) and simple moving average (SMA) (Xu and Yeh, 2007). In

February 2011, IMF (2011) clearly listed “a potentially perpendicular value adjustment in Chinese housing markets” as one main risk in worldwide improvement from the predicament of financial. New construction of housing normally is encouraged by the rising prices of houses, and supported the growth for the country as well. For instance, a high reading is viewed as Bullish or positive for the China, meanwhile a low reading is read as Bearish or negative for the China (Sing, 2012). In the policy perception, a first-rate house price indicator is also of great significance.

According to Crowe (2011) policy creators in most main economics including China are progressively more susceptible to transforms in conditions of housing market, meanwhile the price of house is always being implemented as one important index. Presently, two authorized housing price indices are commonly reorganized in China, explicitly, the “Average Selling Price of Newly-Built Residential Buildings”, abbreviated as the “Average Price Index” henceforth, and the “Price Indices for Real Estate in 70 Large-and-Medium-sized Cities”, namely “70 Cities Index”, both are calculated and reported by the National Bureau of Statistics of China (NBSC). They present nearly the only dependable foundations for explanation and analysis of Chinese housing prices index.

Firstly, in current China, housing markets is a main segment of housing dealings concentrate in the newly-built sectors, which should also be a crucial phase in other growing housing markets’ preliminary housing growth (McMilen, 2012). Secondly, by taking into considerations its prospective affecting on macroeconomics, for strategy makers the newly-built housing price index could be still more practical than the resale price pointer (Wong, 2011). Thirdly, one main confront for evaluating resale housing

prices is to segregate the era outcome from the pure changes of price (Chau, 2005). Nevertheless, the newly-built sector is differentiated from the resale sector in some features like the excellence changes over time of sales are always larger in the newly-built sector as it is the market for stream supplies, and there also exist some restricted factors affecting new units' prices like developers' pricing strategies. Table 2.1 below is presenting China's housing price index from January 2010 until December 2014. According to Table 2.1, showing that recently China is experiencing a slightly increasing trend in their housing price index.

**Table 2.1 Housing Prices Index (HPI) in China from Year 2010- Year 2014**

| Months/Years | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|
| **Jan** | 104.54 | 104.55 | 103.2 | 115.09 | 114.88 |
| **Feb** | 104.54 | 104.55 | 103.2 | 115.09 | 114.88 |
| **Mar** | 104.54 | 104.55 | 103.2 | 115.09 | 114.88 |
| **April** | 104.55 | 104.03 | 103.57 | 113.08 | 114.38 |
| **May** | 104.55 | 104.03 | 103.57 | 113.08 | 114.38 |
| **June** | 104.55 | 104.03 | 103.57 | 113.08 | 114.38 |
| **July** | 103.57 | 104.34 | 109.31 | 115.2 | 114.38 |
| **August** | 103.57 | 104.34 | 109.31 | 115.2 | 113.76 |
| **Sep** | 103.57 | 104.34 | 109.31 | 115.2 | 113.76 |
| **Oct** | 106.78 | 103.57 | 112.1 | 115.12 | 113.08 |
| **Nov** | 106.78 | 103.57 | 112.1 | 115.12 | 113.08 |
| **Dec** | 106.78 | 103.57 | 112.1 | 115.12 | 113.08 |

**Sources: National Bureau of Statistics of China**

Accordingly the techniques developed in the resale sector are not essentially appropriate for newly-built house price extent; as a replacement for vigilant practical re-evaluations and appraisals based on inclusive perceptive of newly-built housing markets are called for (Deng, 2012). As the "Average Price Index" is assessed by the weighted average formula devoid of value modification, and the "Seventy Cities Index" with a basic form of

the identical approach (Xu and Yeh, 2014). These two accessible certified indices are both problematic in the practical feature. Therefore, to amend such unfairness, it applied the hedonic modeling method to the newly-built housing markets in 35 main cities in China (Wong 2011). According to the figures provided by the Ministry of Housing and Urban-Rural Development of China (MOHURD), the new units accounted for about sixty four per cent in floor area of all private housing units sold at the nationwide level in year 2010. Thus, the building of newly-built house price index is still the key task in house price extent in present China.

## 2.10 Summary

There is a merged perspective of China housing market as could be viewed in this segment. There is certainly proof for housing market overvaluations. Nevertheless, there are also happened a disagreement supporting the China's housing market development like to low LTV or the high ratio of home ownership. Besides that, housing prices are strongly correlated to the earnings obtained by a person. An increase in the income for a person, it will be following increase the housing demand and therefore raising the housing prices in the market. Housing price will be affected if there is a larger demand than a supply for housing.

For instance, when there are only left few houses in the housing market, people are ready to pay out extra cash to purchase a house. Therefore, this will result in the increasing of the price of houses in the market. Nonetheless, those cannot afford to buy a house due to lower income, generally they are forced to rent out a house or keep on with their own parents after their marriage. In fact, the government of China wants to defend

the lower-income citizens in buying their first own house. As a result, those reasons will also be the chief factors to affect the housing prices index in China.

# CHAPTER 3

# METHODOLOGY

## 3.0 Introduction

From previous Chapter 2 had analysed and elaborated the condition of housing in China. Hence, this chapter will further discuss the specific independent variables that affecting China's housing price index, as well as theoretical framework, hypotheses, data collection and analysis technique.

## 3.1 Macroeconomics Variables

Macroeconomics environment commonly is having direct and huge influences on any national economics condition. Housing price nowadays in China had slowly became a serious problem, due to house is one of the most essential item for any living human. Hence, this research had identified few macroeconomics variables from previous Chapter 2, which previously having significant influences on China housing price index, to examine their impact in nowadays.

### 3.1.1 Inflation Rate

Bell (2006) defined inflation is the depreciation money caused by a permanent rising of the price level for goods like consumer products or investment goods. According to Fama and Schwert (2007) the relationship between housing prices and rate

of inflations has been focused since years ago. Bond and Seiler (2008) stated that owning a house can evade inflation: there is expected or unexpected inflation. Kenny (1999) also found that inflation could cause a housing price increase. Furthermore, the China's governments have been recognised that housing is an essential necessitate for every citizen in China as well as fundamental elements of the urban economy (Hongli, 2010). Therefore, the China's government has been implementing a housing strategy that emphasised on the contribution of the personal sector in housing scheme development (Asiah, 1999). Asset prices are the Grange cause of inflation (Shiratsuka, 1999). Goodhart and Hofmann (2000) argued that housing prices are usually conducive to forecasting future inflation. Normally, the Index of Consumer Price will be measuring the rate of inflation. A rise in prices is reflected by a positive inflation rate (Yan Zang, 2010). Past decades, between year 2004 till year 2014, China only experienced once of the depreciation situation in their country, with levels of price decreasing by approximately 0.7 per cent in year 2009 (Wu, 2015).

Commonly, Yuenmin (2011) stated that the inflation rates of a country are defined as a key economic indicator. It is generally used for international assessment. China has been displaying the lowest inflation of emerging countries in 2013 among the main industrialised and emerging economies worldwide. Smets (2007) argued that unexpected asset price variation will manipulate inflation prospect by virtue of the policy-functioning mechanism and price. Stevenson (2000) focused on the long term connection of price rises and accommodation market, which shows that the co combination test gives strong indication that housing and inflation share a universal long

term tendency. The price of houses is essentially caused by large money prices and interest rates (Chinyue and Yan, 2010).

Generally, there is shown that the strong and permanently link between inflation and housing prices. Most of the things' prices in the economy will be increasing during inflation (Zhu, 2004). According to Kearl (2009), the amount of housing will be reduced if there is a raise in inflation front loads real payments on a long-term fixed rate mortgage. The impact of inflation on housing prices is determined by consumer revenue allocated to housing consumption and non-housing consumption under utility maximization (Stock and Watson, 2001). Li and Ge (2008) found that housing properties in Shanghai do not offer adequate deception for inflation. Bond and Seiler (2008) cited that buying a house can avoid inflation like expected inflation and unexpected inflation. Inflation could also be causing a housing price rise (Kenny, 1999).

Duang (2007) stated that expenditure prices in the short term and long term extensively influence fluctuations of housing prices. Besides, housing prices comprise of no valuable information for future price prediction (Gichrist and Leahy, 2002). Apart from that, housing price is comparatively associated with commercial real estate price, while the ratio of housing price to commercial real estate price is negatively associated with the ratio of housing construction to commercial real estate development. On one hand, Hongcen (2010) cited that commercial real estate price reveals the same patterns along with housing price which called co-movement. In other words, there exist a mass effect between housing construction and commercial real estate construction.

Specifically, residential real estate market and commercial real estate market is related in their constructions or development and also their prices. Zhu (2004) showed

the strong and long-lasting link between inflation and housing price. During inflation, most things in the economy will increase their price. However, the cost of the raw material for building a house will increase. According to Kearl (2009), an increase in inflation front loads real payments on a long-term fixed-rate mortgage, and thus reduces the quantity of housing. It must be noted due to the global development that increasing money supply causes inflation and house prices to increase. Table 3.1 below shows the monthly inflation rate from January 2010 until December 2014, used for further analysis in this research. According to Table 3.1, showing that recently few years China is experiencing a very fluctuate of inflation rate where it may possible brings ambiguity of influences on China housing price index.

**Table 3.1: Monthly Inflation Rate of China from year 2010-2014**

| Month/Year | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|
| **Jan** | 1.5 | 4.9 | 4.5 | 2 | 2.5 |
| **Feb** | 2.7 | 4.9 | 3.2 | 3.2 | 2 |
| **Mar** | 2.4 | 5.4 | 3.6 | 2.1 | 2.4 |
| **April** | 2.8 | 5.3 | 3.4 | 2.4 | 1.8 |
| **May** | 3.1 | 5.5 | 3 | 2.1 | 2.5 |
| **June** | 2.9 | 6.4 | 2.2 | 2.7 | 2.3 |
| **July** | 3.3 | 6.5 | 1.8 | 2.7 | 2.3 |
| **August** | 3.5 | 6.2 | 2 | 2.6 | 2 |
| **Sep** | 3.6 | 6.1 | 1.9 | 3.1 | 1.6 |
| **Oct** | 4.4 | 5.5 | 1.7 | 3.2 | 1.6 |
| **Nov** | 5.1 | 4.2 | 2 | 3 | 1.4 |
| **Dec** | 4.6 | 4.1 | 2.5 | 2.5 | 1.5 |

**Sources: National Bureau of Statistic of China, 2015**

### 3.1.2 GDP Growth Rate

The Gross Domestic Product (GDP) is commonly defined as the output of goods and services produced by labour and property within a particular country and it is generally considered as a measure of a country's economic performance (Chinyue, 2010). According to Zhu (2011), the formation of housing markets and house prices in Asia is very important as Asia has witnessed fast growth of private housing and market-based housing finance in the past decade, even though development has been irregular across countries. Especially the development has been particularly extraordinary in China has led to a significant change in the mortgage market background. For example, in China, housing mortgages were initiated as late as 1998, but the market rapidly expanded to $227 billion at the end of 2005 to become the largest mortgage market in Asia. At the same time, the GDP rate had been increased 10% in China (Guangyu, 2010).

Meanwhile, Zietz (2009) cited that other indicators like globalisation has stronger effects toward s the housing prices movements in China, the outcomes are reliable with globalisation in China's cities. To conclude, it has brought everyone awareness here to categorise the importance driver on the China's housing market which is GDP rate. Furthermore, GDP growth is strongly related with the development of economic as well. Zhiyong (2010) has stated that high GDP growth and better economic expansion push the rising exception of housing price ,which increases housing demand, with the shortage of the housing supply, so that make housing price rise. Additionally, the major parts of the GDP are related with real estate development. One such example is GDP increases, the related people's per capita income will also increase, so that it

enhance the consumer's consumption ability, then, pull price level higher, overall prices then rise. In short, GDP are used to increase the added value of housing market, thus it is becoming one of the main factors influencing prices (Hongli, 2010).

According to the established model, it shows that housing prices have a positive relationship with GDP and this factor has a great impact on housing prices (Hongchen, 2010). Thus, when the housing prices in the formulation of regulatory schemes are controlled by the government, they can take the means of financial to increase lending rates in order to depreciate the price of housing in the market. For instance, in Shanghai, one of the big cities in China has shown that the major factors influencing housing prices have its own features driven by financial and economic in the country (Hongli, 2010). In spite of that, other factors cannot be denied that their affecting level is only a relatively lesser degree, these factors affect each other, and this is significant structures for factors affecting the prices of housing in China. As a result, when the government is in charge of housing prices in the adjustment of regulatory policy, they can take the monetary ways to increase rates of lending in order to decrease the commodity housing's prices. This is because of cost of developers and consumers are increased by the higher interest rate. In addition, the fiscal policies like taxes of real estate and other means can be achieved at the same raise in the developers and consumers' cost (Xia, 2010). To sum up, the policy of government and GDP growth rate indeed play vital roles to affect the housing prices in the market.

Apart from this, Yuemin (2011) cited that a major part of the GDP comes from the real estate constructions and development and its associated real estate, the over-concentration of money and high-level expedition for the construction which will

enhance the additional cost of the real estate, that force prices up. In other words, one of the parts of the GDP are used to build up the town supporting facilities and infrastructure, a wide variety of wellbeing building, bringing into a related raise in the added price of commodity housing, it also will push up housing price (Hao, 2011). Besides, through variety aspects and cause and a large extent, GDP manipulate the commodity housing's price. For instance, in Shanghai, the major cause influencing housing prices possess its own uniqueness driven by financial and economic (Yao, 2011). Subsequently, the financial policy and economic conditions of a country are the main causes affecting housing prices of a country. Table 3.2 below shows the monthly GDP growth rate from January 2010 until December 2014, used for further analysis in this research. According to Table 3.2, showing that recently few years China is experiencing a decreasing trend of growth rate, where it may possible brings ambiguity of influences on China housing price index.

**Table 3.2: Monthly GDP Growth Rate in China from Year 2010- Year 2014**

| Month/Year | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|
| **Jan** | 11.90% | 9.70% | 8.10% | 7.80% | 7.40% |
| **Feb** | 11.90% | 9.70% | 8.10% | 7.80% | 7.40% |
| **Mar** | 11.90% | 9.70% | 8.10% | 7.80% | 7.40% |
| **April** | 10.30% | 9.50% | 7.60% | 7.50% | 7.50% |
| **May** | 10.30% | 9.50% | 7.60% | 7.50% | 7.50% |
| **June** | 10.30% | 9.50% | 7.60% | 7.50% | 7.50% |
| **July** | 9.60% | 9.20% | 7.40% | 7.90% | 7.30% |
| **August** | 9.60% | 9.20% | 7.40% | 7.90% | 7.30% |
| **Sep** | 9.60% | 9.20% | 7.40% | 7.90% | 7.30% |
| **Oct** | 9.80% | 8.90% | 7.90% | 7.60% | 7.30% |
| **Nov** | 9.80% | 8.90% | 7.90% | 7.60% | 7.30% |
| **Dec** | 9.80% | 8.90% | 7.90% | 7.60% | 7.30% |

**Sources: National Bureau of Statistic of China, 2015**

### 3.1.3 Interest Rates

Interest rates used in this research is referring to China general market interest rate. Interest rates have a main impact on the real estate markets in China (Yongheng 2012). Changes in interest rates can significantly influence the ability of a person in purchasing housing. For instance, as the interest rates fall, the cost to get a mortgage to purchase a home decreases which creates a higher demand for properties which pushes the prices up (YanMing, 2010). On the contrary, as interest rates rise, the cost to obtain a mortgage increases, thus it will lower the demands and prices of real estate. According to Jinxiao (2010), the factors affecting housing prices in China include interest rates, government policies and mortgage rates. Interest rates and inflation rates have a strong connection to the fluctuations of housing prices in China (Tingting and JingWu, 2012). Throughout diverse liquidity effects it is affected by bank lending rates. The housing price is can also be related the price of any assets. It can be determined by the low-cost expected future trend of cash flows (Xin-na, 2010). For instance, if the commercial banks increase the credit availability, it means that the bank will offer lower lending rates and support present and upcoming activity of the economic (Guan 2012). Barakova (2003) stated, the better credit availability will affect the housing demand to accelerate when the households are borrowing constrained. Therefore, the increasing in demand will then be resulted in higher housing prices.

Besides, there are two-sided relationship between household borrowing and housing prices. That means, housing prices may prominently affect household borrowing through variety effects of wealth. According to Goodhart and Hofmann (2007), generally reinforce boom–bust cycles in housing and credit markets may happen,

which raise the possibility of a prospect monetary crisis. Nevertheless, Goodhart and Hofmann (2007) suggested that the principles of both house prices and credit from their long-run tendency are precious signs for future investors. Therefore, interest rates have also playing a significant role in pushing up housing prices. Huang (2004) studied the housing markets and interest rates in few cities in China such Beijing, Chongqing and Jiangyin, had found that the interest rates played an important role in creating different housing market structures.

Additionally, Goodhart and Hofmann (2007) mentioned that there are three different ways to manipulate households' credit demand through housing assets. Firstly, households may be facing borrowing restrictions due to the financial market deficiencies. As a result, if the instructors can provide more securities in the house, households will wish to borrow more; in other words, the households borrow basically according to the ability of their securities' net value. As the securities value of housing is quite high, an increase in housing prosperity opens up the borrowing restrictions faced by households. Second, households' recognized life span assets may have a considerable influence as a result of changes in housing wealth. An increase in the recognized lifetime assets induces households to spend more today, which will mean even consumption over the in general life cycle. Therefore, it will enhance the demand for credit.

Lastly, the value of bank capital will also have an impact on housing price movements on credit supply (Xu 2010). That is, housing estimation increases the value of the dwellings owned by the bank. Besides that, the values of loans are secured by housing loans. Therefore, a variation in the housing price will affect the risk-taking capacity of banks. So, banks are willing to lend more to the public. In the nutshell, for

homeowners, focus on changing interest rates because they have a direct influence on real estate prices (Guang 2011). However, interest rates also affect the availability of capital and the demand for investment. These capital flows influence the supply and demand for property and, as a result, they affect property prices (Chen 2011). Table 3.3 below shows the monthly general interest rate from January 2010 until December 2014, used for further analysis in this research. According to Table 3.3, showing that recently few years China is experiencing a considerable of stable trend of interest rate, where it may possible brings ambiguity of influences on China housing price index.

**Table 3.3: Monthly General Interest Rate in China from Year 2010- Year 2014**

| Month/Year | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|
| **Jan** | 2.25 | 2.6 | 3.1 | 2.85 | 2.85 |
| **Feb** | 2.25 | 2.6 | 3.1 | 2.85 | 2.85 |
| **Mar** | 2.25 | 2.6 | 3.1 | 2.85 | 2.85 |
| **April** | 2.25 | 2.6 | 3.1 | 2.85 | 2.85 |
| **May** | 2.25 | 2.85 | 3.1 | 2.85 | 2.85 |
| **June** | 2.25 | 2.85 | 3.1 | 2.85 | 2.85 |
| **July** | 2.25 | 2.85 | 2.85 | 2.85 | 2.85 |
| **August** | 2.25 | 3.1 | 2.85 | 3.1 | 2.85 |
| **Sep** | 2.25 | 3.1 | 2.85 | 3.1 | 3.05 |
| **Oct** | 1.91 | 3.1 | 2.85 | 3.1 | 3.05 |
| **Nov** | 1.91 | 3.1 | 2.85 | 3.1 | 3.05 |
| **Dec** | 1.91 | 3.1 | 2.85 | 3.1 | 3.05 |

**Sources: National Bureau of Statistic of China, 2015**

### 3.1.4 Mortgage Rates

Moreover, government control of the economy is partly affected the fluctuations prices in China's housing market (Yonghe, 2011). For example, the downturn start after the China's government tried to stop speculation in the housing business by raising

mortgage rates and lessening restrictions on bank lending and mortgage accessibility (Jianbang, 2011). However, speed up the housing prices rise by lowering interest rates and loosening mortgage down payment requirements. Thus, the lower mortgage rates may encourage those buyers to bear more debt and purchase dearer home. To sum up, mortgage loans play crucial roles to most buyers in China like Beijing, Shanghai due to high rise of housing price (Zenou, 2010). In addition to that, Yongqi (2002) claimed that the central's bank guideline of the long-term standard bank loan can change the mortgage rates and the rate for the projects of housing developments, which lead to change the demand for loan and eventually slow down and speed up rises in housing prices.

Similarly, the central bank's housing clear credit policy on mortgage down payment rules and regulations can increase or decrease the supply of mortgage credit, which offers to amend in housing prices (Y.P Wang, 2010). For instance, on September 30$^{th}$, central bank of China has issued a strategy to develop the pool of mortgage loans accessible for potential borrower which intends to stimulate the demands (Tao, 2010). Hence, it is necessary to consider mortgage rates and the possible changes in the trends for purchasing housing which is based on this to reduce the cost of pay in housing.

On top of that, there are two types of rate mortgage which are adjustable-rate mortgage and fixed-rate mortgage. An adjustable-rate mortgage varies (ARM) from a fixed-rate mortgage in different ways. First, fixed-rate mortgage is the interest rate remains the same during the life of the loan. On the other hand, with an ARM, the interest rates change according period, normally in related to an index, and payments will be gone up or down accordingly (Chan, 2003). Also, to compare an ARM with a

fixed-rate mortgage, borrowers need to think about the maximum amount of their monthly payment could be increasing. Most significantly, borrowers need to know what might be happened to their mortgage payment of monthly which related to their future ability to afford higher payments (Tsai, 2011). Generally, lenders charge lower initial interest rate for ARMs than for fixed-rate mortgages. Consequently, this makes the ARM easier to be counted which would be also a fixed-rate mortgage for the same loan amount. In addition, the ARM could also be cheaper and valuable over a long period than a fixed-rate mortgage like if interest rates stay steady or move lower (Chen, 2011).

At the same time, since year 2004, the central bank has been increased the interest rates multiple times which directly affects mortgage rate (Liu, 2009). In the meantime, expenditure prices have risen penetratingly, which has given increase to higher rates of inflation. Barnett and Brooks (2006) showed that the amount of investments in housing market in China is imperceptibly interrelated with household income and mortgage rate. Mortgage rates influence both sides of supply and demand (Wengao, 2012). That is on the demand side, the housing's prices constantly is tens of millions count. In the most of the cases, purchasers and investors are taking the structure loan interest rate, mortgage rates multiplied by the total price which is an enormous number (Fubing, 2011). For an example, a more extensive change in the figure of cost will cause every one per cent change in interest rates.

As a result, it is essential to think about mortgage rates and the possible changes in the trends and size for buying houses which base on the elements mentioned to decrease the cost of pay. On the other hand, Liu (2009) claimed that on the supply side, due to the land's cost, wages of labor and materials' high cost will cause the high total

development cost. For instance, in particular to bank loans, as the loan is larger, everyone percentage point accelerate in rates of interest, the capital's cost will also be increasing a bit. Therefore, developers will try to select a low interest rate loans, reduce the high interest rate loans which will be resulting in lack of development funds and the related decrease in the field of development, housing amount for selling will be lessening in the market. In a nutshell, mortgage rates affect both supply and demand sides, thus the prices of real estate is significantly affected (Wu 2015). Table 3.4 below shows the monthly mortgage rate from January 2010 until December 2014, used for further analysis in this research. According to Table 3.4, showing that recently few years China is experiencing a slightly increasing trend of mortgage rate, where it may possible brings ambiguity of influences on China housing price index.

**Table 3.4: Monthly Mortgage Rates in China from Year 2010 – Year 2014**

| Month/Year | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|
| **Jan** | 5.31 | 5.81 | 6.56 | 6 | 6 |
| **Feb** | 5.31 | 6.06 | 6.56 | 6 | 6 |
| **Mar** | 5.31 | 6.06 | 6.56 | 6 | 6 |
| **April** | 5.31 | 6.31 | 6.56 | 6 | 6 |
| **May** | 5.31 | 6.31 | 6.56 | 6 | 6 |
| **June** | 5.31 | 6.31 | 6.31 | 6 | 6 |
| **July** | 5.31 | 6.56 | 6 | 6 | 6 |
| **August** | 5.31 | 6.56 | 6 | 6 | 6 |
| **Sep** | 5.31 | 6.56 | 6 | 6 | 6 |
| **Oct** | 5.56 | 6.56 | 6 | 6 | 6 |
| **Nov** | 5.56 | 6.56 | 6 | 6 | 5.6 |
| **Dec** | 5.81 | 6.56 | 6 | 6 | 5.6 |

**Sources: National Bureau of Statistic of China, 2015**

### 3.1.5 Money Supply of M1

In China, the monetary policy has undergone significant change, especially since year 2008 as monetary improvement and the speed of restructuring have been accelerated (Yizhang, 2009). There are many useful research found that monetary policy has a significant effect on real estate prices. On the other hand, despite China have all been extensively playing a fundamental role in the global economy, research on the real estate market in China has been limited and seldom to be studied. Money supply of M1 will be using in this particular research. Zhang (2009) examined the linkages between housing market and stock market returns in China and the impact of hot money flow. Li discussed the evaluation of housing market in China. At the same time, money supply of M1 has been extensively expanded with the increasing of housing prices in China.

Besides, Webb and Tse (2000) studied the market meet behaviors and the feedback effects among office prices and rentals in Shanghai, Guangzhou and Shenzhen. The impact of money supply of M1 on housing price growth in China has not been thoroughly examined. This policy aims to fill this gap using entire data on China home price increase and associated policy measures since 1998 (Dally, 2011). Money supply of M1 highly considerable on real estate price which made by most of the banks are either state-owned or state holding in China (Chen, 2011). As a result, such reformation of money supply will help allocate the housing prices more efficiently.

Likewise, through a diversity of channels, money supply of M1 in China may be affected housing price modification (XiaoChi, 2009). Firstly, adjustment which made by the central bank on the long-term standard bank loan rate will be changing the rate of mortgage and the rate on real estate development of the projects, speed up or decrease

the housing price increase as well as eventually transforming the demand for loans to the housing segment (Guang, 2012). On the other hand, due to the mortgage rate is much lesser than the return on investments of real estate in China; interest rate policy solely is not adequate in influencing the housing loans' demand (XiaoXi, 2011). Next, XiaoXi (2011) stated that growth or reduction in the increase of money supply of M1 may raise or reduce the loan-making capability of commercial banks, and transform the supply of credit to the housing segment.

Consequently, it may also change the inflationary anticipation of the public and the housing assets' demand. Both channels will affect to a positive effect of money supply growth on the price growth change which happens in housing aspects. Thirdly, housing particular credit policy on mortgage down payment requirements of the central bank may increase or decrease the mortgage credit's supply and the transform of the growth of the home price. Through the money supply of M1 of the Central Bank, there is anticipated to have a stronger impact on the growth of the home price in China related to other more deregulated markets. Housing has been identified as the major elements to lead the growth of economic in China. For instance, there is a major control of housing segment in China, throughout particular mortgage credit policy and general monetary policy which has played a significant role in the dynamics of the price growth of the housing market (Clarida, 2010).

Martin and Morrison (2008) stated that hot money flow into China was always been cited as a key reason for the home price increase in China. With speedy economic growth, expectation of local currency appreciation, comparatively higher interest rate, and vigorous growth of housing price, foreign hot money has been flowing to China's

housing market through two main channels which are direct purchase of housing by foreign investors or buyers; foreign institutions or individuals; development projects of real estate or real estate properties investment by foreign real estate development companies or real estate investment trusts. Conversely, because of the managed-floating foreign exchange system the central bank of China has to buy a large amount foreign currency which flown into China, which caused in a rapid increase of money supply and base money (Lin, 2009).

Zhang and Fung (2006) showed that enclose one section hot money flow has a positive outcome on the home price growth, without calculating for the impact of monetary policy variables such as interest rate or growth in money supply. To sum up, although hot money flow is expected to have a positive impact on the home price growth, it would be interesting to see whether it has any added explicatory power further than the growth money supply of M1. Additionally, in an established environment of monetary policy, central bankers can regulate the supply of the money to accomplish the objectives of desired growth in China. Arrau (1995) found that the rigorous use of money alternates and efficient payment devices reduce the transaction demand for money through lower transactions costs and consequently diminish income flexibility. Precisely, most of the research found that there is a significant structural shift in money rapidity from year to year. Table 3.5 below shows the monthly money supply of M1 from January 2010 until December 2014, used for further analysis in this research. According to Table 3.5, showing that recently few years China is experiencing an increasing trend of money supply, where it may possible brings ambiguity of influences on China housing price index.

**Table 3.5: Monthly Money Supply of M1 in China from Year 2010 – Year 2014**

| Month / Year | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|
| **Jan** | 22958.9 | 26176.5 | 27001.04 | 31122.86 | 31490.06 |
| **Feb** | 22428.7 | 25920.05 | 27031.21 | 29610.32 | 31662.51 |
| **Mar** | 22939.79 | 26625.55 | 27799.81 | 31089.83 | 32768.37 |
| **April** | 23390.98 | 26676.69 | 27498.38 | 30764.84 | 32448.25 |
| **May** | 23649.79 | 26928.96 | 27865.63 | 31020.45 | 32783.96 |
| **June** | 24058 | 27466.26 | 28752.62 | 31349.98 | 34148.75 |
| **July** | 24066.41 | 27054.57 | 28309.07 | 31059.65 | 33134.73 |
| **August** | 24434.06 | 27339.38 | 28573.93 | 31408.59 | 33202.32 |
| **Sep** | 24382.19 | 26719.32 | 28678.82 | 31233.03 | 32722.02 |
| **Oct** | 25331.32 | 27655.27 | 29330.98 | 31950.94 | 32961.77 |
| **Nov** | 25942.03 | 28141.64 | 29688.3 | 32482.19 | 33511.41 |
| **Dec** | 26662.15 | 28984.77 | 30866.42 | 33729.11 | 34810 |

**Sources: National Bureau of Statistic of China, 2015**

### 3.1.6 RMB Exchange Rate

As more people broaden their investment universe by expanding into foreign investment by buying housing, they must also bear the risk associated with fluctuations in exchange rates (Liu, 2009). In addition, fluctuations in Ren Min Bi (RMB) Exchange rate, whether the home currency or the foreign currency can either increase or reduce the returns associated with foreign investments. Thus, currency plays an important role in investing field (Guang 2012). For evidence, since July 21, 2005, authorities began to implement a new managed floating exchange rate regime which based on the market supply and demand with reference to a basket of currencies (Zhang-shuai, 2012). Therefore, the RMB exchange rate became more flexible. Since then, the exchange rate of the RMB against the U.S. got rid of the long-term hovering at 8.27, started the journey of continuous appreciation. Up to December 2012, the central parity rate of the

RMB against the U.S. dollar came to 6.285, had risen by 28.91% compared with the beginning of the exchange rate reform (GaoBo, 2009).

Furthermore, the appreciation of the RMB increased the expected rate of return on investment assets denominated in RMB, the fame and fortune of the capital to make a lot of hot money flow into China to obtain excess returns (Hao, 2011). Subsequently, housing price which has high returns won the good turn of international capital for its double properties as consumer goods and investment goods (Guang, 2011). With the rising internationalization of the housing market investment manners, the relationship between housing prices and the exchange rate is bound to be more closely. Therefore, escalating arithmetical investigation and practical test has enormous implication to this research (Aijian, 2007).

Additionally, Wang (2008) cited that the new open economy macroeconomics believes that capital market and foreign exchange market have interactive relationship. External shocks will lead to changes in asset prices conduction through the foreign exchange market. In general speaking, the appreciation of the RMB affect housing price mainly through the prosperity effect, liquidity effect, the expected effect, overflow effects of credit and extension effect (Jingfei, 2011). For instance, China's central bank, the People's Bank of China (PBOC), has historically kept a close watch on RMB exchange rates. In a floating currency system, trade surpluses classically lead to enhance in the value of the domestic currency (Gao-bo, 2009). This is because as the world demands more of China's goods, it drives up the demand for RMB as well. This should drive its value up. However, this doesn't happen in China due to the PBOC's interference in currency markets (Liu, 2009). China has strict government controls on

the export of its currency and its use in international connections. As a result, transactions between Chinese companies and foreign buyers are settled in US dollars. Chinese companies then exchange their US dollars for Chinese New Year at commercial banks to conduct their daily business (Joseph, 2015).

Furthermore, in the case of global excess liquidity and the U.S. dollar continued low interest rates, increasing housing prices may further attract international speculative capital inflow (Fushan, 2011). For example, in the current management system of exchange rate, international speculative attracted by the high prices further aggravated by the balance of supply and demand in the foreign exchange market in China, increase the pressure on RMB appreciation. RMB appreciation will cause housing price increases (Yao, 2011). Increased prices due to the appreciation of the RMB, in turn, it will increase the pressure of RMB appreciation. In view of China's tangible circumstances, if expand the fluctuation range of the RMB exchange rate, increase the flexibility of the RMB exchange rate, it will increase the risk premium of international hot money, ease the one-sided appreciation of the RMB and weaken the power of international hot money that flows into China ( Tingting, 2012).

Through the practical analysis, and after the exchange rate reform, China's housing prices and RMB nominal exchange rate have a long-term stable co integration relationship, which is a positive correlation (Stevenson, 2010). Consequently, the expected appreciation of RMB promoted the rise of housing prices, and the continuous rise of domestic housing prices attracted global approximate capital to look for which accelerated the drive of growing house prices (Haocheng, 2011). The exchange rate is the exterior price of the national currency, and the housing industry has become a pillar

industry in our country. In the context of globalization, it is necessary to ensure the independence of monetary policy, but also to prevent the international hot money speculation in China's housing market (Wu, 2010). In a long run, the most essential transmission device between the appreciation of RMB and housing prices is the foreign exchange system. Therefore one should continue to improve the exchange rate regime (Xingna, 2010). Table 3.6 below shows the monthly RMB exchange rate from January 2010 until December 2014, used for further analysis in this research. According to Table 3.6, showing that recently few years China is experiencing an appreciation trend of RMB exchange rate, where it may possible brings ambiguity of influences on China housing price index.

**Table 3.6: Monthly RMB Exchange Rate in China from Year 2010 – Year 2014**

| Month / Year | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|
| **Jan** | 6.82 | 6.56 | 6.3 | 6.23 | 6.05 |
| **Feb** | 6.82 | 6.56 | 6.3 | 6.23 | 6.05 |
| **Mar** | 6.82 | 6.5 | 6.36 | 6.23 | 6.05 |
| **April** | 6.77 | 6.5 | 6.3 | 6.23 | 6.23 |
| **May** | 6.77 | 6.5 | 6.3 | 6.23 | 6.23 |
| **June** | 6.77 | 6.5 | 6.3 | 6.22 | 6.23 |
| **July** | 6.77 | 6.5 | 6.3 | 6.22 | 6.23 |
| **August** | 6.77 | 6.4 | 6.35 | 6.22 | 6.16 |
| **Sep** | 6.77 | 6.4 | 6.35 | 6.22 | 6.16 |
| **Oct** | 6.77 | 6.4 | 6.35 | 6.22 | 6.16 |
| **Nov** | 6.77 | 6.4 | 6.35 | 6.22 | 6.16 |
| **Dec** | 6.77 | 6.4 | 6.35 | 6.22 | 6.11 |

**Sources: National Bureau of Statistic of China, 2015**

## 3.2 Theoretical Framework

From previous elaboration on independent variables, the theoretical framework for analysing on the factors influencing housing prices fluctuations in China is shown in Figure 3.1.

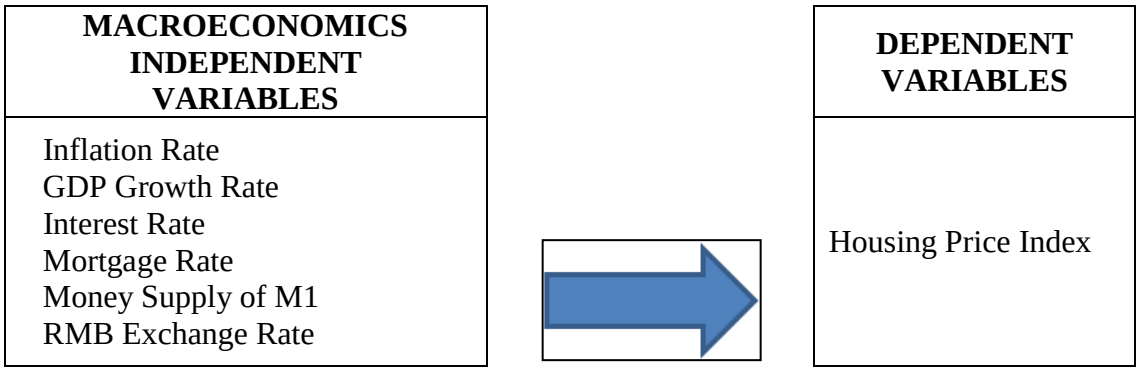


**Figure 3.1 Theoretical Framework**

## 3.3 Hypotheses Development

The study of the relationship between the factors influencing the housing price index derives the following hypotheses as follows:

H1: Inflation rate is having significant influence on Housing Price Index.

H2: GDP growth rate is having significant influence on Housing Price Index.

H3: Interest rate is having significant influence on Housing Price Index.

H4: Mortgage rate is having significant influence on Housing Price Index.

H5: Money supply of M1 is having significant influence on Housing Price Index.

H6: RMB Exchange Rate is having significant influence on Housing Price Index.

From the theoretical framework in Figure 3.1, there is one set of independent variable group – Inflation Rate, GDP Growth Rate, Interest Rate, Mortgage Rate, Money Supply of M1 and RMB Exchange Rate which influencing on the research outcomes for the dependent variable namely Housing Price Index.

## 3.4 Data Collection Strategy

This research major aims to critically analyse the various variables whichever affecting on China's housing price index after China experience year 1978 of economy transmission and Olympics event in year 2008. Hence, various variables' data from year 2010 to year 2014 had been obtained from National Bureau of Statistic of China data base; and various independent variables had grouped into two categories which are Common Macroeconomics Variables and Enhanced Macroeconomics Variables. Common Macroeconomics Variables including Inflation Rate, GDP Growth Rate and Interest rate and Enhanced Macroeconomics Variables including Mortgage Rate, Money Supply of M1 and RMB Exchange Rate.

According to Giovannelli and Proietti (2014), Common Macroeconomics Variables had been justified as a broader term influences on overall nation economics condition; whereas Enhanced Macroeconomics Variables had been justified as a narrow terms, or more specific factors affecting on an overall nation economics condition. Furthermore, due to overall variables are all come in different measurements, hence this research will logarithm every data, in order to maintain the consistency of this research.

## 3.5 Estimation Techniques

During the last 40 years, many authors have tried to examine possible methods to correctly predict corporate or business failure. The studies of Beaver (1966) and Altman (1968) inspired the development of many statistical methods such as the univariate and multivariate models to predict the factors influencing the housing price index. To solve the uncertainty problem linked to the Beaver's univariate analysis, this research will use regression model to analysis the data collected.

### 3.5.1 Multiple Regression Analysis (MRA) Model

The MRA equation function can be written as per below:

$$Y = a + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_n X_n + \varepsilon$$

Where:

$Y$ = discriminant score;
$a$ = estimated constant;
$\beta_1, \beta_2 \ldots \beta_n$ = estimated coefficients;
$X_1, X_2 \ldots X_n$ = explanatory variables;
$\varepsilon$ = error term

Hence, from the equation had been developed, MRA consist of 3 progress to carry on which including firstly estimating the coefficients of variables, followed by calculating the discriminant score of each case and classifying the cases. In this model, a model fit procedure is applied which allowed the predictor variables to be included only based on the contribution they made. A model fit procedure is usually applied when there is sufficient of theoretical basis in the selection of the predictor variables (Low, 2001). This model is estimated complying data obtained from year 2010 to year 2014

and yet there are three models developed, these are:

**Model 1: Common Macroeconomics Variables**

$$HPI_C = a + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \mathcal{E} \quad (1)$$

Where:

$HPI_C$: China's Housing Price Index

$X_1$: Inflation rate

$X_2$: GDP Growth Rate

$X_3$: Interest Rate

$\mathcal{E}$: error term

**Model 2: Enhanced Macroeconomics Model**

$$HPI_C = a + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \mathcal{E} \quad (2)$$

Where:

$HPI_C$: China's Housing Price Index

$X_4$: Mortgage Rate

$X_5$: Money Supply of M1

$X_6$: RMB Exchange Rate

$\mathcal{E}$: error term

**Model 3: Combine Macroeconomics Model**

$$HPI_C = a + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \varepsilon \quad (3)$$

Where:

$HPI_C$: China's Housing Price Index

$X_1$: Inflation rate

$X_2$: GDP Growth Rate

$X_3$: Interest Rate

$X_4$: Mortgage Rate

$X_5$: Money Supply of M1

$X_6$: RMB Exchange Rate

$\varepsilon$: error term

Model 1 utilising common macroeconomics variables, Model 2 would enhance the common macroeconomics variables whereas model 3 combining both Model 1 and 2 of the macroeconomics variables in order to design and to test whether the two set of information in conjunctions are able to produce superior result to the overall model.

## 3.6 Summary

Chapter 3 had clearly identify various independent variables that having impact on China's Housing Price Index from various previous research analysis, as well as had grouped them into 2 categories including Macroeconomics variables and Non-Macroeconomics Variables. From previous research studies, a theoretical framework had been developed, as well as these research hypotheses. Besides that, detail elaboration in research methodology, data collection and sampling, model development

and analysis technique had also been further discuss. Hence, various discussions on data analysis result will be presented in the following Chapter 4.

# CHAPTER 4

# EMPIRICAL RESULTS AND DISCUSSION

## 4.0 Introduction

Secondary data been collected from National Bureau of Statistic of China will be further analysing through EViews software. This chapter presenting the outcomes after various analysis techniques had been employed. Significant outcomes will be discussing further, through the measurement of frequencies, validity, reliability, correlations and coefficient value, followed by result of hypotheses testing and the process of interpretation.

## 4.1 Descriptive Analysis

**Table 4.1: Descriptive Analysis**

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| INF | 60 | 1.40 | 6.50 | 3.2033 | 1.39429 |
| GDP | 60 | .073 | .119 | .08510 | .012571 |
| INT | 60 | 1.91 | 3.10 | 2.7763 | .34384 |
| M_INT | 60 | 5.31 | 6.56 | 5.9875 | .38831 |
| M1 | 60 | 22428.70 | 34810.00 | 28829.9238 | 3293.41782 |
| RMB | 60 | 6.05 | 6.82 | 6.3905 | .22922 |
| HSG | 60 | 103.20 | 115.20 | 108.9453 | 4.92553 |
| Valid N | 60 | | | | |

INF: INFLATION RATE; GDP: GDP GROWTH RATE; INT: INTEREST RATE; M_INT: MORTGAGE RATE; M1: MONEY SUPPLY OF M1; RMB: RMB EXCHANGE RATE; HSG: HOUSING PRICE INDEX

Table 4.1 shows the result for each variables minimum value, maximum value, mean value and standard deviation value. For the independent variable namely Inflation Rate, the minimum value is at 1.4% and maximum value is at 6.5%. Furthermore, mean value for inflation is at 3.2% and standard deviation is at 1.39. This shows that China has recently been experiencing unstable inflation fluctuation that brought some negative impact towards the overall housing price index (Zhu, 2004). Following independent variable to be analyzed is GDP Growth Rate. The minimum value shows at 7.3% and maximum value is at 11.9%. Besides that, the mean value is at 8.51% and standard deviation is 1.26. This value had showed that China recently is enjoying a stable and sustainable growth rate, where it brought some negative impact towards housing price index (Stevenson, 2000). The next independent variable to be analyzed is Interest Rate. The minimum value shows at 1.91% and maximum value is at 3.1%. In addition, the mean value is at 2.78% and standard deviation is 0.34. This value had shown that the capital and the demand for investment are being affected by the availability of interest rates. As a result, it will affect the housing price index (Chen, 2011). Interest Rate is increasing due to counter the problem of inflation, hence making slightly negative impact towards housing price index.

Then, independent variable to be analyzed is Mortgage Rate. The minimum value shows at 5.31% and maximum value is at 6.56%. Furthermore, the mean value is at 5.99% and standard deviation is at 0.39. This value had shown that the Mortgage Rate of China's housing price index influence both sides of supply and demand (Wengao Lin, 2012). Mortgage rate in China is being influenced by general interest rate, sustain at high level and burdening the house buyer. Meanwhile, the following independent

variable to be analyzed is money supply of M1. The minimum value shows at 22428.7 and maximum value is at 34810. In addition, the mean value is at 28829.9 and standard deviation is at 3293.42. This value had shown that the money supply of M1 is highly significant on housing price index in China (Chen, 2011). This value had also shown overall money supply had increase due to economic growth, and hence causing some speculators are hoarding on some properties or houses.

Next, the following independent variable to be analyzed is RMB exchange rate fluctuation. The minimum value shows at 6.05 and maximum value is at 6.82. Then, the mean value is at 6.39 and standard deviation is at 0.23. This value had shown that the currency plays an important role in investing field whereas the relationship between housing prices and exchange rate is bound to be more closely (Shun, 2011). This value had shown RMB Currency Fluctuation has been suppressing by China's government recently in order to export better. However, this had cause some negative impact to housing price index due people rather hold properties or houses compare to holding cash money. Therefore, housing price index is being increased recently due to various causes.

## 4.2 Pearson Correlation Analysis

**Table 4.2: Pearson Correlations – Housing Price Index in China (Dependent Variable)**

| Independent Variables | Correlations | Significant level (at 5% level) |
|---|---|---|
| INF | -0.616 | 0.000 |
| GDP | -0.682 | 0.000 |
| INT | 0.327 | 0.000 |
| M_INT | -0.089 | 0.500 |
| M1 | 0.848 | 0.000 |
| RMB | -0.714 | 0.000 |

INF: INFLATION RATE; GDP: GDP GROWTH RATE; INT: INTEREST RATE; M_INT: MORTGAGE RATE; M1: MONEY SUPPLY OF M1; RMB: RMB FLUCTUATION; HSG: HOUSING PRICE INDEX

According to Table 4.2 above, the result clearly shows the relationship strength between various independent variables and dependent variable. Inflation is having moderate negative relationship with Housing Price Index at significant level. This result shows that decreasing of inflation rate will cause housing price index to increase. Next, the GDP growth rate is having moderate negative relationship with Housing Price Index at significant level. This result shows that decreasing of GDP will cause housing price index to increase. Furthermore, the interest rate is having small but definite positive relationship with Housing Price Index at significant level. This result shows that increasing of interest rate will cause housing price index increase. In addition, the monetary policy, M1 is having high positive relationship with Housing Price Index at significant level. This result shows that increasing of M1 will cause housing price index to increase. Next, the RMB exchange rate is having moderate negative relationship with Housing Price Index at significant level. This result shows that depreciating of RMB exchange rate will cause housing price index increase.

## 4.3 ADF Test

**Table 4.3: ADF Summary Result**

| Variables | Category | t-Statistic | Test Critical Value | Probability Value |
|---|---|---|---|---|
| INF | first different, none | -9.681 | -1.1945 | 0.0000 |
| GDP | level, intercept | -2.917 | -2.912 | 0.0494 |
| INT | first different, none | -7.55 | -1.1945 | 0.0000 |
| M_INT | first different, none | -6.673 | -1.1945 | 0.0000 |
| M1 | level, trend & intercept | -4.859 | -3.488 | 0.0010 |
| RMB | first different, none | -7.662 | -1.1945 | 0.0000 |
| HSG | first different, none | -7.549 | -1.1945 | 0.0000 |

INF: INFLATION RATE; GDP: GDP GROWTH RATE; INT: INTEREST RATE; M_INT: MORTGAGE RATE; M1: MONEY SUPPLY OF M1; RMB: RMB FLUCTUATION; HSG: HOUSING PRICE INDEX

According to Table 4.3, showing that each variable including independent and dependent variables, t-statistic value is outside boundary of test critical value, at significant level and different categories. INF is proven a stationary data at one per cent significant level and within the first different and none category. GDP is proven a stationary data at five per cent significant level and within the level and intercept category. INT is proven a stationary data at one per cent significant level and within the first different and none category.

Furthermore, M_INT is proven a stationary data at one per cent significant level and within the first different and none category. M1 is proven a stationary data at one per cent significant level and within the level and trend & intercept category. RMB is proven a stationary data at one per cent significant level and within the first different and none category. Lastly, the dependent variable namely is also proven a stationary data at one per cent significant level and within the first different and none category. This result is showing that the data is suitable to analyse by using linear equation.

## 4.4 Multiple Regression Analysis

### 4.4.1 Model 1: Common Macroeconomics Variables

According to Table 4.4, showing the Model 1 Adjusted R Square value at the level of 0.595; which is referring to overall Common Macroeconomics Variables including INF, GDP and INT could explain as much as 59.5% of influences on China's HSG. Besides that, F Statistic value is at the level of 29.847 is significant at one per cent significant level. This value shows that overall Common Macroeconomics Variables indeed having significant impact towards China's HSG. This value also had proven that Model 1 is worth to continue with its analysis.

**Table 4.4: Model 1 Common Macroeconomics Variables**

Dependent Variable: HSG
Method: Least Squares
Included observations: 60

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 1.836654 | 0.040971 | 44.82780 | 0.0000 |
| INF | -0.032645 | 0.010929 | -2.987071 | 0.0042 |
| GDP | -0.232148 | 0.045834 | -5.064946 | 0.0000 |
| INT | -0.077369 | 0.041606 | -1.859532 | 0.0682 |

| | | | |
|---|---|---|---|
| R-squared | 0.615231 | Mean dependent var | 2.036773 |
| Adjusted R-squared | 0.594619 | S.D. dependent var | 0.019605 |
| S.E. of regression | 0.012483 | Akaike info criterion | -5.864631 |
| Sum squared resid | 0.008726 | Schwarz criterion | -5.725008 |
| Log likelihood | 179.9389 | Hannan-Quinn criter. | -5.810016 |
| F-statistic | 29.84735 | Durbin-Watson stat | 0.215061 |
| Prob(F-statistic) | 0.000000 | | |

INF: INFLATION RATE; GDP: GDP GROWTH RATE; INT: INTEREST RATE; HSG: HOUSING PRICE INDEX

According to Table 4.4, INF is having a significant negative impact on HSG at one per cent significant level. The coefficients value shows at -0.032, referring to when there is one unit increase in INF, HSG will decrease as much as 0.032. Furthermore,

GDP is also having a significant negative impact on HSG at one per cent significant level. The coefficients value shows at -0.232, referring to when there is one unit increase in GDP, HSG will decrease as much as 0.232. However, INT is having insignificant negative impacts on HSG at one per cent significant level. The coefficients value shows at -0.077, referring to when there is a unit increase in INT, HSG will decrease as much as 0.077. Hence, result from Table 4.3 had formed the below model:

$$HPI_C = c - 0.032INF - 0.232GDP - 0.077INT + \varepsilon$$

### 4.4.2 Model 2: Enhanced Macroeconomics Variables

**Table 4.5: Model 2 Enhanced Macroeconomics Variables**

Dependent Variable: HSG
Method: Least Squares
Included observations: 60

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 1.349982 | 0.396431 | 3.405335 | 0.0012 |
| M_INT | -0.335860 | 0.043829 | -7.663032 | 0.0000 |
| M1 | 0.283350 | 0.052627 | 5.384162 | 0.0000 |
| RMB | -0.391624 | 0.190026 | -2.060895 | 0.0440 |

| | | | |
|---|---|---|---|
| R-squared | 0.860044 | Mean dependent var | 2.036773 |
| Adjusted R-squared | 0.852547 | S.D. dependent var | 0.019605 |
| S.E. of regression | 0.007528 | Akaike info criterion | -6.875947 |
| Sum squared resid | 0.003174 | Schwarz criterion | -6.736324 |
| Log likelihood | 210.2784 | Hannan-Quinn criter. | -6.821332 |
| F-statistic | 114.7089 | Durbin-Watson stat | 0.585861 |
| Prob(F-statistic) | 0.000000 | | |

M_INT: MORTGAGE RATE; M1: MONEY SUPPLY OF M1; RMB: RMB FLUCTUATION; HSG: HOUSING PRICE INDEX

According to Table 4.5, showing the Model 2 Adjusted R Square value at the level of 0.853; which is referring to overall Enhanced Macroeconomics Variables including M_INT, M and RMB could explain as much as 85.3% of influences on China's HSG. Besides that, F Statistic value is at the level of 114.7089 is significant at

one per cent significant level. This value shows that overall Common Macroeconomics Variables indeed having significant impact towards China's HSG. This value also had proven that Model 2 is worth to continue with its analysis.

According to Table 4.5, M_INT is having a significant negative impact on HSG at one per cent significant level. The coefficients value shows at -0.336, referring to when there is one unit increase in M_INT, HSG will decrease as much as 0.336. Furthermore, M is having a significant positive impact on HSG at one per cent significant level. The coefficients value shows at 0.283, referring to when there is one unit increase in M, HSG will increase as much as 0.283. However, RMB is having significant negative impacts on HSG at five per cent significant level. The coefficients value shows at -0.391, referring to when there is a unit increase in INT, HSG will decrease as much as 0.391. Hence, result from Table 4.4 had formed the below model:

$$HPI_C = c - 0.336M\_INT + 0.283M - 0.391RMB + \mathcal{E}$$

### 4.4.3 Model 3: Combine Macroeconomics Variables

**Table 4.6: Model 3 Combine Macroeconomics Variables**

Dependent Variable: HSG
Method: Least Squares
Included observations: 60

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 1.773167 | 0.425276 | 4.169452 | 0.0001 |
| INF | -0.003781 | 0.009408 | -0.401893 | 0.6894 |
| GDP | 0.065013 | 0.045179 | 1.438997 | 0.1560 |
| INT | -0.100498 | 0.039924 | -2.517238 | 0.0149 |
| M_INT | -0.240173 | 0.076514 | -3.138923 | 0.0028 |
| M1 | 0.279291 | 0.054318 | 5.141766 | 0.0000 |
| RMB | -0.843105 | 0.256453 | -3.287564 | 0.0018 |

| | | | |
|---|---|---|---|
| R-squared | 0.877801 | Mean dependent var | 2.036773 |
| Adjusted R-squared | 0.863967 | S.D. dependent var | 0.019605 |
| S.E. of regression | 0.007231 | Akaike info criterion | -6.911620 |
| Sum squared resid | 0.002771 | Schwarz criterion | -6.667280 |
| Log likelihood | 214.3486 | Hannan-Quinn criter. | -6.816046 |
| F-statistic | 63.45304 | Durbin-Watson stat | 0.508956 |
| Prob(F-statistic) | 0.000000 | | |

INF: INFLATION RATE; GDP: GDP GROWTH RATE; INT: INTEREST RATE; M.INT: MORTGAGE RATE; M1: MONEY SUPPLY OF M1; RMB: RMB FLUCTUATION HSG: HOUSING PRICE INDEX

According to Table 4.6, showing the Model 3 Adjusted R Square value at the level of 0.864; which is referring to overall Enhanced Macroeconomics Variables including M_INT, M and RMB could explain as much as 86.4% of influences on China's HSG. Besides that, F Statistic value is at the level of 63.453 is significant at one per cent significant level. This value shows that overall Common Macroeconomics Variables indeed having significant impact towards China's HSG. This value also had proven that Model 3 is worth to continue with its analysis.

According to Table 4.5, Model 3 had shown that there are two independent variables are not significantly influencing on HSG, namely INF and GDP. Hence,

WALD Test had been implemented to examine the possibility of re-analyse of Model 3 through variables elimination.

### 4.4.4 WALD Test

**Table 4.7: WALD Test Summary Result**

| | t-statistic / F-statistic | Probability |
|---|---|---|
| Removing only INF | -0.457442 | 0.6492 |
| Removing only GDP | 1.279754 | 0.2062 |
| Removing INF and GDP | 0.820078 | 0.4459 |

INFLATION RATE: INF; GDP GROWTH RATE: GDP

According to table 4.7, WALD test result had shown that both insignificant variables from Model 3 can either remove independently or overall. By removing only the variable namely INF, p value is at 0.6492 where it is insignificant at one per cent significant level. Meanwhile, by removing only the variable namely GDP, p value is at 0.2062 where it is insignificant at one per cent significant level. Lastly, by removing both insignificant variables at the same time, p value is at 0.4459 where it is also insignificant at one per cent significant level. Hence, the final result shown that both insignificant variables can be removes, and hence Model 3 can be re-analyse.

### 4.4.5 Model 4: Finalize Macroeconomics Variables

**Table 4.8: Model 4 Finalize Macroeconomics Variables**

Dependent Variable: HSG
Method: Least Squares
Included observations: 60

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 1.692540 | 0.407574 | 4.152715 | 0.0001 |
| INT | -0.091144 | 0.038478 | -2.368714 | 0.0214 |
| M_INT | -0.263894 | 0.051941 | -5.080645 | 0.0000 |
| M1 | 0.256594 | 0.051831 | 4.950580 | 0.0000 |
| RMB | -0.688533 | 0.221528 | -3.108109 | 0.0030 |

| | | | |
|---|---|---|---|
| R-squared | 0.873000 | Mean dependent var | 2.036773 |
| Adjusted R-squared | 0.863764 | S.D. dependent var | 0.019605 |
| S.E. of regression | 0.007236 | Akaike info criterion | -6.939753 |
| Sum squared resid | 0.002880 | Schwarz criterion | -6.765225 |
| Log likelihood | 213.1926 | Hannan-Quinn criter. | -6.871486 |
| F-statistic | 94.51786 | Durbin-Watson stat | 0.475837 |
| Prob(F-statistic) | 0.000000 | | |

INT: INTEREST RATE; M._INT: MORTGAGE RATE; M1: MONEY SUPPLY OF M1; RMB: RMB FLUCTUATION HSG: HOUSING PRICE INDEX

According to Table 4.8, showing the Model 4 Adjusted R Square value at the level of 0.864; which is referring to the Finalize Macroeconomics Variables including INT, M_INT, M1 and RMB could explain as much as 86.4% of influences on China's HSG. Besides that, F Statistic value is at the level of 94.51786 is significant at one per cent significant level. This value shows that overall Common Macroeconomics Variables indeed having significant impact towards China's HSG.

According to Table 4.8, INT is having a significant negative impact on HSG at five per cent significant level. The coefficients value shows at -0.091, referring to when there is one unit increase in INT, HSG will decrease as much as 0.091. Furthermore, M_INT is having a significant negative impact on HSG at one per cent significant level. The coefficients value shows at -0.264, referring to when there is one unit increase in

M_INT, HSG will decrease as much as 0.264. However, M is having a significant positive impact on HSG at one per cent significant level. The coefficients value shows at 0.257, referring to when there is a unit increase in INT, HSG will increase as much as 0.257. Lastly, RMB is also having a significant negative impact on HSG at one per cent significant level. The coefficients value shows at -0.689, referring to when there is one unit increase in INT, HSG will decrease as much as 0.689. Hence, the final result from Table 4.8 had formed the below model:

$$HPI_C = c - 0.091INT - 0.264M\_INT + 0.257M - 0.689RMB + \varepsilon$$

This result does meet with the hypothesis of this research where Interest Rate indeed significantly influencing on Housing Price Index. This finding is tally with interest rates and inflation rates have a strong correlation to the fluctuations of housing prices in China (Tingting, 2012) and the changing interest rates is significantly important for homeowners as they have a direct influence on housing price index (Guang, 2011). This result is also consistent with other research including Hao (2010), Jing Wu (2012) and Guang (2011).

Meanwhile, result from Table 4.7 does meet with the hypothesis of this research where Mortgage Rate indeed significantly influencing on Housing Price Index. This finding is tally with mortgage loans play crucial roles in most buyers buy the house as the housing prices in major cities in China like Beijing, Shanghai (Shun, 2011). Furthermore, Barnett and Brooks (2006) showed that the amount of investments in housing market in China is weakly correlated with household income and mortgage rate.

This result is also consistent with other research including Wu (2013), Liu (2012) and Wengao (2012).

Furthermore, this result does meet with the hypothesis of this research where money supply of M1 indeed significantly influencing on Housing Price Index. This finding is tally with Martin and Morrison (2008) stated that hot money flow into China was always been cited as a key reason for the home price increase in China and Zhang and Fung (2006) showed that wrap one section hot money flow has a positive outcome on the home price growth, without calculating for the impact of monetary policy variables such as interest rate or growth in money supply. This result is also consistent with other research including Guang (2012), Chen (2012) and Arrau (1995).

Lastly, result from Table 4.7 does meet with the hypothesis of this research where RMB Exchange Rate indeed significantly influencing on Housing Price Index. This finding is tally with Stenvenson (2010) China's housing prices and RMB nominal exchange rate have a long-term stable co integration relationship, which is a positive correlation and currency plays an important role in investing field (Guang 2012) as well as RMB appreciation will cause housing price increases (Yao, 2011). This result is also consistent with other research including Tingting (2011), Haocheng (2010) and Xingna (2011).

## 4.5 Summary

The summary of this research empirical result had shown in Table 4.9 below. Hence, from a series of analysis above, there are 4 hypotheses are accepted and 2 hypotheses are rejected. Hence, this result shows that, among various independent variables, there is only INT, M.INT, M1 and RMB is having significant impact towards China Housing Price Index.

**Table 4.9: Summary of Findings**

| | Independent Variables | Impacts on China's Housing Price Index | 5% Significant Level |
|---|---|---|---|
| Model 1: Common Macroeconomics Variables | 1. Inflation Rate | -0.032645 | 0.0042 |
| | 2. GDP Growth Rate | -0.232148 | 0.0000 |
| | 3. Interest Rate | -0.077369 | 0.0682 |
| Model 2: Enhanced Macroeconomics Variables | 1. Mortgage Rate | -0.335860 | 0.0000 |
| | 2. Money Supply of M1 | 0.283350 | 0.0000 |
| | 3. RMB Exchange Rate | -0.391624 | 0.0440 |
| Model 3: Combine Macroeconomics Variables | 1. Inflation Rate | -0.003781 | 0.6894 |
| | 2. GDP Growth Rate | 0.065013 | 0.1560 |
| | 3. Interest Rate | -0.100498 | 0.0149 |
| | 4. Mortgage Rate | -0.240173 | 0.0028 |
| | 5. Money Supply of M1 | 0.279291 | 0.0000 |
| | 6. RMB Exchange Rate | -0.843105 | 0.0018 |
| Model 4: Finalise Macroeconomics Variables | 1. Interest Rate | -0.091144 | 0.0214 |
| | 2. Mortgage Rate | -0.263894 | 0.0000 |
| | 3. Money Supply of M1 | 0.256594 | 0.0000 |
| | 4. RMB Exchange Rate | -0.688533 | 0.0030 |

# CHAPTER 5

# CONCLUSION

## 5.0 Introduction

Previous chapter had provided a series of empirical result based on MRA model. Overall, four different models had analysed including Model 1: Common Macroeconomics Variables, Model 2: Enhanced Macroeconomics Variables, Model 3: Combine Macroeconomics Variables and Model 4: Finalise Macroeconomics Variables. The empirical result had shown that overall 4 hypotheses are accepted due to significant impact towards dependent variable, and 2 hypotheses are rejected due to insignificant impact towards dependent variable. In this chapter, a summary of the findings is provided. It is then followed by implications of the study. A discussion on the limitations and recommendation for future research conclude the chapter.

## 5.1 Discussion

As a conclusion, upon completion of this research, this research would be able to identify the factors affecting the housing prices index in China. The independent variables are using to analyse the housing price index are Inflation Rate, GDP Growth Rate and Interest Rate, Mortgage Rate, Money Supply of M1 and RMB Exchange Rate. Every independent variable is on a monthly basis, ranging from year 2010 to year 2014.

The research was conducted to identify and analyse the impact of each Independent Variables on China's Housing Prices Index.

**Model 1: Common Macroeconomics Variables**

Model 1 is clearly shows that Inflation Rate and GDP Growth Rate are having significant influences on China's Housing Price Index, at reverse relationship. Inflation Rate and GDP Growth Rate is influencing on China's Housing Price Index at -0.033 and -0.232. However, Interest Rate showing an insignificant influencing on China's Housing Price Index, hence this variable under Model 1 is possible to eliminate from discussion. Above empirical result had shown that whenever there is a decrease in Inflation Rate, it is making housing price in China to be higher (Hongli, 2010) due to lower inflation will make money value to appreciate. This consequence will cause relatively higher purchase power, more demand on house and hence making a higher house price in China (Bond and Seiler, 2008). Besides that, a decrease in GDP Growth Rate is causing population in China has more worried on the market and they are intend to hold properties such as a house instead of cash money (Zhu, 2011). Hence, increase in housing demand is significantly raising housing price in China.

**Model 2: Enhanced Macroeconomics Variables**

Model 3 is clearly shows that each Enhanced Macroeconomics Variables are having significant influences on China's Housing Price Index. Mortgage Rate and RMB Exchange Rate is reversely influencing on China's Housing Price Index at -0.336 and -0.392. Besides that, Money Supply of M1 is significant influencing on China's Housing

Price Index at 0.283. This result had shown that when Mortgage Rate had decreased, it is providing a lower borrowing cost for China's population (Jianbang, 2011). This will made China's population more willingly to borrow money to purchase a house. Furthermore, depreciation of RMB Exchange rate will shift the intention of holding money towards holding properties such as a house, hence encourage more buying on house (Guang 2012). Lastly, increase in Money Supply of M1 shows that there is increase in purchase power and hence causing China's population are more willingly to purchase more housing (Yizhang, 2009). Above overall actions had increase demand on housing, and hence significantly raising housing price in China.

**Model 4: Finalize Macroeconomics Variables**

Model 4 is the finalise model where had remove two insignificant independent variables namely Inflation rate and GDP Growth Rate. This finalise Model 4 result shows that the overall independent variables which affecting China's housing price index are Interest Rate, Mortgage Rate, Money Supply of M1 and RMB Exchange Rate. Even though from Model 1 showing that Inflation Rate and GDP Growth Rate is influencing on China's housing price index, however it is not at significant level in Model 4. This is due to whenever inflation rate had decrease, not necessary will causing housing price to increase. According to Yee (2013), inflation rate can be caused by other price increases such as medical price, food price and others. Furthermore, GDP increase is not showing that there is an equal distribution in among China's population (Yujian, 2011). Hence, even though higher purchase power come with higher GDP, it is not necessary reflect the overall China's population rushing to purchase houses.

According to Model 4, Interest Rate, Mortgage Rate, Money Supply of M1 and RMB Exchange Rate are having significant influences on China's Housing Price Index. Interest Rates strongly reflect the capital and the demand for investment are being affected by the availability of interest rates and consequently will influence on housing price index (Chen, 2011). Additionally, interest rates have a strong connection to the fluctuations of housing prices in China (Tingting and JingWu, 2012). Furthermore, this result clearly shows that when there is a decrease in general interest rate in China, it will provide better credit facilities for China's population (Guang, 2011). Hence, with a better convenient of credit facilities, it is increasing general purchase power and it is possible to increase the demand on housing purchase. This action is significantly raising China's housing price.

Next, Mortgage Rate is playing a vital role most of the house purchasers and investors (Wengao, 2012). Mortgage Rates in China is being affected by common general interest rates, sustain at high level and which will be burdening the buyers of house. Hence, it is necessary to consider mortgage rates and the possible changes in the trends for purchasing housing which is based on this to reduce the cost of pay in housing. Moreover, Money Supply of M1 is define as hot money flow into China and was always been cited as a key reason for the home price increase in China (Martin and Morrison, 2008). In addition, Money Supply of M1 is highly considerable banking industry in China which made by most of the banks are either state-owned or state holding in China (Chen, 2012). As a result, such reformation of money supply will help allocate the housing prices more efficiently. Throughout particular mortgage credit policy and

general monetary policy which has played a significant role in the dynamics of the price growth of the housing market (Clarida, 2010).

According to Yao (2011), RMB depreciation will cause housing price to increases and currency indeed playing a vital role in China's housing industry. Subsequently, housing price which has high returns won the good turn of international capital for its double properties as consumer goods and investment goods (Guang, 2012). With the rising internationalization of the housing market investment manners, the relationship between housing prices and the exchange rate is bonding to be more closely. Precisely, the expected depreciation of RMB promoted the rise of housing prices due to people had shift their initial intension of holding cash money towards holding properties. Hence, the continuous rise of domestic housing prices attracted global financial capital to look for better investment opportunities in China, which accelerated the drive of growing house prices (Haocheng. 2010).

Lastly, Model 4 also had shown the significant sequences influences of the four independent variables on China housing price index. RMB Exchange Rate is making the greatest influences on China Housing Price Index, followed by Mortgage Interest rate, Money Supply of M1 and lastly is Interest Rate. This result showing that China's population is paying high attention on their own RMB Exchange Rate fluctuation, and they have the intention to shift their assets holding, from cash money to property whenever there is depreciation in RMB Exchange Rate.

## 5.2 Implications of the study

The contributions of this research are discussed and the implications of the findings for research are also emphasised. First and foremost, one major important contribution of this research is to examine the impact of Common Macroeconomics Variables and Enhanced Macroeconomics Variable on China's Housing Price Index. Most of the housing supply studies in China that are conducted at the national and regional level, in this research, the impact is examined at the local level, providing more evidence about local housing market analysis in China. In addition this research has highlighted the factors involved in estimating housing price index in China. Finally, the analysis of six different independent variables using the data obtained to explain the significantly impact on the dependent variable.

## 5.3 Limitations of the study

One significant shortcoming may relate to this research was limited to time and cost constraint either, in which the time duration could be literally constricted. This has limited the validity of this research and the time of range of research period. Future research could look into this limitation and to get more time periods to come out with a more solid and precise research.

Furthermore, the research is only limited to China only. However, the research failed to cover more diverse range of the data from different countries to make comparisons on the independent variables due to the available independent variables are limited. Therefore, future research could look into other countries as well to make the comparisons regarding the housing price index.

Moreover, the independent variables could also be added and examined by future research in the event of this area of research being continued. This is because of only several independent variables will constraint the interest and observation of the research which was initially wanted to examine some other Macroeconomic variables in the research in order to increase the accurately and the validity of the data. Additionally, the multiple regression analysis models being used in this research may not fulfilled the requirements of the data accordingly. Therefore, more models can be used for next study in order to increase the accuracy of the data obtained.

## 5.4 Recommendations for future research

A more diversified range of independent variables could comprise a more study research. For example, future research might include broader independent variables from different countries. Besides, the time durations given should be prolonged to let the research has more time to look into this aspect precisely. The costs allowed in this research should be increased in order to get a more completed data from the source given.

Alternatively, future research might further inspect into the other types of independent variables. Also, it is suggested that future research could examine into this relative area, for instance, different variables may have different results and perception towards different countries approaches. Then, it is also encouraged that the research should be done continuously from time to time in order to observe the change and updated information regarding the housing price index.

This research basically reviewed selected independent variables affecting the housing prices index in China on several important independent variables. Consequently, future research might add the numbers of different countries to compare the results and analysis the housing price index is it being affected by same independent variables. In addition, the cost to execute the research also limited due to the overseas country. So, in future research, the cost of the research can be adding by sponsors or institutions of university in order to obtain a more comprehensive data and information.

Last but not least, future research could test on the gap analysis of independent variables and look into other perspectives instead of the six perspectives only. Through sufficient information updated in future research, it helps to enhance the buyers, researchers by reducing the uncertainty on buying the housing in future. It enables to enhance decision making based on available updated information on websites or journals. Therefore, the buyers are able to compete in the competitive housing market and grab the investments opportunity with immediate accurate information without any hesitations. Besides, the buyers and investors also will feel satisfy with convenience and efficiency latest information updated to enable them to have more investing business opportunities and growth in future.

## 5.5 Overall Conclusion

This research has fundamentally examined selected literatures on China's Housing Price Index from several significant Common Macroeconomic Variables Enhanced Macroeconomics variables. Based on the research, it can conclude that Interest Rate, Mortgage Rates, Money Supply of M1 and RMB Exchange Rate are significantly impact on China's Housing Price Index. Therefore, this research found out that the reason behind the rising of housing price index in China may due to these few factors in recent years.

Additionally, the evidence from research also suggested that on-going interest rate liberalisation will increase the effectiveness of indirect monetary policy and the effectiveness of using interest rates as determinants of housing prices. Furthermore, China's transition to more market-based monetary devices will be necessary to successfully to deliver a greater impact on China's Housing Price Index.

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