HOUSING BUBBLE PHENOMENA AND THEIR DETERMINANTS IN KUALA LUMPUR

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ABSTRACT

Housing could be perceived as both a principal of residence and an investment asset. In the past 15 years, this asset class witnessed a dramatic increase in prices, especially in the Kuala Lumpur. The rampant increase in house prices has widening the gap between a house's expected value and its fundamental price. A wide deviation of house price from its fundamental price could cause a housing bubble, which would have a negative impact on the financial market. This paper examines the potential emergence of a housing bubble by using rent to price ratio and employing economic fundamental factors to estimate housing fundamental value, and take difference between actual house price and fundamental value as bubble. Based on the time series regression of the economic fundamental factors, shows that properties in Kuala Lumpur were priced at 4.2% and 11.3% above their fundamental value in years 2012 and 2013 respectively. This finding also were supported by the simple test indicator of rent to price ratio where the ratio were declining drastically after 2011. With the divergence of market price and fundamental price shows an increasing gap each year proved that housing bubble are likely to appear.

Keywords: Housing, Bubble, Assets Price Bubbles, Kuala Lumpur, Time Series, Rent to Price Ratio

ABSTRAK

Rumah boleh dilihat dari segi dua aspek yakni sebagai kediaman dan juga sebagai aset pelaburan. Dalam tempoh 15 tahun kebelakangan ini, kelas aset ini menyaksikan peningkatan harga yang dramatik terutamanya di Kuala Lumpur. Peningkatan harga yang mendadak ini telah meluaskan di antara harga rumah asas dengan harga rumah pasaran. Perbezaaan jurang yang besar di antara harga rumah pasaran dengan harga rumah sebenar boleh membawa kepada gelembung rumah, yang akan memberi kesan negatif kepada pasaran kewangan. Kajian ini mengkaji kemungkinan akan kemunculan gelembung perumahan dengan menggunakan dua jenis kaedah iatu nisbah di antara indeks sewa rumah dengan harga indeks rumah dan kaedah keduanya adalah dengan menggunakan kaedah regresi dengan mengambilkira faktor asas ekonomi untuk menganggarkan indeks nilai sebenar rumah. Perbezaan yang terbentuk di antara dua jenis indeks harga rumah ini akan memberikan gambaran akan kemungkinan gelombong perumahan. Berdasarkan regresi ini, satu faktor asas ekonomi, menunjukkan bahawa hartanah di Kuala Lumpur berharga 4.2% dan 11.3% lebih tinggi dari nilai asas mereka pada tahun-tahun 2012 dan masing-masing 2013. Penemuan ini juga telah disokong oleh ujian nisbah indeks sewa rumah dengan indeks rumah di mana nisbah yang telah menurun secara drastik selepas 2011. Dengan perbezaan harga pasaran dan harga asas harga menunjukkan jurang yang semakin meningkat saban tahun membuktikan bahawa terdapat kemungkinan untuk berlakunya gelombong perumahan di Kuala Lumpur.

Kata Kunci: Perumahan, Gelembung Pelaburan, Aset, Kuala Lumpur, Kajian Masa, Krisis Subprima, Kediaman

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CHAPTER 1

INTRODUCTION

1.1 Background

Financial crisis over the years have been a feature of the economic cycle in both the advanced and developing countries. It is a well-known fact that the 1997 financial crisis and the global financial crisis in 2008 happened primarily due to the burst of housing bubble. Housing bubbles are carefully monitored by the regulators for it often leads to a surge housing loans default and corporate bankruptcy which eventually pull a country economy into recession. For this reason, regulators worldwide strive to contain the rapid growth in house prices before it developed into a bubble. In Malaysia for instance, house prices have escalated during the past four years by nearly 47% for the national average and 58% for Kuala Lumpur (NAPIC, 2013). In response to these predicaments, Malaysian government has resorted to a two pronged approach to contain the price hike in the housing sector. On the demand side, property-cooling measures are initiated effective January 2014 to curb speculative activities in the property market. The cooling measure includes the removal of Developer Interest Bearing Scheme (DIBS)[1], the hike in the real property gain tax (RPGT) from 15% to 30%, the decrease in margin of financing to 70% for the purchase of third property and a more stringent housing loan approval criteria On the supply side, serious efforts are made to increase the supply of affordable houses in prime areas in Malaysia through the Perbadanan PR1MA Malaysia[2] National Housing Department and Syarikat Perumahan Negara Berhad

[1] DIBS is a scheme where the developer will bear the interest payment of the buyer's mortgage loan during the construction period. Buyer will only pay the deposit and will serve the loan once the house is completed. For speculator, they will take this opportunity to 'flip' the property due to its low deposit. On the other hand, if the project s abandon, the buyer still need to bear the cost of whatever amount has been disbursed to the developer.

[2] PRIMA is a government owned company under the Prime Minister Department which the role to plan, develop affordable housing between the price of RM100,000 to RM400,000 for the middle income group in Malaysia. It is govern under PR1MA Act 2012

(SPNB). Under Budget 2015 that was announced, the government has taken measure to increase the housing supply by building;

i. 80,000 unit of affordable housing under build by PR1MA for household income between RM8,000 to RM10,000
ii. 26,000 unit of houses under the People's Housing Programme managed by the National Housing Department
iii. 12,000 Rumah Mesra Rakyat and 5,000 unit of Rumah Idaman Rakyat by SPNB.

This will then help to increase the housing supply in the market. This strategy is guided by the economic theory which dictates that an increase in the supply of new houses will lead to a drop in house price.

Besides for occupancy purposes, property, as one of the paramount asset class, is a highly demanded investment assets in the ASEAN economy in the past decade. The large transaction volume in this industry appears to have an impact on the economic stability of the country and the region. The investors' main objective in purchasing the housing unit is capital gain through the increase in property prices. This profit chasing behaviour of investors is likely to lead to sudden surge in property prices particularly during the period of hot markets where the market is crowded with overoptimistic investors. This tends to increase the volatility of the market and lead to a bubble phenomenon. Given the negative effects of the bubble the regulators do closely monitor and attempt to detect the determinants of the housing bubble in order to manage and minimize the impacts of potential financial crisis.

The concerns of the ramification of crisis are valid evidenced by the Asian Financial Crisis experiences. Table 1.1 shows how the Asian Financial Crisis had a negative effect on the growth of house prices in seven Asian countries. Hong Kong, Thailand, South Korea and Singapore manage to stimulate back the real estate development after the crisis period. This is different for Philippines where it is badly affected and the recovery rate is much slower compare to the other region. In the Asian region, Malaysia ranked seventh in terms of increases in the house price index, following the Asian Financial Crisis. The Asian Financial

Crisis seems not to effect Malaysia badly compare to the other region. Malaysia managed to gauge the crisis and manage its real estate market at a moderate way. The house price increase is much slower after the crisis compare to the other countries.

Table 1.1.1:
House Price Indexes Movement during and after the Asian Financial Crisis for Selected Asian countries

Country	During Crisis Period	After Crisis Period
Hong Kong	-61.34% (1997-2003)	+60.72% (2003-2005)
Thailand	-19.54% (1997-1999)	+29.34% (1999-2006)
South Korea	-20.31% (1997-2001)	+24.28% (2001-2003)
Singapore	-45.57% (1996-1998)	+20.31% (1997-2001)
Philippines	-56.20% (1997-2000)	+14.11% (2004-2005)
Indonesia	-48.71% (1995-1999)	+13.59% (1999-2005)
Malaysia	-11.53% (1997-1999)	+10.70%(1999-2005)

Source: Global Property Guide report (http://www.globalpropertyguide.com)

House Price Growth in 2013

In Kuala Lumpur, the average value of residential properties increased 37.66% to RM673,249 in 2013 from RM489,052 in 2012, while Penang recorded a 31.45% increase from RM304,858 to RM400,738 in the same period. In Selangor, there was a 19.91% increase in 2013 to RM405,895 from RM338,508 in 2012. Although the overall Malaysian property market recorded a contraction of 10.9% in volume terms, there was still a marginal increase in value of 6.7%. In 2013, 381,130 transactions worth RM152.37 billion were recorded compared to 427,520 sales and RM142.84 billion in value in 2012. The value is the price that is transacted during the sales. The dynamic movement in house prices would affect the housing indexes. Based on a recent report by the Malaysian Department of Statistics, the annual house price index in Malaysia for the period 2000 to 2014 is as shown in the table below;

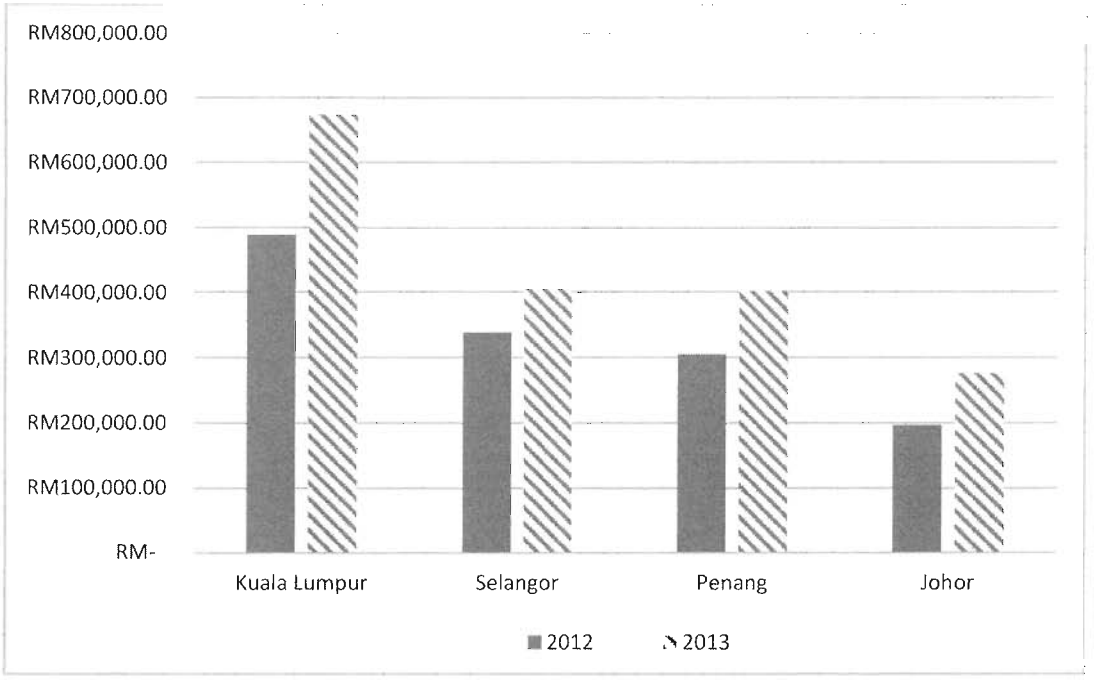

Chart 1:

Residential Property Prices in 2012 and 2013

Table 1.2 shows that the house price index increased rapidly after the year 2007. This coincided with the period of low interest regime in Malaysia where base lending rate (BLR) was brought down to as low as 5.5% in 2009. House financing became affordable and accessible to potential buyers and investors alike during this period. Cheap financing costs were likely to be factors led to the house prices, especially in Klang Valley, to increase dramatically as shown above. This shows an increasing concerned of the possibilities of housing bubble to occur in Malaysia. Nonetheless, there are no specific empirical studies to prove on the housing bubble phenomena in Malaysia. A recent survey by Sime Darby in collaboration with University Malaya indicated that the property market in the Klang Valley is still accessible and affordable (Surach, 2014). It should be pointed out that the 1,183 respondents of this study comprised of homeowners with monthly income of RM14,580. This is high when compared to the average gross monthly income of RM5,742 for urban

householders in Malaysia in 2012. So far there have been very few studies undertaken to prove the existence of the housing bubble in Malaysia.

Table 1.1.2:
Malaysian House Price Index for All Types of Houses (2000- 2013)

Year	Malaysia House Price Index	Annual Change (%)
2000	100	
2001	101.1	1.1
2002	103.6	2.5
2003	107.7	4.0
2004	112.9	4.8
2005	115.6	2.4
2006	117.8	1.9
2007	124.0	5.3
2008	129.8	4.7
2009	131.8	1.5
2010	140.7	6.7
2011	154.6	9.9
2012	172.8	11.8
2013	192.9	11.6

1.2 Problem Statement

When bubble occurs in the financial market, the costs are expensive because it exposes the country to bubble crashes and capital reversal (Caballero & Krishnamurthy, 2005). The capital reversal caused from the crash in the housing market brings about stronger negative impact compared to stock or equity market breakdown. According to Hebiling & Terrones (2003), this is due to the characteristics of housing as an asset with high transaction costs, illiquidity and heterogeneity. Therefore, when the housing market crashes, it brings greater

wealth effect on consumption compared to stock market bubbles. Case et al. (2005) also concurs that the wealth effect triggered by the changes in residential property prices is bigger than that of other financial assets. As a matter of fact, Helbling and Terrones (2003) proved that during the period 1970 to 2002, the downturn in the US housing market caused by the bursting of housing bubble, was larger compared to the equity price bubble.

When the house price bubble hits the financial market, the adjustment takes a longer time because the house prices tend to return to the equilibrium price level. Therefore, inefficient house prices remain in the market for a longer period (Helbling & Terrones, 2003). This period lasts about twice as long compared to stock market collapse (Malpezzi & Wachter, 2005). During the period 1970 to 2002, 15 OECD (Organisation for Economic Co-operation and Development) countries recorded output losses and long periods of recession caused by the housing bubble crisis. The respective GDPs for these countries took four years to recover to their pre-crisis level. This indicates the severity of the impact on the economy caused by the bursting of the housing bubble.

Looking at the current scenario on what Malaysia is facing as shown in Chart 1.1, the housing market seems to show sign of bubble. If housing bubble were to occur in Malaysia, it will bring a big impact to the economy thus may affect our aim of becoming a high income nation by 2020. This is because, as explain by Malpezzi & Wachter (2005) the recovery rate of the housing market crash will take twice as long as the stock market. With Malaysian market being much smaller that the U.S market, the recovery rate may take longer compare to the US.

Kuala Lumpur being the capital city of Malaysia can be a good testing ground to housing bubble phenomena. Being the highest the state in term of house price increase, this could due to two possible reasons which is increase in demand or there are too many speculations going around. If the demand was driven by speculation, then the market price does not truly represent the true demand. When the demand no longer could support the increasing supply, then properties overhang may happens once again as what had happened to Malaysia during

1999 to 2001. Abandon project that was recorded during that period caused house buyer to continue to bear the cost from their approved financing.

Therefore, the problem when a housing bubble occurs in Malaysia not only it will worsen the housing affordability problems, it also brings negative impact on the economy and at the end recession in Malaysia market may occur once again

1.3 Research Questions:

The two main research questions of this proposal are:

i. Is there a housing bubble in Kuala Lumpur?
ii. What are the determinants of the property prices in Kuala Lumpur?

The first research question looks at the existence and magnitude of property bubbles by comparing real property prices with its intrinsic value. The second research question provides empirical evidence of the determinants of property prices in Kuala Lumpur.

1.4 Research Objectives

The two main objectives of this research are:

1. To identify the existence and magnitude of property bubble in Kuala Lumpur.
2. To identify the determinants of house prices in Kuala Lumpur.

1.5 Significance of the Study

With the exception of anecdotal information which suggests Malaysian property market is presently in a bubble, no study has so far provides a careful analysis on the existence and the magnitude of property bubbles, if any, in Malaysia. One exception is Hussain at al. (2012) who argued for the presence housing bubble in five districts in Klang Valley, i.e. Ampang, Batu, Kuala Lumpur, Petaling and Setapak during 2005 to 2010. Bubble was measured as the difference between house price and the intrinsic value. However the computation of intrinsic value is not clearly defined in Hussain et al. (2012)'s study. The authors also did not highlight the magnitude of bubble in the study. Therefore, my study will complement Hussain et al (2012)'s study to by providing more scientific and rigorous ways to compute property's intrinsic value using predicted value derived from house price index regression model.

Moreover, in 2013, the housing industry comprising construction and real estate business, contributed respectively 10.6% and 6.8% to the Malaysian GDP. In comparison, the manufacturing sector only contributed 3.2% of the GDP (Department of Statistic of Malaysia, 2013). Research has proved the effects of the boom and bust of house prices and its economic significance in a country (Blanchard, O., & Watson, 1982; Jarrow, Protter, & Shimbo, 2010; Mikhed & Zemčík, 2009; Nowak & Rosenthal, 2014; Todd Sinai, 2012) Therefore, the findings of this paper should shed some additional light to the regulators on how housing impacts monetary policy and vice versa. .The residential prices in Malaysia have experienced significant price expansion. It is vital to understand the house price dynamics in other countries. In Malaysia, house prices have kept increasing until recently when a slowdown is evident. This study will also identifies and explores other factors that could affect the housing prices in Malaysia. Given the lack of information and research in this area, this study is envisaged to enhance the understanding of the housing bubble phenomena and the determinant of house prices in Malaysia.

1.6 Scope and Limitation of the Study

The scope of the study would cover house prices within the Kuala Lumpur area during the period 2000-2013The three main limitations of this study are: (1) Findings from using Kuala Lumpur data may not be generalizable to other states in Malaysia; (2) Small sample size as annual data for each of the house price indices (All, High Rise, Terrace, Semi-Detach, Detach) are used due to the absence of higher frequency data for most of control variables in the model. (3) I do not cover period prior to year 2000 as Malaysian House Price Index only starts in 2000. Ideally, I should use high frequency data such as quarterly or monthly for a longer period so that I could better capture the dynamics of house prices and macro-variables.

CHAPTER 2

LITERATURE REVIEW

Housing Bubble

The concept of 'bubble' in investment refers to a bust after a period of rampant boom in house prices. House buyers' over-optimism towards the housing market has contributed to the rapid increase in house prices. They are willing to accept a higher purchase price in return for future rise in house prices that is more than offset their initial investment. Furthermore, these optimistic buyers perceive house as a low risk investment that is unlikely to fall in prices at least in the short-run (Case & Shiller, 2003). As the expectations of rapid and steady future price increases are important motivating factors for the buyer, house prices would fundamentally remain unstable. Basic economic theory of supply and demand dictates that the cost of goods is mainly driven by demand and supply. If the residential prices are not driven by actual demand for dwelling purposes, it is not possible for the prices to continuously escalate. This is because once people stop perceiving that house prices would continue to rise, then the support for their acceptance of high house prices could collapse. House prices could then fall due to diminished demand: the bubble busts.

The literature broadly classifies bubble into rational bubble and irrational bubble. A rational consists of fundamental value and bubble component (Gurkaynak, 2005). Bubble under the rational expectation framework is defined as the difference between house price and the house intrinsic or fundamental value. Irrational bubble on the hand measures housing bubble by growth rate of housing prices and does not consider housing fundamental (Case and Shiller, 2003; Hendershott et al., 2003). Shiller (2000) for instance describes bubble from the speculative aspect. According to him, speculative bubble is caused by a change in public opinion arising from news of price movements. These are described as "precipitating factors" that could change the market direction. These take the form of price feedback as an "amplification mechanism". The amplification mechanism drives away the doubts of the

investor regarding the real value of an investment. However, the rapid price increase could not be taken as the only evidence of a bubble. This is because there could be no housing bubble when housing price is increasing as long as the housing price is lower than the house fundamental value.

Detecting Housing Bubble

Rational bubble models attempt to overcome the limitations of irrational bubble models by explicitly estimate the fundamental value. Blanchard & Watson (1982) defines housing bubble as the discrepancy of assets prices far exceed present value of expected cash flow. According to the authors, the fundamental price of an asset is referred to as the present value of the future price with the assumption that there is no rational bubble and no-arbitrage of the financial assets. The authors use two types of test to determine bubble in assets which is in this studies the author uses gold as an assets in the financial market. The two types of tests were runs test and tail test. There is no evidence of bubble shows using the runs test while the T-Test shows lack evidence of bubble. Therefore the author could only conclude that if there is a bubble it will only be for a short lived.

Shiller (1981) resorted to bound test approach to detect the existence of a bubble in the stock market. According to the author, in an efficient market, there would be a fundamental value which imposes a bound on the variance. When a rational bubble exists, the assets price's variance would surpass the bound imposed by the variance of the fundamental value. However this test was taken theoretically on an efficient market which in the real market the variability of stock price is large. The author did not directly observe the real interest rate because the author believes that it cannot be evaluated statistically. Thus the test did not entirely prove bubble because of its structure on the bubble parts are too little and can be rule out by the author assumption of the interest rate not being able to evaluate statistically. In the real financial market, the interest rate is also one the main factor of bubble.

In Thailand the formation of bubbles in housing market undergo through 3 stages of development prior to the 1997 Asian Financial Crisis, namely the Pre-Growth Stage, Take Off and Losses (Wong, 2001). Each of the stages was used to illustrate the model constructed based on the relationship between economic development, overflow of supply, herding effect, growth and collapse of the housing market and the financial crisis. This variable is used then to identify bubbles. The author explain that the bubbles in Thailand as over optimism in housing property. Wong (2001) relates the behaviour as the herding effect where it can take an extreme form where the decision made is based on the observation of others rather than on their private own information. The author conclude that the bubble occur after 1997 due to the fast and persistent growth of economy that causes the vulnerability of the firms in the country.

Kim (2004) documented evidence of property bubble in the Korean housing market by using a long-run ratio of the median price of houses against per capita personal income as a long run equilibrium relationship. This mean that, with a higher ratio between the median houses price against per capita personal income, a bubble will likely to occur. Using this approach, the author was able to prove that there was a housing bubble between 1989 and 1991. However, the latest house price 'boom' in year 2003 could not be accounted for as a bubble. In Seoul's prime sub-market (Gangnam), a housing bubble was evident from the second quarter of 2002 onwards, especially in those units within the redevelopment area for higher density. The author also used the house price–rent ratio to identify the housing bubble in Korea. The concept is that house price as an asset should be based on the rental market. If the price to rent ratio deviates higher substantially from the long-run average, then a bubble is expected to exist (Kim, 2004). This second method of price-rent ratio also supported the first method of using the long run equilibrium approach.

Bubble explosions were observed from 1990 to 1992 and from 1995 to 1997 in Kowloon, Hong Kong and New Kowloon, which indicated misspecification error with a high deviation of fundamental price and market price (Chan, 2001). According to the author, property prices comprised the rational bubble, fundamental house price and misspecification of error component. The author identified the deviation from the fundamental price and the

market price caused by the misspecification error. The misspecification error component is uncovered by employing the signal extraction approach of Durlauf and Hall (1989). Hansen and Sargent (1980) formula is used to measure the misspecification error. From here, the bubble is calculated by the projection of the market price of housing and the fundamental price. The author managed to prove that the bubble explode most sharply between 1990 and 1992 and between 1995 and 1997.

The Hong Kong housing market was then further analysed by Xiao and Tan (2006). The Kalman Filter approach was utilised for identifying the existence of bubbles from the 1980s to the 1990s in the Hong Kong real estate market. Unlike Chan (2001) study, the misspecification error is in Xiao and Tan research is uncovered by using Kalman Filter. The author concludes that the large swing in property price during the 1980s and 1990s were caused by the rise and fall of rational bubble. The property market of Hong Kong has experiences a rational bubble between 1993 and 1997, when property prices rose significantly above their respective fundamental values. The culmination of the bubble occurred right before the eruption of the Asian Financial Crisis.

Using a combination of fundamental variables and speculative bubbles, Kalra (2000) has examined the Hong Kong property price model using ARIMA model. The fundamental variables uses here can be derived from demand and supply variables. The demand variables consist of residential property price index, rental price index, and base lending rate (BLR). The supply variables include are real construction cost index, real effective exchange rate and the number of apartment completed. They also include variables are GDP, per capita real GDP nominal wages and population. From here on the univariates time series model were plotted to observe the trend behaviour of property price changes and the deviation from actual changes from trend values. In this test, the author calculates the deviation of actual price changes from trend by using ARIMA model. The model than suggest property price were higher 10-15% than the trend during first quarter of 1997 and dropped 5-1-% below the market trend after 1998. This study shows that half of the movements in Hong Kong property prices could be explained by fundamental variables while the other half was due to the

inflation, which is likely to appear after the collapse of bubbles in some cases. It also indicates that the rational bubble is closely associated per capita GDP growth, movement in the effective exchange rate and interest rate while housing volume and construction cost variables are relatively unimportant.

This research was further improved to detect multiple bubbles in Hong Kong by Yiu et al. (2013). Based on Sup Dickey–Fuller (DF) method, the author has done a more flexible and recursive regression by calculating the right tail DF. The two variables used in this method are real property price index and real rent index where it is calculated and plotted along with the critical value. The bubble is proved when the value of calculated is highly above the critical value. The test revealed that the bubble occurred in Hong Kong not only in 1997, but there were 9 other bubbles between 1994 and 2011. This includes two periods with shot lived negative bubble (June2000 and November 2000 – March 2001). In the pre-post 2008 global financial crisis periods, two active bubbles were noted in the overall market, one in early 2008 and another in 2011. However, both bubbles existed for a very short period (Yiu et al., 2013).

Using generalized impulse response analysis and Granger Causality Test, Shen, Hui, and Liu (2005) examined the Beijing and Shanghai housing markets. According to the authors, if a housing bubble exists, the market will display abnormal interactions between house prices and market fundamentals, and vice versa. With the Granger causality test and impulse respond analysis shows that housing price seem to have interacted abnormally with the market fundamental after 2003 in Shanghai. Market fundamentals that were used are disposable income, the stock of vacant new dwellings and local GDP on each of both city. All of these market fundamentals were then run a regression for both Beijing and Shanghai city to estimate the fundamental price. It is then concur that only the Shanghai housing market faced a housing bubble in 2003. The fundamental values were determined and it showed that Shanghai housing prices diverged 22% from the market fundamental values, and this deviation could be attributed to the bubble.

Multiple regression analysis is also used to determine housing bubble in Czech Republic. Hlaváček and Komárek (2009) uses two approaches in determining bubble in five of the Czech Republic regions (Prague, Ostrava, Ustinad Labem, Brno and Ceské Budějovice. The authors used simple indicator of rental return ratio and price to income ratio for each region. Both ratios show a decline. The declination between 2000 to 2005 was in line with the drop of interest rate. However both income and rental ratio against house price continue declining further after 2006 although the government has raised the government bond yield and interest rate shows a possibility of bubbles . The second approach is by looking into the demand and supply factor. The variables involve are time series data of building plot price, construction cost, marriage and divorce rate, net migration, unemployment rate, economic activity, vacancies and labour force, rent per month and average monthly wages. Fundamental price were then estimated based on the multiple regression of panel data and the time series data. This model than indicate the overvaluation period of property during 2002-2003 and 2007-2008 periods. The overvaluation or bubble in 2007-2008 period are found not to be as huge as 2002-2003 period. This mainly due to price driven in 2002-2003 period was because of the speculation link with the Czech Republic's accession to the EU, whereas the recent surge in 2007-2008 period is due primarily to improved fundamentals (wage growth, higher population growth, and unemployment rate). Therefore, from the simple indicator and the model develop shows a property price bubble in 2002/2003 and 2007/2008 in Czech Republic four out five region there were tested. Only Prague shows bubble using the simple indicator but was not supported with the model used.

Using the Rational Expectation Theory (also known as Fama-French Three Factors) and multiple regressions for a period of 5 years, from 2005 until 2010, M. Hussain (2012) pointed out that the housing bubbles in the Klang Valley residential property market in Malaysia is getting bigger and stronger during this period. Hassain et al. (2012) measure bubble as the difference between property (double storey and condominium) selling price and its intrinsic value. The intrinsic value is in turn measured by the lagged value of property prices multiplied with the capitalization rate minus the lagged rental income derived by the property. The computation of intrinsic value is unclear to me because authors did not

highlight the capitalization rate being used in this study. Importantly, they did not highlight the magnitude bubble and its variation during the study period.

2.1 The Determinants of House Prices

Although the bubble also exists in the equity markets (Shiller, 1981) and in other financial product markets, the factors determining the housing bubble involves several other fundamental variables. This is because of the nature of housing that incorporates both commodities and investment assets that prove to be the influence of house price. Housing has specific aspects due to its durability, location and heterogeneity, the high cost of owning (down payment requirement, transfer cost and taxation) and the existence of the secondary market. Hence, the housing market is commonly viewed as a different market segment. However the fundamental factors in determining the housing price are the supply of and demand for houses(Lean & Smyth, 2012; Liew & Haron, 2013; Ong, 2013; Tsatsaronis & Zhu, 2004). It is also proved that housing market in creates a ripple effect across the country. The ripple effect that when all house price were taken together, there is an evidence of ripple effect emanating in Johor, Kuala Lumpur and Penang. This has proved the common perception that price n the few develop region will lead to price cycle in Malaysia (Lean & Smyth, 2012).

The demand factor is primarily the affordability of the purchaser. Sani (2013) was of the view that residual income is more suitable to measure housing affordability. The residual income affects both the accumulation of savings and wealth by households and the availability and riskiness of housing loans. The housing affordability also prove to be fuel by the income growth in Beijing. This was presented by the studies made by Yang and Shen (2008). The authors reported that income growth plays an important determinant for house price in Beijing.

Another factor that influences property prices is the unemployment rate. It affects disposable income either directly or indirectly via labour force mobility (migration in search of work). The lower unemployment rate along with high economic activities will improve the disposable income(Hlaváček & Komárek, 2009). It is also proved to affect the demand of prime mortgage at the level of Metropolitan area. This because the lower the unemployment rate and lower portion of population below 65 years old would drive demand for prime mortgage (Goetzmann, 2010). The relationship of unemployment rate and house price is clearly show in the report by Will Dunning (2014) for Canadian market. The reason Canadian housing starts were so strong in 2002 until 2007 was that the employment rate in Canada was rising.

Macroeconomic variable such as gross domestic product (GDP) and population influence the prices of residential units in Malaysia. Ong (2013) verified that population growth has a positive relationship with the housing market in Malaysia. People are willing to spend more money to own a house when the stock of houses is low in the market. This would definitely drive the housing demand and price. However, those with lower income are unable to afford to buy a house and are forced to rent a house or stay with their parents after marriage. When there is a demand for renting, investors would rent out their own houses. Thus, the rental ratio should also be looked at as a variable in the housing bubble.

In studying the subprime crisis of 2008, the main variable that was prove to be driving the house price in United State of America are population growth and unemployment rate. These proved to be operating in the mid-tier and high-tier markets. During the run up of 2003, the size of population growth and unemployment rate has motivated the house price in the expected direction through 2003(Coleman, LaCour-Little, & Vandell, 2008).

The increase of income population would also increase the GDP in economy which subsequent increased the demand for real estate through higher prices of primary property and higher rental. This has been proved in Singapore where GDP growth contribute to the wealth of the population that are then contribute to an increase in income. (Pillay & Rangel, 2008). With the growing of GDP, house price will also followed to increase as the same path and this

had bring positive profit progress to the construction industries and other interrelated industries. Therefore, this creates a back- push force enhancing house price level to new high. (Liew & Haron, 2013). This relationship between GDP and house price was also found significant by Green (1997) which proved to be a good predictor of housing investment. In determining the house price in Korea, the fluctuation of house price has become closely correlated with the GDP since the Asian Financial Crisis. The house price boom in Korea between 2001 and 2003 has exceeded the GDP growth by wide margin thus bring to house price bubble in the market (Kim, 2004).

The mortgage interest rate or base lending rate also fuels the house prices. (E. Glaeser, 2010). The interest rate determines the quantity of credit applied and approved. It is an essential determinant of housing industry activities in Malaysia (Teck Hong, 2010). Therefore it plays an integral parts in real estate purchase as most of the purchase made are through mortgage financing within their income budgetary constrain. The mortgage interest rate or Base Lending Rate responds in the opposite direction, as growth in the mortgage rate makes loan financing of property purchases less attractive and increases households' repayments of existing loans.(Pillay & Rangel, 2008).

CHAPTER 3

METHODOLOGY

3.1 Data source

House price indices were taken from National Property Information Centre (NAPIC). Population growth and rental price index were obtained from the Department of Statistics, Malaysia. The data on the base lending rate and the unemployment rate are from BNM while the rest of the variable which are income growth and GDP growth are from World Bank. All the data used are annual data. The housing indices comprise five categories namely the All House Index covering all residential properties in Kuala Lumpur and the decomposition of this index by property types, .i.e. Terrace Index, High-Rise Index, Detached Index and Semi-Detached index.

3.2 Research Design

Determining housing has many ways and method being used. Econometric model which consist of fundamental economic variables are among method that has been used widely (Chen, Gan, Hu, & Cohen, 2013; Hlaváček, 2009; Pillay & Rangel, 2008). There also as discuss in Chapter 2 which uses expectation theory and filtration of variable using Kalman Filter of DF filter. However, this studies will uses econometric studies by running regression against the fundamental economic value. Before such approach is being taken, a simple indicator involving price-to-rent ratio is use to compare the result.

Rent to price ratio

Housing is also relates to an investment. In an investor view of point, rental represents the return it will receive when the property purchase is being lease. Therefore the ratio indicates the attractiveness if property at particular time. Lower value of this ratio indicates a higher possibility for of property bubble because investors are willing to pay a much higher price (denominator) over the cash flows (rental) generating ability of the property (numerator). Rent to price ratio has been used to detect property bubble in the United States of America market (Mikhed & Zemčík, 2009), in China (Hou, 2010) and Czech Republic (Hlaváček & Komárek, 2009)

Hedonic price regression

We employ a time-series regression model to examine the determinants of house prices in Kuala Lumpur controlling for fundamental factors that are found to explain house price in the literature. This regression models serve two purposes. First, the estimated coefficients are used to compute the house price expected value where the deviation of it from the actual house price is used as a proxy to bubble. In other words, bubble is measured as the difference between actual house price and expected house price value. Second, the sign and significant of estimated coefficients in the regression models allows to identify the determinant of house prices. The model can be specified as follows:

House Price = f (Unemployment Rate, BLR, GDP Growth, Income Growth, Urban Population).

The dependent variable is the house price index is regressed against fundamental factors such as GDP growth, unemployment rate, urban population, base lending rate (BLR) and income growth. The house prices in Malaysia are reflected in the house price indices computed by NAPIC. The base year for these house price indices is year 2000.

Earlier studies assessing the housing bubble in Klang Valley only covers factors such as Housing Rental Index, Bank Lending Rate and Housing Intrinsic Value(Hussain et al., 2012). In this studies we will cover other fundamental economic variable such as unemployment rate, urban population, BLR and income growth. According to Levin and Wright (1997), the most common demand factors used to study house prices are income and interest rate. Understanding the housing price dynamics, the impact of the housing supply factor should also be taken into consideration. This is because the supply of houses is inelastic in the short term.

Studies show that financing facilities are one of the significant factors that affect the movement of prices of residential units. (Wen, 2013; E. L. Glaeser et al., 2010; Blanchard, O., & Watson, 1982). This is because purchase of residential units in Malaysia involves mortgage financing. Therefore, the interest rate plays a big role in enhancing the financing package, as well as in leveraging the income. The interest rate for mortgage financing in Malaysia are represented by BLR. BLR Rate is a rate determined by each bank based on how much it costs to borrow the money to be lent to borrowers. The cost to borrow money is determined by the Overnight Policy Rate (OPR) – the interest rate at which other banks lend to each other. The Base Lending Rate in Malaysia control by the Bank Negara Malaysia.

According to Liew et al. (2013), factors such as population growth, increasing demand GDP growth, transaction cost of housing (transfer fee and taxation), housing quality and public facilities influence the prices of residential units in the Klang Valley. Therefore in a time series data of GDP growth and population growth were taken as the explanatory variables. For this studies, the urban population growth were taken to represent the Kuala Lumpur as the federal city in Malaysia. Taken into consideration the riple effect of house price it will bring if bubble were to occer, thefore the highly urbanize city like Kuala Lumpur were selected.

Another significant of precipitating factor is the employment gain (Hashim, 2010) A highly employ region will increase the income of the population and therfore increase the accesibility fo mortgage financing. Unemployment rate also prove to reflect the market efficiency with lower unemployment rate show a less efficient market economy(Qi & Li, 2004)

CHAPTER 4

RESULTS AND DISCUSSION

4.1 Descriptive Statistics

Descriptive statistics for each of the variables in the regression model are shown in Table 4.1. The All House Price Index represents the average price for all 4 types of houses. The index is produce quarterly but for this studies purpose the index use is annually by averaging each quarter. All property is based on the percent price changes from year 2000. Although all property in year 2000 with the based point as 100. Detached housed has constantly being the highest price increase through the 13 years compare to other types of houses. The highest point of index of detached house was in 2008. A part from that, the most volatile in term of price is the high rise building.

Turning to the control variables, GDP growth averaged 5.05% during the study period ranged from -1.51% (2009) to 8.86% (2000). Income growth measured by annual change in gross national income per capita averaged 3.3% ranged from -2.12% (2009) to 5.32% (2000). On average, 67.8% of the population is living in the urban reflecting the rapid urbanization rate in Malaysia over the past one decade. BLR averaged 6.4% during the study period.

Table 4.1 :
Descriptive Statistics

	Definition	Mean	Std. Dev.	Min.	Max.
Dependent variables					
All Houses Index	As defined	128.95	26.28	92.05	171.15
Terrace Index	As defined	127.16	24.95	92.44	167.25
High-Rise Index	As defined	126.99	26.83	89.61	171.59
Detached Index	As defined	136.69	30.71	92.47	185.45
Semi-Detached Index	As defined	132.91	28.94	91.65	178.54
Explanatory variables					
GDP Growth	Annual growth in gross domestic product	5.0538	2.62965	-1.51	8.86
Income Growth	Annual growth in gross national income per capita.	3.3480	2.27223	-2.12	5.32
Unemployment Rate	As defined.	0.02857	0.002709	0.023	0.034
% of Urban population	The percentage of people living in urban area.	67.8159	3.65284	61.98	73.28
BLR	Base lending rate	6.4036	0.37645	5.55	6.75

4.2 Rent to Price Ratio Results

Chart 1 below shows the price to rent ratio measure as the ratio of house price index over the rental index. From Chart 1, one could deduce that the rental ratio was consistently declining every year. The rent-to-price ratio were minimum change in 2008 to 2009 but a big declination starts after 2010.

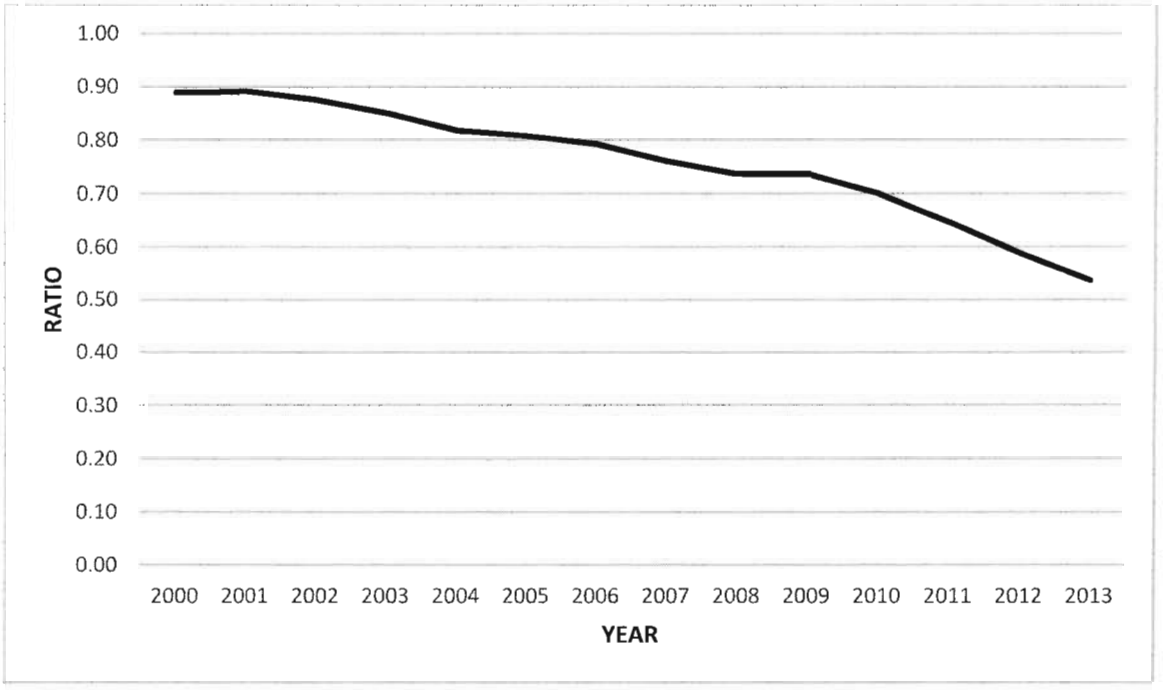

Chart 1 :
Rent-to-price ratio between 2000 to 2013

Table 4.1 further shows that rent to price ratio deteriorating significantly during 2010 and 2013 coincided with the double digit growth in house prices as discussed in the introduction section of this report. Based on the previous studies, this downward slopping of this ratio indicates the possibility of a bubble particularly during 2010-2013 where the ratio was at a lower point. If the rental increase is minimal or not as big as the price increase, this will give a longer period for the investor to gain return out of the rental based on the purchased price. Therefore the property will be unattractive for investor to invest because of the longer period of reaching the breakeven point of the investment.

Table 4.2:
Change in Rent to Price Ratio

Year	Change in rent to price ratio
2001	0.25%
2002	-1.76%
2003	-2.85%
2004	-3.77%
2005	-1.28%
2006	-1.87%
2007	-3.98%
2008	-3.25%
2009	0.03%
2010	-4.88%
2011	-7.70%
2012	-9.01%
2013	-8.75%

4.3 Time Series Regression Results

The estimation results of the regression model are presented in Table 4.3. The time series analysis is for the period of 2000 to 2013. Before we look at the explanatory variables individually, we have to refer to F-test (see the bottom of Table 4.3) to confirm that the model for housing bubble determination is acceptable. Table 4.3 shows that except for High Rise Index, all models are significantly at the 1% level. This implies that all variables in the models are jointly related to house price indices. All models achieve a reasonable fit, explaining 61% and 89% of the variation in house price indices. Note that we use growth instead of level for most of the control variables to avoid multicollinearity issues associated with these variables. Not reported here, the average variance-inflating factors (VIF) of lesser than 10 suggest that the explanatory variables are not highly correlated.

Table 4.4 also presents the OLS estimation results on the determinants of house prices in Kuala Lumpur. The dependent variables are All Houses, Terrace, High-Rise, Detached and Semi-Detached House Price Indices obtained from Malaysia's National Property Information

Centre. Other explanatory variables are defined in Table 4.1. The study period is between 2000 and 2013. T-statistics are reported in parentheses while ***, ** and * refer to statistical significance at 1%, 5% and 10% levels, respectively.

Table 4.3 :
The Determinants of House Prices in KL

Explanatory variables	Dependent variables				
	All House Types	Terrace	High-Rise	Detached	Semi-Detached
Intercept	-445.840	-419.082	-486.297	-527.010	-485.117
	(-4.908)	(-4.773)	(-3.289)	(-6.125)	(-5.863)
Unemployment Rate	292.679	341.338	644.096	34.396	58.486
	(.214)	(.258)	(.289)	(.027)	(.047)
BLR	13.296	12.580	17.535	15.031	12.657
	(1.335)	(1.307)	(1.082)	(1.593)	(1.395)
GDP Growth	.542	.693	-.022	.179	.554
	(.155)	(.205)	(-.004)	(.054)	(.174)
% of Income Growth	-.714	-.831	-.065	-.583	-.773
	(-.181)	(-.217)	(-.010)	(-.156)	(-.214)
Urban population	7.092***	7.092***	7.121***	8.368***	7.890***
	(7.189)	(7.189)	(4.435)	(8.955)	(8.781)
No of Obs	14	14	14	14	14
Adjusted R^2	0.89	.818	.605	.875	871
F-Value	12.67***	12.21***	4.98**	19.28***	18.51***

Next, we use the estimated coefficients in Table 4.3 to identify periods when property prices were overvalued and also to identify the magnitude of such overvaluation. The estimates of expected property prices and the gaps between actual and expected property prices are shown in Charts 3 and 7. A period is considered to be in the bubble if the actual property price is higher than the expected property price. Focusing on Chart 3 which presents the All House Index capturing all residential property prices in Kuala Lumpur, it appears properties were undervalued in year 2007, 2008 and 2010 where the expected property prices were 10.38%,

10.97% and 7.29% higher than the actual property prices, respectively. Properties were found to be overvalued in year 2012 and 2013 where the expected property prices were 4.22% and 11.28% lower than the actual property prices, respectively. The pattern of over-undervaluation could also be observed for the house price index decomposed by property types (Charts 2-5). The overvaluation (bubble) after 2011 onwards is consistent with the rent-to-price ratio findings early. In the simple indicator analysis of rent-to-price ratio shows a sharp decline from year 2010 onwards.

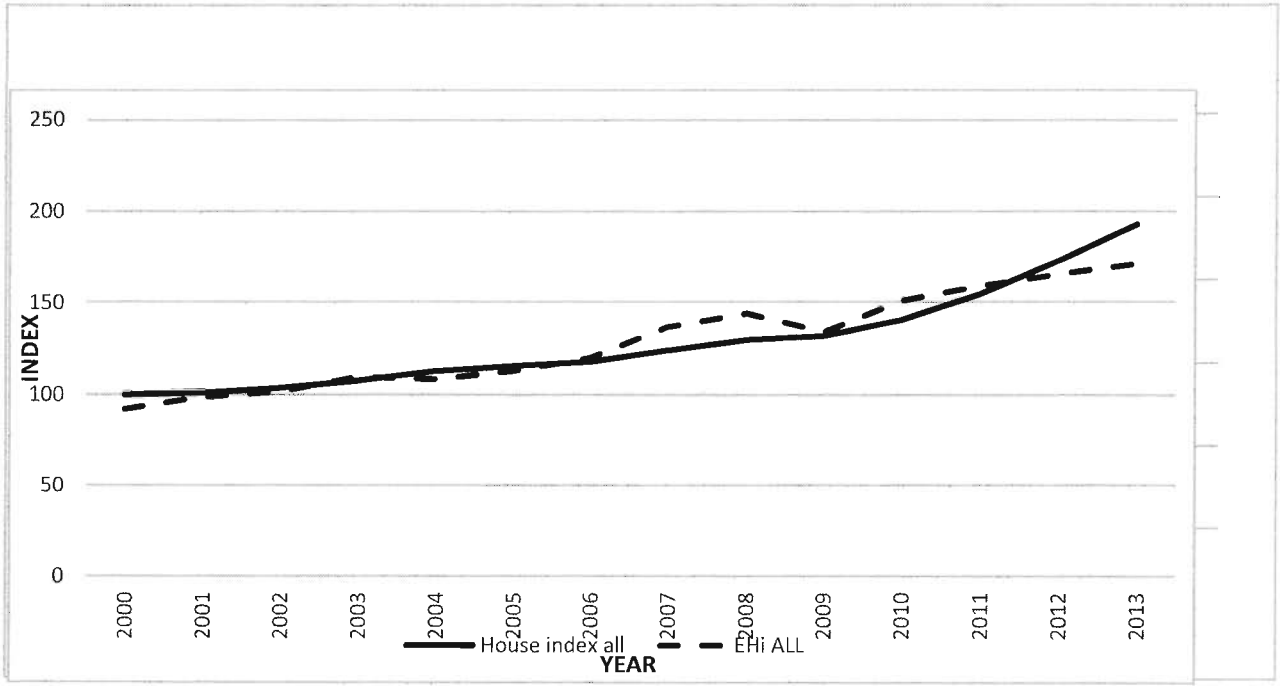

Chart 2 :
Estimated Value of House Price Index against the Actual Price Index

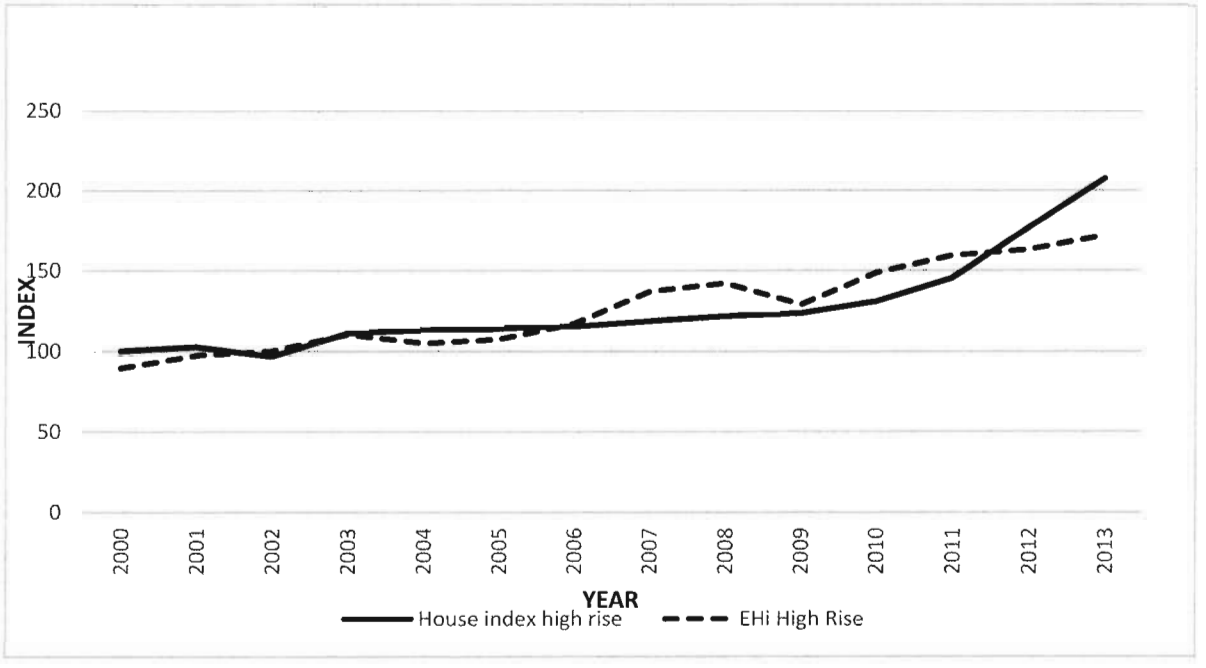

Chart 3 :
House Index for High Rise vs Estimated

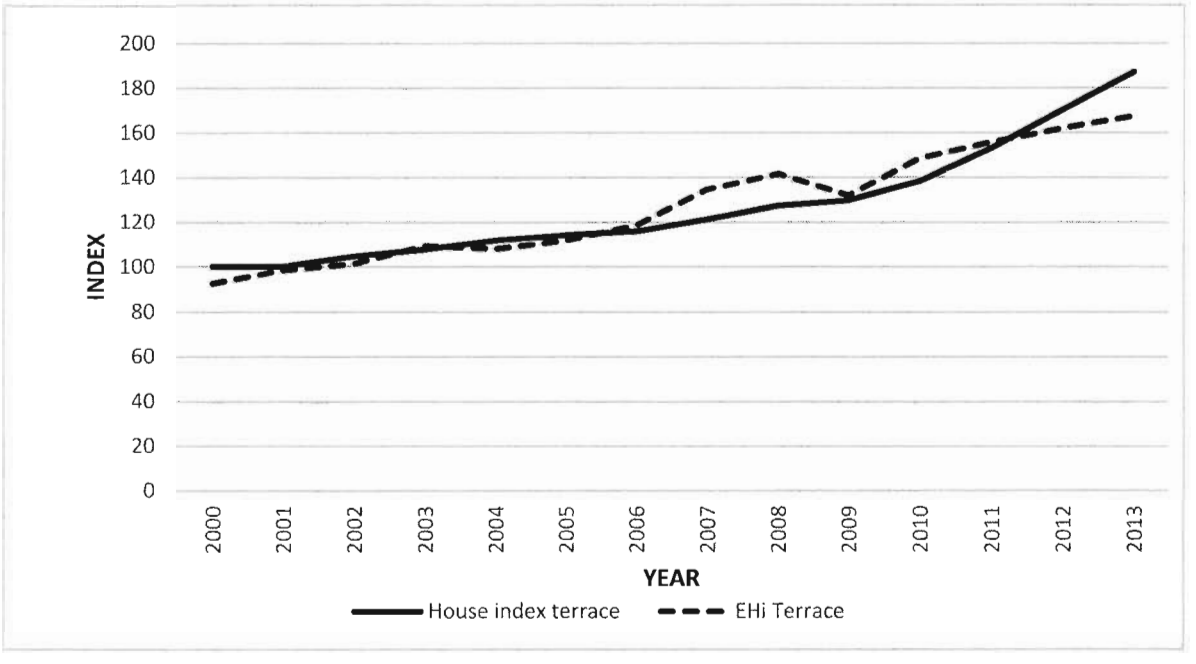

Chart 3:
House Index for Terrace vs Estimated House Index for Terrace

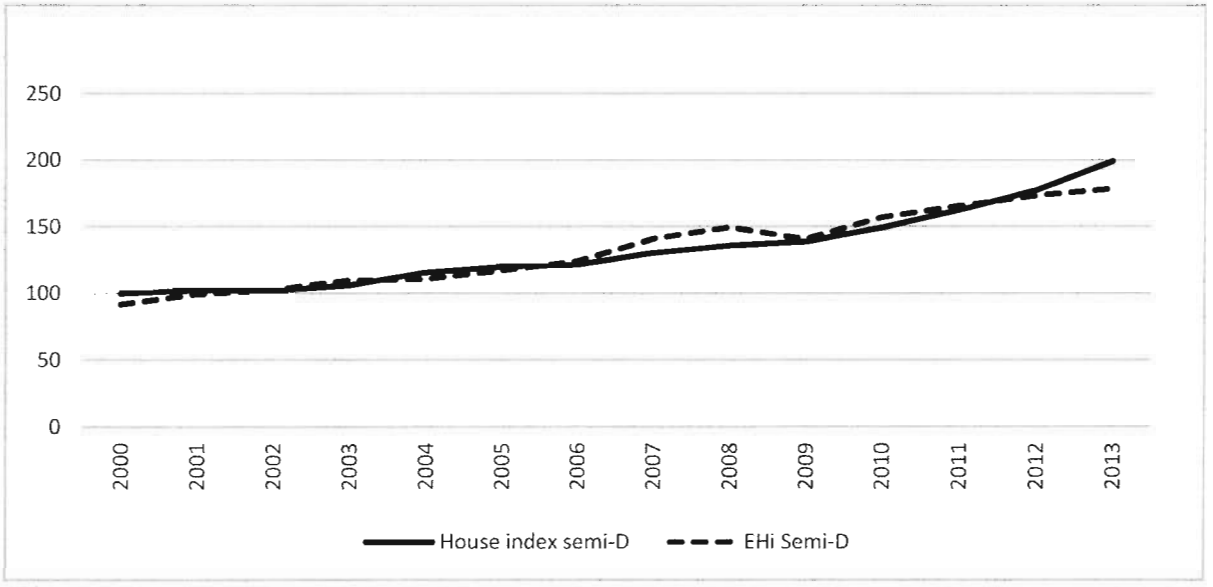

Chart 4 :
House Price for Detached vs Estimated for Detached

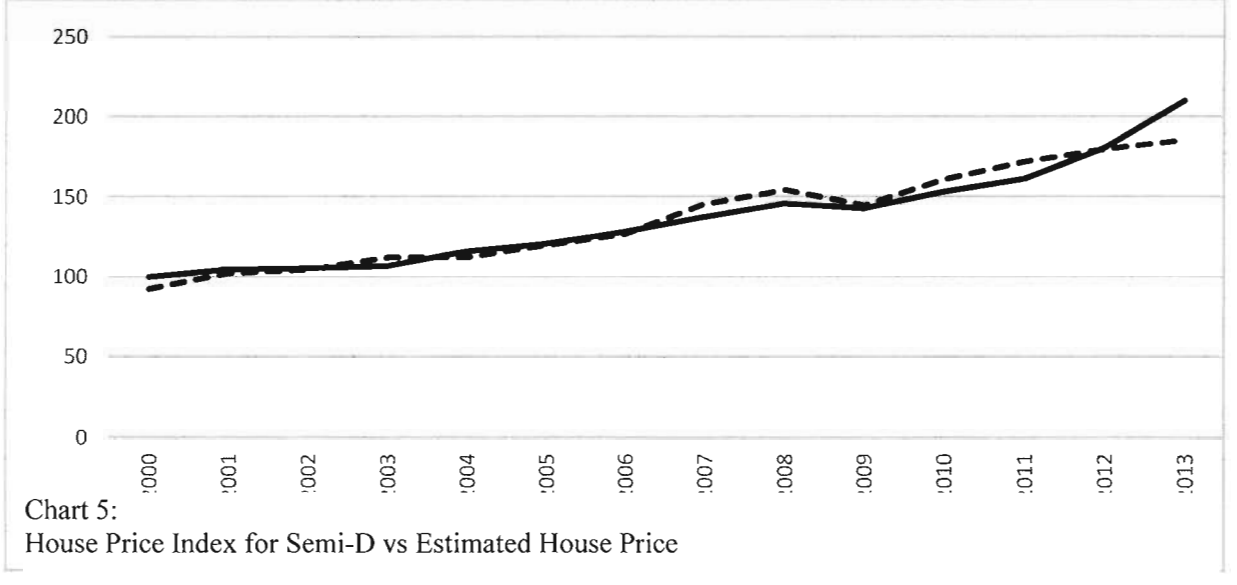

Chart 5:
House Price Index for Semi-D vs Estimated House Price

Table 4.4 reproduces Chart 3 by explicitly showing the difference between house price index and its expected value. Contrary to our expectation that house prices are overvalued since 2006, both tests on rental index ratio and regression analysis show that the property prices were in fact undervalued during 2006 to 2011. It is only in 2012 that property prices begin to be overvalued, with higher gap in the percentage between the expected fundamental price and market price. One plausible reason to the observed undervalued phenomenon is due to the inefficient nature of housing market as compared to financial market. The latter is quick to incorporate new information while the former is known to be lagged in adjusting to new information. Housing projects typically take at least two years to be completed. Sales are made upon launching of the project. The feasibility studies are done earlier. The development plans also are undertaken in phases, where each phase has its own imputed price increase. When the population growth is decreasing, the developer does not offer a lower residential house price for their next phase. This is because the feasibility study was done earlier and the population projections might differ from the reality. Therefore after 2011, a serious gap in property overvaluation is evident. This could result in a housing bust, given the oversupply of houses

Table 4.4 :
The Gap percentage between the all type of House Index and Expected house index

Year	Gap percentage
2000	7.95%
2001	2.30%
2002	1.84%
2003	-1.80%
2004	3.93%
2005	2.33%
2006	-1.86%
2007	-10.38%
2008	-10.97%
2009	-1.74%
2010	-7.29%
2011	-2.95%
2012	4.22%
2013	11.28%

CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.1 Summary of Findings

In this paper, the research on housing bubble phenomena was undertaken using two different approaches. One is based on the simple indicator of rent to price ratio and the computation of property's expected using time series regression models. The econometric model is based on the concept of supply and demand with explanatory variables that have been proven to be highly correlated to house prices(Hlaváček & Komárek, 2009;Kim, 2004). However, there are other significant variables that affect residential prices. Due to the lack of time series data, the variable presented here is the best for the current moment. Therefore, the results of the regression time series should be interpreted with caution. From the analysis, it could be observed that the house prices are mainly driven by fraction of urban population in Malaysia. This is the demand factor. The lands for residential houses are getting fewer in the urbanized areas and this would result in a decrease in the supply of residential houses.(Pillay & Rangel, 2008)

Based on the regression, the urban population growth is the most significant among all the variables. This relates to the demand of property. In places such as Kuala Lumpur, the limited of land has caused the demand to be higher than what the new construction of houses could supply. Increase of population in the urbanize area will increase the demand and with the limited supply, house price will increase dramatically(Hou, 2010). This is also reflect to rent-to-price ratio where there is a sharp decline after 2009.

The main contribution of this research is the identification periods where a bubble is likely to occur measured by the positive value of the different between expected house value and actual house price. Contrary to the general perception that our property market is in a bubble stage since the middle of 2000s, we found that housing market in Kuala Lumpur was

undervalued during the period 2007 and 2008. The actual house prices closely tracks the expected (fundamental) house value during 2001-2006, and 2009. We only observed overvaluation (bubble) in years 2012 to 2013. The undervaluation in year 2007, 2008 and 2010 could due to the fact most of the investors were shun away from the market during the crisis period. Overvaluation in years 2012-2013 was probably arised because of the low interets regime and coupled with the exemption of property gan tax during 2007-2009 which had help rebuild the momentum and investors' optimistism towards property market.

5.2 Recommendations

One of the interesting finding of this study is the time of the residential properties being undervalued. It was during 2006 until 2010. Overvalued of residential properties only starts to show sign of overvalue starts from 2012 and the gap is getting serious in 2013. In this studies variable such as GDP Growth, unemployment rate, urban population growth, income growth and Base Lending Rate are the one being look into. Therefore the recommendation will linger around this variable.

One of the problem in housing bubble is not entirely the overvaluation of the property that were than face a sudden drop of price which what had happened in United States of America where the house price hit below the nominal price after a rapid price increase. The problem here lies in the overleveraging of income among the property buyer. The estimated house price based on the fundamental variable presented in this paper shows and undervalue property in 2006. In order to boost up the housing industry back then were the easing of the mortgage loan and taxation. With the attractive instalment rate against house price, people then starts to leverage their income thus many have bought properties above of what there are capable to serve the loan. The scenario is acceptable for the buyer if the rental rate return is higher that the loan taken. But when the rental rate does not increase as high as the house

price or the increase of interest rate could not cover the value of their rental will be the point of what the buyer face the problem of overleveraging.

Housing property as discuss earlier may link too many economic activity in Malaysia. If the bubble do persist, such impact may bring highly negative effect to the financial of the country. The slow recovery rate compare to stock market crash is another negative impact for housing bubble.

Therefore, the steps to curb the speculator also should be taken seriously. Currently the control taken in financing by Bank Negara Malaysia such as 70% financing mortgage loan for those who own property more the 2 at one time, strict net income requirement in approving loan and high real property gain tax has shown its effect on housing activities. This will address the issue of overleveraging in fundamental economic aspect.

The government should also tackle the bulk purchase of properties made by investor club. The intention of the investor club here is to speculate the properties that they have purchase. Buying the property in bulk purchase give them the open hand to monopoly the particular housing project. Although such bulk purchase could not be stop completely because it is up to the developer to assure the unit build are sold and not to face overhang, the government still have an upper hand to assure this action is contain. Such as, any bulk purchase could only made under a company. With that, the margin loan should not be the same as an individual and taxation charge must be different under a company.

In business point of view, the decision to develop a new place which the economic activities is still uncertain and brings a higher risk to the developer. However, focusing on the area or region that already establish will also drive the house price and caused it to be overvalued. Therefore, the government should starts to develop and further markets other satellite cities in Malaysia. In doing so, township planning like public transportation, high investor attractiveness and smart city concept should be embedded on the new city. Therefore the residential project will not only be to focus on the Kuala Lumpur. This is because it has been proved under this studies that urban population growth is highly significant with house price.

Therefore, with higher urban population growth and high employment rate may assure the developer of such housing project investment.

In Malaysia, the government intervention in the housing industry is still consider relatively low compare countries like Singapore and Hong Kong. Proper planning and good regulation is needed to control the housing market so that it is still within the reach especially within the lower to middle income group. Although it seems there are 3 agencies highly contributing for the affordable housing (PR1MA, National Housing Department and SPNB), it will be better if it is centralize. This is to prevent redundancy in the objective and overlaps of application. This centralization could be under the purview of only one ministry which is at the current moment will be best handle by the Housing, Local Government and Well Being Ministry.

5.3 Suggestions of Future Study

Studies on housing bubble phenomena in Malaysia relatively scant. This study only covers Kuala Lumpur region. It would be interesting to look and compare region of highly develop and less develop for example comparison between Penang and Johor with Kuala Terengganu and Ipoh. We can then have a deeper understanding of such cities and its unique point. Every state has its own planning and different rate of urbanization.

The dependent variables used in this studies comprises of house index. It is recommended that the use of property level data and with a longer time series data. Longer time series data is highly recommended because of the studies on phenomena need to see its cycle and with a longer time period, we can observe the financial crisis being face through the years.

Many approach and method have been used in determining housing bubble. Some of approach has been explain in the literature review. It is good to have all the variables use to be test with a different approach.

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