Boom-Bust Housing Price Dynamic: The Case of Malaysia

Yip Chee Yin[1]*, Woo Kok Hoong[2], Oon Kam Hoe[3], Nabihah Binti Aminaddin[4], Nurfadhilah Binti Abu Hasan[5]

[1]Universiti Tunku Abdul Rahman, Malaysia, [2]Universiti Tunku Abdul Rahman, Malaysia, [3]Universiti Tunku Abdul Rahman, Malaysia, [4]Universiti Tunku Abdul Rahman, Malaysia, [5]Universiti Tunku Abdul Rahman, Malaysia. *Email: cyyip@utar.edu.my

ABSTRACT

This paper aims to differentiate housing price bubble from a housing price cycle through the investigation and analysis of the price volatility driving components using graphical analysis, cointegrating regression and mean reversion regression. The findings suggest that Malaysia is not facing any housing bubble at the point of time since there is no sharp upsurge and rapid fall of house prices (HP). The recent upswing in HP followed by a gradual coming down rather reflect a severe price cycle which started in 2009. The peak was observed in 2013 and since then has reversed into a continuous but gradual fall. The cycle is persisting and has not bottomed out yet. Our results show that the main reasons for the price booms are speculative herd instinct and lax in house loan lending policy before 2012. Subsequently the various anti cooling measures by the Malaysian government have helped to control price expansion.

Keywords: Stability Test, Cointegrating Regression, Mean Reversion Regression, Bubbles, Cycles
JEL Classifications: R3, N2, G1, J10

1. INTRODUCTION

Housing besides playing the primary role as shelter has become a market commodity that by speculative buying and selling generates appreciable wealth during the boom period. In recent years, many countries like China and United Kingdom have experienced prolonged period of housing boom which was followed by relatively sharp and rapid weakening of housing prices, causing massive public debts and recession with severe damages to the economy. However, it has also been proven that the housing market is one of the main drivers for economic growth and governments enact policies to support housing finance to promote home ownership and ultimately economic growth. Nevertheless, established literature (Cerutti et al., 2015; ECB, 2003; Collyns and Senhadji, 2002) has revealed that financial factors such as credit expansion, low interest rates and excessive liquidity, encourage further demand and risk taking that lead to speculative buying. When housing prices get disconnected from the economic fundamentals and price expansion continues unchecked driven by speculation or over optimism, the boom will be followed by bust that will see widespread sharp and rapid weakening of house prices (HP) if no suitable intervention from policy makers. The result as demonstrated in past boom-bust episodes when they

assumed the characteristics of housing bubbles, is rampant mortgage loan default that will trigger financial instability and severe damage to the real economy. However, the bubble can be moderated into a cycle of gradual hike and fall in prices. As such, policymakers are confronted with the conflict between the objective to promote a more dynamic housing industry through home ownership and the associated risks of an overheated housing market.

Housing market and the price dynamics are among the centre of attention of policymakers. Housing price cycles and housing bubbles are now of great interest to academic researchers as well as real estate property players. Research studies including Agnello and Schuknecht (2011), show that the severity or magnitude of the bust and thus the costs on the economy, is strongly correlated with the duration and magnitude of the boom. Hence, as analyzed by Hessel and Peeters (2011), if the factors pushing the boom are not well monitored and addressed, non-fundamentals particularly speculation or excessive expectation on the uptrend of prices, will cause the boom to morph into a bubble. The mild form of housing bubbles is also known as housing cycles. However, there are many divergent views of how to identify the mild form of housing bubbles.

Housing price cycles are common phenomena since HP reflects the interaction of supply and demand fundamentals against the backdrop of short term natural inelasticity of the supply market (affected by factors such as land and building permits), resulting in the fluctuations of housing prices. If the self-correction mechanism on changes of housing prices due to fundamental factors is overwhelmed by exuberant expectation of buyers resulting in prolonged price expansion, the cycle could deteriorate to boom-bust nature. If the episode of volatile housing prices is just a cycle, the implications are generally not so severe. However, it is imperative that suitable measures need and should be taken to prevent the volatile situation from falling into a housing bubble. However in records, bubbles are identified on hindsight base on the temporal and spatial pattern of the movements of housing prices and the magnitude of the trail of resulting damages. This scenario therefore underpins the importance of understanding the process that determines the housing prices so that the influence of non- fundamental factors including speculation, on the rapidly rising HP could be better assessed. However, economists have divergent views on the mechanics of the formation of a bubble. To-date, there is no consensus with regard to the structure of a housing bubble, making it difficult to differentiate a HP cycle with that of a housing bubble. In a joint critique study on a research report of the U.S. housing market, Mayer and Shiller (2006), both discussant authors give differing views; while Shiller is outspoken about the possibility of a housing bubble in US, co-author Mayer, does not believe that there is a housing bubble in most markets in the US though housing prices are high. Apart from this controversial argument, Capozza et al. (2002) employ mean reversion regression to show that the price cycle in US market is still stable while Glindro et al. (2011) conducted a panel data analysis of nine Asia countries and by using modified mean reversion regression, they showed that no sign of bubble is observed.

Given the importance of a healthy growing housing market to the economy and the damaging effects of a bust, better insights into the dynamics of housing prices would be helpful to policymakers, developers and buyers/investors alike. This study therefore attempts to propose an approach to differentiate and thus identify the housing price cycle from the housing bubble, applying in the context of the Malaysian housing market. In view of the uncertain nature of differentiating a housing bubble from that of a cycle, this paper specifically offers an alternative approach to investigate whether bubble or cycle exists in the Malaysian housing market. The proposed strategy includes different approaches to validate and corroborate the results that suggest the existence of bubble in the market. We conduct a more scientific and rigorous way to compute property's fundamental value using predicted value derived from HP regression model. We use a graphical analysis coupled with qualitative analysis, utilizing the views and ideas as proposed by well-known economists, Mayer and Quigley (2003) and Case and Shiller (2004). We define the threshold value of percentage increase in HP for the formation of bubble using the results from this graphical analysis. The concept is primarily based on Mayer (2011) and Glindro et al. (2011). Next, we utilize the mean reversion regression model proposed by Capozza et al. (2002) to test for the stability of the HP movement.

1.1. A Brief Review of the Malaysian Housing Market

The sharp rising of HP in Malaysia over the past 12 years (2001-2012) was accompanied by the rapidly increasing household debt of which a significant portion was made up of housing loans, over the same period. In its 2012 report, the Central Bank of Malaysia (2013) (Bank Negara Malaysia [BNM]) posted that property financing is a significant component of bank loans, taking a total of 41% of the total financing by the banking system as at end-2012. And of this amount, 27.4% was on residential property financing. The same report also revealed a finding on housing price trend that since 2010, current prices were being determined by previous prices, a trend reflecting speculative behavior, an early sign of a housing bubble. Although housing price expansion has peaked in 2013 moderated by the various macro-prudential and fiscal measures implemented by the government, the high rate of household debt and home loans in relation to gross domestic product (GDP) have persisted, standing at 89.1% as at end-2015 with housing loans showing an 11% increase. As pointed out by economists, in such a scenario of a combination of high household debts and housing boom, any unexpected rapid fall in housing prices and decline in household income will cause financial instability and an ensuing severe economic downturn. Moreover, the construction sector is one of the significant contributors to the Malaysian economic growth (4.4% of GDP in 2015 - BNM report 2015). A slowdown in the sector will have significant negative impact on the economy. In addition, given the slowing national economy and the many headwinds, both internal and external, that the country is currently facing, the volatile housing price movements in the Malaysian market over the past decade should be of concern. Housing prices in the Malaysian market for the period 2009-2013 increase by 9.5% per year, comparable to the rates in some OECD countries that have experienced housing booms before the global financial crisis of 2007-2008 which is generally agreed to be ignited by the subprime mortgage crisis in U.S.A. Average rise of 8.6% for U.K., 11.3% for U.S.A. and 13.3% for Ireland for the period 2006-2007 (Bank of International Settlement - Property Price Statistics). In addition, the sharp increase in housing prices in Malaysia for the period running-up to the 1997 housing bubble bust, was at an annual average of 11%. On the other hand, the Malaysian economic growth since coming out from the 1998 financial crisis has range from 3.32% to 9.43% with the exception in year 2001 and 2009 when growth dropped to 0.52% and −2.53% (The World Bank - the GlobalEconomy.com). In addition, other factors that fuel housing demand have included significant growth in population and heavy rural urban migration. After examining the long run expansion of HP in Malaysia, two research questions arises. One, is the recent volatile trend of HP (2009-2016) a housing bubble or just another price cycle in the property market? Two, if it is a price cycle, at what stage is the cycle moving through? Is this phase of housing price movements a housing bubble or a price cycle supported by fundamentals?

Our results show that other than cities like Kuala Lumpur and George Town which may be facing an incoming risk of a bubble, Malaysia as a whole, is free of any impending bubble in the immediate future. What we are experiencing is actually a periodic severe form of HP cycle. However, by providing a new piece of indication, it is found that Malaysia is facing a strong upward

surge on HP especially after the year 2009. Nevertheless, the price cycle is still stable.

The rest of the paper is organized as follows: Section 2 reviews selected contentious housing bubble literature. Section 3 describes the empirical methodologies. Section 4 presents the empirical findings and Section 5 concludes this paper.

2. LITERATURE REVIEW

To-date, there is no consensus on the definition of housing bubble. For example, it is recognized that HP in many countries in the OECD have moved in tandem with housing prices in the US during the last 15-20 years. However, only the supposedly infamous bubble (2008-2009) in the US housing market has attracted considerable attention and focus. The reason could be that some economists have found that the rampant growth in international housing prices is rational and supported by fundamentals of supply and demand (Himmelberg et al., 2005; OECD, 2005), while others have described these price rises merely as booms in price cycles. They were careful not to define them as bubbles (Agnello and Schuknecht, 2011; Gallin, 2006). Additionally influential housing economists suggested differing views about the existence of housing bubble in the United States (Gerardi et al., 2010). In view of this unsettled issue about the existence of housing bubble, we start to base our study of whether bubble or cycle on the following definition by Mayer (2011) and Glindro et al. (2011) and then supported by graphical analysis and mean reversion results.

2.1. Definition by Mayer (2011)
Housing bubbles represent extreme movements of HP rising rapidly about 20%, 30%, or even 40% per year for 2 or 3 years and then falling just as rapidly in the following 3 years. This type of housing bubble happened in Las Vegas, Phoenix and Miami in this decade and in Vancouver, Canada, in the late 1980s and Japan in the mid-1980s (Mayer, 2011).

2.2. Definition by Glindro et al. (2011)
Housing bubbles represent extreme movements of HP rising rapidly about 20% (Glindro et al., 2011) per year for two or three consecutive years and then falling just as rapidly in the following 2 or 3 years.

Since Glindro et al. (2011) is a study of housing price dynamics in nine emergent economies including Malaysia, their definition of housing bubble is more appropriate in the Malaysian context. As such, we set 20% rise in HP as our threshold value for raising the alarm for intervention policies and measures to be implemented and to take effect. Therefore we select the 20% as the threshold value to raise the alarm for housing bubble.

However, both definitions are based on the accurately determined fundamental HP. Up-to-date, there is still no consensus of what are the fundamental variables that determine the HP. This study attempts to minimize the effect of this uncertainty by using consistency principle approach that is we investigate the same phenomenon using at least more than two approaches. We review some important literature about housing bubbles.

Scharfstein and Stein (1990) describe a prominent model with all rational agents. However, their model omit considering the fundamentals, and that rational professional investment managers adopt a herd behavior to make the investment decisions similar to that made by their colleagues and by this way they can protect their business prospects based on the fact that when bubbles burst, they can share the blame with the majority of managers that have contributed to inflate the bubble. By this approach, they have introduced certain degree of herd instinct in their computation and analysis. However, their method is unable to explain the tremendous volume of transactions taken place. This study uses mean reversion regression to by-pass this problem.

Another model is presented in Allen and Gale (2000) which explains how a bank-based economy can cause bubbles. In their model, rational investors who have only limited liability can still borrow from banks. So they have the incentive to continue investing even in overpriced assets as long as there is uncertainty about the duration of prices remaining above the fundamental. The rationale behind this behavior is that in the case of a bursting bubble, the bank has to bear the losses. However, as long as the bubble continues, the investor can still make profits. This study agrees with the important role played by banking institutions. However, we do not agree that lax in banking regulations is the sole cause of housing bubble. It is only one of the main causes of housing bubble. This study uses qualitative method to analyze this lax in banking regulation problem.

One popular bubble model is to compare observed HP with fundamental HP as predicted by using the long-run relationship between HP and macroeconomic factors (Abraham and Hendershott, 1996; Kalra et al., 2000; Capozza et al., 2002). However, this approach requires a necessary and sufficient condition for the presence of a bubble which is defined as the divergence of the actual efficient HP from its fundamental value and which is rather subjective. In addition, correct specification of fundamental variables is crucial to the reliable estimates of price deviation from equilibrium since the overvaluation/bubble part is the residual part that cannot be explained by the list of fundamental variables. Glindro et al. (2011) investigate what determines the fundamental values and short-term dynamics of HP in nine Asia-Pacific economies. Ahuja et al. (2010) also use a fundamental model on asset pricing to investigate whether HP are rising too fast in China. In addition, Chen et al. (2013) investigate the existence of bubbles in the Beijing housing market from 1998 to 2010 using economic fundamentals. This is the fundamental model approach to explain formation of bubbles. However for this fundamental approach, it is often unclear as to how to determine the fundamental variables, and to compute the fundamental value from the fundamental variables (Yiu et al., 2013). This problem of difficulties in identifying fundamental variables motivates us to conduct detailed analysis of the variables before selecting the so called fundamental housing variables. To meet this end, we ensure that the model is robust and consistent, diagnostically acceptable, and in line with conventional wisdom and economic theory. Studies exclusively on the Malaysian housing market price movements are relatively few and among which there is a notable research done by Hussain et al. (2012) who have argued

for the presence of housing bubble in five districts in Klang Valley, i.e. Ampang, Batu, Kuala Lumpur, Petaling and Setapak during 2005-2010. Bubble is measured as the difference between market HP and fundamental HP. However the computation of fair (fundamental) HP and definition of bubble is not clearly defined in the study. Importantly, the authors also do not highlight the magnitude of bubble or verify its existence in the study. Another more recent study by Yip et al. (2016) on housing bubble in the Malaysian market has revealed essentially similar finding as this current paper. However, Yip et al. (2016) only applied statistical analysis in their study and has not corroborated their results with economic and affordability analysis. This present paper fills up the gaps and put in detailed economic analysis to back up the statistical findings.

3. EMPIRICAL METHODOLOGIES

3.1. Fundamental HP
Most bubble models need fundamental HP for computation. Fundamental HP are taken to be the fitted HP which are obtained by regressing actual HP on housing determinants like mortgage rate (MTR), mortgage credit to GDP, interest rate and unemployment. The difference between actual and fundamental prices is defined as overvaluation of prices (OVP) which can be due to normal price adjustment or speculative activity. Most studies consider speculative activity as the bubble component. However, in this study, we classify OVP as the bubble component as illustrated by equation 1:

$$P_t = f_t + B_t \qquad (1)$$

Where, P_t, f_t, B_t respectively represents HP, fundamental HP and bubble component. We further assume that bubble component consists of adjustment of prices due to short run price dynamics and prices due to speculation. Basically, this assumption is reasonably valid only if the speculative sub-component is very much larger than the short run dynamic price adjustment sub-component. This is because short run dynamic price adjustment can adjust the price level back to normal price level and thus cannot cause the formation of bubble.

Fundamental HP can be taken as: The long term average prices, or the long run equilibrium fitted HP. We choose the later because it is more plausible. We compute this long run equilibrium HP using a three step approach. Firstly, we identify the housing determinants that have significant predictive information about HP. We do this identification by going through literature review, and then compile a list of the determinants from which we select by merit of significance base on conventional wisdom and stepwise regression. Secondly we run the cointegration regression and thirdly compute the bubble component and then analyze with the aid of graphs and conventional wisdom. The selected significant determinants for this study are GDP, MTR, mortgage credit to GDP ratio (MGD), exchange rate (Japanese Yen/Ringgit) (EXJ) and exchange rate (Hong Kong Dollar/Ringgit) (EXH). Our HP are in fact HP indexes which has the advantage of compensating the difficulty of observing rents for the houses (Mayer and Shiller, 2006).

3.2. Cointegrating Regression
We determine whether each determinant is an integrated series of order 1 that is I(1). If all the series are I(1) we can conduct cointegrating (long run) regression using both fully modified ordinary least square (FMOLS) and Canonical Cointegrating Regression (CCR) models. The fitted values from the regression are our fundamental HP.

3.3. Computation of Bubble Component
We compute the bubble component values (B) by subtracting the fitted HP from the actual HP. It is given by equation 2 in term of percentage:

$$B_{pt} = \ln P_t - \ln \hat{P}_t \qquad (2)$$

The criterion for likely to be bubble is given by equation 3:

$$B_{pt} > 20\% \qquad (3)$$

3.4. Housing Bubble Investigation Methodologies
Any housing bubble should consist of a price booming period and followed by a rapid fall in prices for certain length of time. Thus the first step we should do is to show that there is a rapid price booming for certain period of time. This we can do by three different approaches: One, fixing the threshold for booming price surge; two, analyzing the uptrend graph of prices using common psychology; third, testing the stability of the price movement. The followings are the three types of methodology.

3.5. Graphical Analysis
We analyze price behavior from line graphs by using common logical deduction. In addition, we also analyze HP-income graph. Besides using normal line graph, we also use % increment year-on-year line graph for the analysis. Next by using historical data trend, we define the threshold value for the formation of bubble.

3.6. Price Stability Model (PSM)
We use PSM to test the stability of the price cycle which can be used as one of the measures to identify whether it is a cycle or bubble. If the price cycle is unstable, we can conclude tentatively that it is indeed a bubble. PSM is based on mean reversion regression, a short run regression. Mean reversion regression is popularized by Capozza et al. (2002) who proposes that HP changes in the short run which are governed by reversion to fundamental values and also by serial correlation. In another words, deviation from the fundamental HP are mainly due to economic shocks and that this produces the short-term dynamics of HP. This means reversion process is summed up by the formula given in equation 4:

$$\Delta p_t = \alpha \Delta p_{t-1} + \beta(p_{t-1}^* - p_{t-1}) + \gamma \Delta p_t^* \qquad (4)$$

Where, p_t is log of (observed) real HP and Δ is the difference operator. the long run HP fundamentals which is obtained by FMOLS or CCR cointegrated regression analysis. In efficient housing markets, prices will adjust instantaneously so as to maintain $\gamma = 1$ and $\alpha = 0$. However, since housing is a slow-clearing durable asset, it is reasonable to expect that the current price changes are partly due to previous changes in own price

levels, by the deviation from the fundamental value and partly by contemporaneous adjustment to changes in fundamentals.

For the case when α < 1 and β > 0, the price change is stationary because of the fact that α < 1. Previous changes in own price level has little effect on present changes in price level and that deviation of present price from fundamental values is minimum, indicating that the housing cycles are stable. That is there is less danger of housing cycle becomes a bubble. Put it differently, price increase is due to fundamental adjustment of prices which is classified as price cycle phenomenon. However if α ≥ 1 it means that the data series is nonstationary, producing the housing cycles which are explosive. This is confirmed by the condition β ≤ 0, meaning that current HP are higher than the fundamental prices producing housing cycles which are not stable. Housing bubbles are likely to form.

4. EMPIRICAL FINDINGS

4.1. Graphical Analysis

Figure 1 shows the house price movement trend with three prominent price cycles: 1990-1993, 1994-1997 and 2009-2016. For the first cycle, it starts to rise rapidly from 4% to 25% within 2 years and then drops drastically from 25% to 5% within 2 years also. This satisfies the bubble characteristics of Mayer and Glindro. Similar price movement can be observed from 1994-1997. However, for the third cycle, it started to spiral up from 2% in 2009 reaching a peak of 12% in 2013 and then turned around and decreased to about 6% in 2015. This third cycle does not show sharp price movement. So this temporal pattern does not fit the Mayer or Glindro criterion for bubble. This graphical analysis suggests that we are not in the midst of a bubble but rather a prolonged price cycle.

One new indication seems to emerge from analysis of income and HP graph as shown in Figure 2 and which supports the above conclusion. Between 2001 and 2008, income moves parallel with HP which is the norm since with more income, more people can afford to buy houses and thus pushing up HP. However, despite the drastic drop in income for the period 2008-2009, HP still

spiral upward. Subsequently income goes up in 2010 but it drops again in 2011. All these while, HP move up rather exponentially. The two graphs suggest that HP moving up faster than income after 2011. Apparently HP are not sensitive to the fluctuation of income, a possible indication that investors are convinced that HP will continue to rise and thus very certain of a profitable return for their investments. This result is in line with the finding noted in BNM 2012 report of the trend of current prices are affected by past prices. This is a vital sign for the formation of housing bubble. Still, this may not satisfy the criterion for the formation of a bubble. Income may not move up in tandem with the rise of HP. But this could be a temporary phenomenon (a short run economic shock) as once the economy picks up income level will move up.

4.2. Empirical Analysis

To identify cycle or bubble, we compute the difference between the observed HP and fundamental HP which are predicted based on the long run relationship between HP and macroeconomic and financial factors. However, in order to obtain the correct set of housing determinants to run effective cointegrating regression, we examine past literature to obtain housing determinants, followed by general to specific rule to run regression and then analyzing the results from two different long run cointegrating regression.

Prior to performing cointegrating regression, Granger (1969) causality test and Johansen's (1994) multivariate approach to cointegration test have to be performed initially. It is necessary to confirm whether the dependent variable is I(1) and all the explanatory variables are also I(1) and no I(0) explanatory variable. For this purpose, we conduct Augmented Dickey Fuller and Kwiatkowski–Phillips–Schmidt–Shin unit root test. Following the confirmation of the initial statistical tests, we perform the Johansen multivariate cointegration test and Granger causality analysis. It is found that all the variables, HP, GDP, MTR, exchange rate of Japanese Yen to Ringgit (EXJ), exchange rate of Hong Kong dollar to Ringgit (EXH) and household debt to gross domestic product (MGD) are I(1) and cointegrated, meaning that there is a long run relationship among them. Next, we run the VECM model and the end result is that GDP, MTR, MGD, EXJ and EXH each has long run causality with HP, running from each determinant to HP. However, the results of Granger causality test suggest that

Figure 1: Year on year house price changes in %
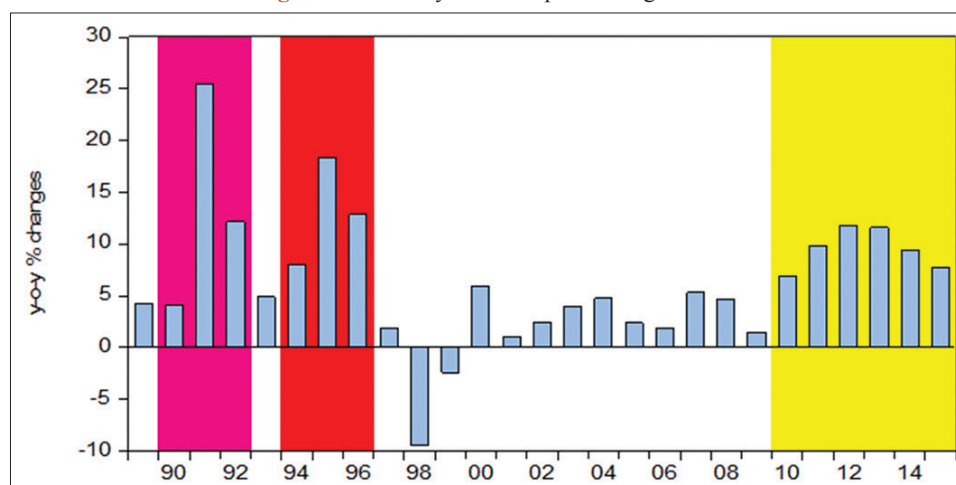
HP to GDP and HP to EXH are unidirectional. The conclusion is that there may not be any short run causality from GDP, MGD, MTR, EXJ and EXH to HP. This suggests that there is no short run equilibrium among the variables in level. Indirectly this lends support to our preference for long run causality analysis. The final result is: We conclude that HP in the real estate sector and its determinants in Malaysia are cointegrated and that there is a meaningful long-run relationship between them. Then from the results of cointegrating regression of Table 1, we compute the fitted values of HP using the best fitted model which happened to be FMOLS. The fitted values or the fundamental prices are shown in equation 5:
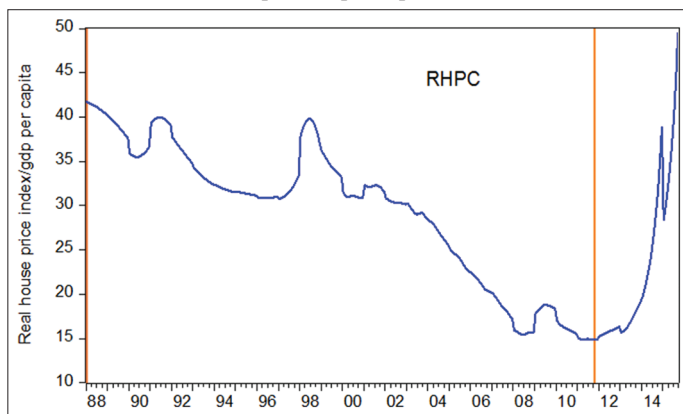
$$\hat{p}_t = E[\ p_t\ ] \tag{5}$$

Where, $\hat{p}_t$ represents the fitted HP and p_t is the HP.

4.3. Long Run (Cointegrating) Regression Results

When FMOLS is compared with CCR, both of them produce a set of results which is not in conflict with economic theory

Figure 2: RHPC = Overall real house price index/gross domestic product per capita

Source: Real house price index/gross domestic product per capita is obtained form international monetary fund

Table 1: Cointegrating regression results with house price as dependent variable

Model	FMOLS	CCR
	Model 1	Model 2
GDP	0.12 (0.01)	0.11 (0.02)
MGD	18.68 (0.00)	18.42 (0.00)
MTR	−2.01 (0.01)	2.03 (0.02)
EXJ	4.64 (0.00)	4.62 (0.00)
EXH	−1.34 (0.00)	1.35 (0.00)
Adjusted R²	0.98	0.98
Long run VAR	1.25	1.24
S.E. regression	1.34	1.35

VAR: Variance, S.E. regression: Standard error of regression, GDP: Gross domestic product, FMOLS: Fully modified ordinary least square, CCR: Canonical cointegrating regression

and conventional wisdom. However, FMOLS has a better set of adjusted R square, long run variance and standard error of regression. Hence, we select the set of results produced using FMOLS to compute the fundamental HP using equation 5. Next, we compute B_{pt} by using Equation 2 and keeping in mind that B_{pt} must be more than 20% for possible bubble to exist. The results as shown in Table 2 indicate that B_{pt} is always <20%. The criterion in equation 3 is not satisfied and therefore it is expected that there is no bubble yet but price cycle.

Values in Table 3 shows that $\alpha < 1$ and $\beta > 0$, suggesting that the price change is stationary and that HP and its fundamental values are very close to each other, which indicates that the HP cycle is at play and that it is stable. Capozza et al. (2002) found that HP increases are due to fundamentals only. In addition, it is found that $(1 + \alpha-\beta)^2-4\alpha = 1.963 > 0$. This implies that the transitory path in response to changes in equilibrium HP value suggests a damped fluctuation around the equilibrium level. The property of oscillation is determined by the magnitude of $\alpha + \beta$. Usually a higher α indicates a higher amplitude of price oscillation while a higher β implies a higher frequency of the fluctuation process. As a whole, since the HP changes are stable, it lends support to the previous graphical analysis that the HP are efficient in the sense that it follows the fundamental path and recover the equilibrium price after absorbing some short term economic shocks.

5. CONCLUSION

From a policy perspective, it is important to identify the components of housing price overvaluation - whether due to housing market frictions or unsustainable overconfidence and high expectation of capital gains from the housing market, as each driving factor would require different containment approach. From the afore described study, employing graphical analysis and some psychology consideration, we come to the conclusion that the Malaysian housing market is facing a severe price cycle starting from 2009 to 2016 and the cycle is still persisting. This cycle is not classified as bubble because it does not spiral up sharply for two consecutive years and fall rapidly for the next two subsequent years. Moreover, when this cycle is analyzed, it is found to be stable. Basing on these results, we conclude that it is a price cycle. However, the price behaviour of being disconnected from influence of income suggests overconfidence on the part of house buyers or investors. Additionally, this cycle demonstrates that price expansion has peaked in 2013 and since then the prices have started to come down gradually. Furthermore, the HP-income graph suggests that increase in income cannot catch up with the rise in HP and thus causing housing affordability problem after 2011. Other than income and HP imparity, land cost, construction cost and compliance cost have gone up drastically, roughly in the ratio of 20%: 70% and 10% which are due mainly to the worsening of exchange rate with respect to the USD. Therefore

Table 2: Annual OVP in percent

Years 2001-2012	01	02	03	04	05	06	07	08	09	10	11	12	Total
B_{pt}=annual OVP in %	1.1	0.8	2.0	1.5	2.3	3.8	2.2	0.4	0	3.5	3.7	4.1	25.4

OVP: Overvaluation of prices

Table 3: Short run house price dynamics

Variable	Coefficients	t-statistical	P value
C	0.0067	3.373	0.0018
Δp_{t-1}	−0.322	−2.446	0.0190
$p_t^* - p_t$	0.0045	4.622	0.0001
Δp_t^*	0.0051	4.023	0.0002
Adjusted R²	0.451		
F (P value)	0.000		
S.E. regression	0.0077		

Persistence parameter α=−0.322, mean reversion parameter β=0.0046, contemporaneous adjustment parameter γ=0.0051

the scenario points to the solution that to overcome the current housing problem is to hasten economic growth to create higher income for the people.

6. ACKNOWLEDGMENTS

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