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Prediction Supply Modelling for High-Cost Housing in Malaysia

Fazilah Ramli[#1], Rozlin Zainal[#2], Maimunah Ali[*3]

#*Construction Management Department, Faculty of Technology Management and Business, Universiti Tun Hussein Onn Malaysia, 86400, Parit Raja, Batu Pahat, Johor, Malaysia.*
**Management and Technology Department, Faculty of Technology Management and Business, Universiti Tun Hussein Onn Malaysia, 86400, Parit Raja, Batu Pahat, Johor, Malaysia.*

[1]fazilahramli92@yahoo.com
[2]rozlin@uthm.edu.my
[3]maimunah@uthm.edu.my

Abstract— **Oversupply and overhang among the high-cost housing type has become a blazing field that is often discussed in the press due to the failure in getting a balance of construction demand and supply unit. The basic purpose of the research is to develop a prediction modelling for high-cost housing supply based on the macroeconomic factors. The investigation involved the improvement of the analytical framework by synthesizing the models and framework advanced by a past analyst on the housing supply market framework. As initial, macroeconomic data of MHPI, GDP, BLR, CPI, population size, PCI, CBI, housing demand rate and housing stock index from 2007 to 2017 are collected from National Property and Information Centre (NAPIC) and Department of Statistics Malaysia (DOSM) website. The prediction of the housing supply is investigated using Multiple Regression Analysis (MRA). Based on these problem, the investigation contended that the housing supply prediction model will be accomplish using experimental data from economic data with supported from macroeconomic factors such as world borrowing cost, outflows of foreign capital, subprime crisis, population characteristics, migration, urbanization, stamp duty exemption, moratorium, RPGT, and also microeconomic factors such as location and accessibility, basic and public facility, financial loan, location and placement, credit facility, construction cost, development approval, price and rental and housing stock.**

Keywords— *housing Malaysia, Prediction Supply Modelling, microeconomic changes, factor analysis, Multiple Regression Analysis (MRA),*

1. Introduction

The challenging of the housing market condition due to the growing pile of unsold housing units has been limelight in the press and has been the issue of regular debates by government planning and property players. The focus part is no longer about the growth in the housing price since the house price has moderated to 5.6% in the second quarter of 2017 compared with 7.1% a year ago [1]. The seriousness of the issue is attested by statistical data when NAPIC found that the number of unsold units had increased by 41% to 21,000 units, which valued at RM12.26 billion, with most of the value contributed by 7,300 units that are priced at half-a-million ringgit each [2]. As the percentage of the unsold housing units can be related to the phenomenon of imbalance of the housing market, therefore, the remaining 21,000 units approved by the planning authorities are actually an oversupply. Over the past five years, be that as it may, the yearly fulfillment of houses has declined significantly to 80,089 units, far underneath the 166,000 normal net increments in the quantity of family units' every year (BNM, 2016) [3]. This proposes a normal lack of 85,911 lodging units for each year somewhere in the range of 2011 and 2015.Unusually, the critical slackening unsold housing units still happen when the housing supply is diminished. Ironically, [3] revealed that numerous new units have been produced but the survey likewise features that many existing units are unsold. Malaysia's Household Income and Basic Amenities Survey Report of 2012 demonstrate that about 42% of households facing affordability in homeownership issue [4]. This sign demonstrates the housing moderateness crosswise over Malaysia has continuously declined because of the uneven pace of house costs and income growth [3].Realizing that the critical figures of unsold, unsold, and low performance mostly involve the high-cost housing sales [5], have sparked lively discussions and debates, it is about time to implement the prediction supply model, to highlight the importance of controlling the supply by only focussing on the actual supply needed. As stressed by [7-10], market failure happen due to irresponsiveness of current planning practices

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during the earlier stage in the housing development. [11] also opined that the imperfection housing market can be minimized by giving a solution to solving the early stage of determining the housing supply. At the same time, [12] also points out that efficient housing supply can be achieved by not only focus on the housing needs but also should consider several factors. The prediction supply model is established by the previous study as a method of market research to find out the exact number of high-cost housing needed by the locals [13], however, [14] argued that it will not happen since there are external factors which also contribute and influence the supply and the production of housing.

With this background, this research aims to develop a prediction supply model for the high-cost housing market by the interplay between housing supply determinant factors. Therefore, this research is going to evaluate the responsiveness the macroeconomic and microeconomic changes,

production process and government policy toward the determination of high-cost housing supply. Further to those, this research also highlights the current issues of unsold from the oversupply of housing as experienced in the Malaysian housing property industry. [15] claimed that the majority of the housing units offered in the market have caused oversupply problem in the housing market. Table 1 shows the housing provided by developers still beyond the housing demand as it has been on an inclining trend since 2013. The table shows the rise for the surplus of the high-cost housing supply from 2013 until 2016 record an average increase for 9.1% per year. About 56,137 housing units were identified as an overhang during all the years with a total worth more than RM 20 billion. For most of these five consecutive years, Pulau Pinang (northern), Selangor (western), Johor (southern) and Pahang (eastern) are identified contributed to the huge of the total amount for high-cost housing unit during 2016.

Table 1. Surplus of the High-Cost Housing Unit in Malaysia (NAPIC, various years)

State	2013	2014	2015	2016	2017
	Unsold Housing Unit	Unsold Housing Unit	Unsold Housing Unit	Unsold Housing Unit	Unsold Housing Unit
Perlis	29	80	66	1	9
Kedah	379	674	1,437	1,549	303
Pulau Pinang	799	233	1,018	4,601	836
Perak	119	810	937	1,897	562
Selangor	650	1,041	4,617	3,647	1,788
Melaka	129	101	70	597	93
Johor	1,917	4,107	3,630	4,584	1,911
Negeri Sembilan	300	703	537	1,262	728
Kelantan	165	98	208	190	99
Terengganu	49	308	126	785	979
Pahang	213	841	1,091	940	1,294
Total	**4,749**	**8,996**	**13,737**	**20,053**	**8,602**

2. Malaysian Housing Property Market

According to [16], housing property markets in Malaysia are found to be the largest property sector as the sector accounts by recording more than 60% transactions which equivalent to two-thirds from the total property transactions in the Malaysian every year. Ironically, the existence of unsold housing units resulting from the oversupplied market has been a debatable issue in Malaysia. In fact, most states recorded a plunge sales

performance were about 20,876 unsold housing units, which worth as much as RM12.26 billion. As designated by the NAPIC, there were approximately 7,538 new housing units launched in Malaysia in 2015, while there was a present stock around 4.8 million units in the market reported in Q1 2015 [17]. The extensive numbers of unsold units suggest the issue of struggle in selling and moderateness. Besides that, NAPIC (2017) also reported that two storey and three storey terraced, condominium and apartment units are identified as the biggest contributor in the addition of 14,792

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unsold housing units which is equivalent to 41% increase during 2017 compared to the second quarter of the previous year.

From that figure, half of the unsold units priced between RM250, 000 and RM500, 000, meanwhile another 23.3% units are priced above RM500, 000. Not only that, [18] reported that Kuala Lumpur saw the most launches with 22,000 units, albeit with the low sales performance of 19.5%, followed by Selangor (13,522 units with 45% sales performance) and Johor (7,926 units with 44% sales performance). Again, most of these unsold units comprise two- or three-storey terrace houses priced between RM500, 000 and RM1 million. All the reports are seem to be strongly supported with [19] who identified that developing terraced housing units already become a favourite among developers since 2002 even [20] had proved that those housing types are known as the riskiest assets compared with other housing types such as bungalows, semi-detached houses and condominiums or apartments.

Even more housing launches are made by developers, [21] and [22] had found that the housing launch for the category of houses priced above RM250, 000 is increasing rapidly compared to housing priced below RM250,000. Figure 1 shows the housing launch for priced below RM250, 000 has the lowest unit beginning 2015 until 2017 since every consecutive year experienced an average drop in housing launch 3,000 units per year. Meanwhile, housing launch for priced between RM250, 000 until RM500, 000 is high as it is having an increment unit as much as more than 10,000 units every year and experienced the highest housing launched unit during 2016 and 2017. Not only that, housing launch for housing priced above RM500,000 also still high compared to the housing priced below RM250,000 even the sales performances for that category is not increasing from time to time.
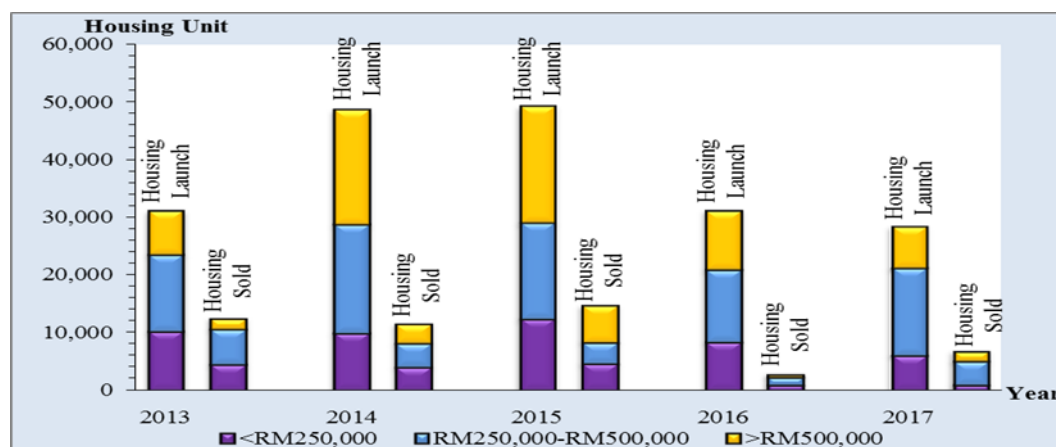

Figure 1. Housing Sales Performances by Price Range in Malaysia (NAPIC, various year)

This sign actually shows that the launch of a new housing unit had slightly turned to the luxury property segment from 2012 until 2017. The situation is getting worse when the sales performance of housing priced above RM250, 000 is recorded as the lowest total sold units in a decade as only 17% of housing launched is sold. The unsold volume and value increased by 40.0% against the preceding half of 2016, predominantly priced starting RM250,000 to RM1,000,000 (BNM, 2016). This is close to double the historical average of 72,239 units per year between 2004 and 2016 which is equivalent to 130,690 units are unsold are identified during 2017. By looking at this scenario, it can reflect that unaffordability issue is become worsen as the majority of the unsold unit come from the overflow of high-cost housing.

2.2 Review on the Prediction Model Developed by Previous Studies

Studies trend before the year 2000 is not highlighting too much on way to balancing the market. The study only discussed on the market situation through theoretically rather than tested through empirically. Meanwhile, the model developed starting during 2010 shows the studies are prone to investigate on how to balancing the housing market. As an example, [23-25] related the housing market with the economic factors that affect the housing market indicates the factor of the subprime crisis and the Asian financial crisis during 2007 until 2009 and 1996 until 1998 respectively. The crises occur seem to raise awareness among researchers about the importance of the study on the effect of the economic factors

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toward the housing market especially. We can see the research is focussing on to find a solution for a current problem that such as surplus of the high-cost housing as recorded by [26] and [17] or highlighted by the previous study [27] on

oversupply of housing in Johor leading for [28] develop a prediction model for low-cost housing demand. Table 2 shows the advantages and disadvantages of the model proposed by previous studies

Table 2. Advantages and Disadvantages of Previous Model Developed

Year	Author	Advantages	Disadvantages	Structural Element
1998	Ali	Enables estimation of the optimum supply for shop house unit	-The model does not include all factor of macroeconomic and macroeconomic supply -Adapted to the particular area	-Property market report, NAPIC, residential area, Shop house price, shop house occupancy rate, building material cost index, type of shop house, total housing unit, shop house rent
2010	Lee et al.	Function of demand for new house and supply for new housing enabling to establish the main factors that determine the unsold new housing stocks	-The model does not include such factors as social and political -The model is more oriented to the analysis of government intervention while regulating the policies	-New house prices, housing stock prices, housing loans, housing stock prices, funds, materials and manpower
2012	Xu & Coors	Notably comprehensive grouping of the factors for the evaluation of urban residential development in the sustainability assessment	-Laconic and simplifies description -It is not clear what group is the most influential	-Driving forces, pressure, state, impact, environment, society, urban population, economics, urban GDP, housing demand and supply
2014	Ozbas et al.	The model can be used in different specific cities and regions around the world	-The model cannot be accurately evaluated when there is a significant delay -The model is more oriented to the analysis of causal relationship in housing market	-Economic balance, supply, demand, policies, construction of new buildings and price
2016	Salleh et al	Clear and comprehensive enumeration of the peculiarities of the country with housing market environment, microeconomic, macroeconomic	The model takes into account only graphical structure of housing market elements to establish housing mismatch	The local community, government, and private institution
2016	Zainun et al.	The influence of actual time series data on low-cost housing demand on the forecasted housing demand is established	-Underestimated demand-supply balance and the influence of general macroeconomic and microeconomic indicators are not considered	-Time series data on housing demand, low-cost housing

This research uses an integrated of all the theories listed as a conceptual framework and the conclusion is illustrated in Figure 2. The process and the elements affecting the surplus of the housing units are shown with detail refer in this illustration. All the elements were derived from the literature review from several disciplines. Combination theory of factors affecting the surplus of housing is come from various areas such as the role of formal and informal institutions, regulations, economic growth, social and politic.
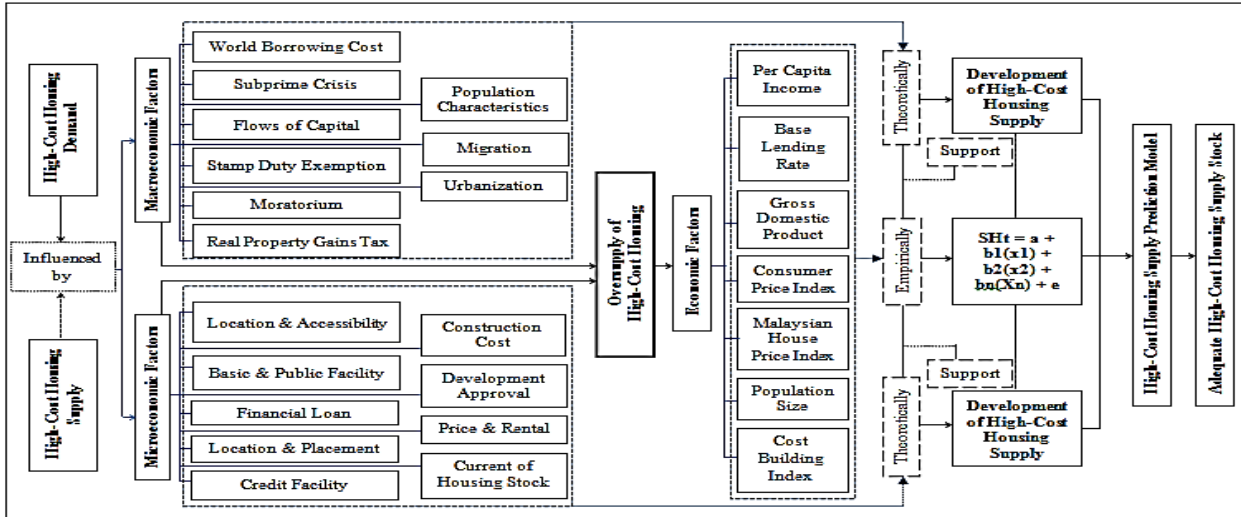

Figure 2. Proposed Conceptual Framework

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3.   Methodology

In this research, the correlation technique is used to explore the interrelationships among the factors involved. Only 346 samples will be selected from 3,488 populations of housing developers who have conducted or currently develop the high-cost housing projects around Johor, Selangor, Pahang and Kedah will answer the questionnaires forms. Pearson r correlations analysis is used to evaluate the relationship between macroeconomic factors (world borrowing cost, flows of capital, subprime crisis, population characteristics, migration, urbanization, stamp duty exemption, moratorium, real property gains tax) and microeconomic factors (location and accessibility, basic and public facility, financial loan, location and placement, credit facility, construction cost, development approval, price and rental, housing stock) with the development of high-cost housing supply in Malaysia. The strength and direction of each variable are defined to describe each relationship between all factors. It is necessary to test all the factors by using the correlation analysis method to test their formulating relationships, whether they are having a strong correlation or weak correlation between macroeconomic and microeconomic factors towards the development supply of the high-cost housing in Malaysia.

Once the researcher had recognized the effect of the factors on the high-cost housing supply in Malaysia therefore the research will use the secondary data analysis method. Multiple Regression Analysis (MRA) will be carried out since the presume variables must be empirically proven by data. The dependent variable (Y) is the supply unit of high-cost housing while household income, employment rate, GDP, mortgage interest rate, stock index, cost index building, unemployment rate, rent and price, vacancy rate, number of residential house are used as independent variables in predicting the housing supply unit that representative for the whole of the economy, social and politic factors in the macroeconomic and microeconomic context. In the secondary data analysis, the online source was preferred due to the availability of most of the data, efficiency in extracting and analysing the data and constraint of time and resources.

All the results will be used to develop the prediction supply for the high-cost housing market in Malaysia. Macroeconomic and microeconomic factor, which cannot be measured via empirically is used to support the development of the prediction modelling. The multiple regression analysis in forming the hedonic equation will be utilised during this stage. The development of prediction of high-cost housing supply in Malaysia will resume as the variables are tested for statistical significance for further analysis. The model is expected to consist of:

$$SHt = a + b1(x1) + b2(x2) + bn(Xn) + e \qquad (1)$$

Where,

SHt is a house supply at a particular time t,

a is a constant,

x1…xn is a set of macro and micro-housing factors,

bl…bn is the sensitivity of macro/micro factors on the price

During regression analysis, the formation of the multiple regression analysis equations can be carried out using the SPSS software. The stepwise analysis takes into account the existence of multicollinearities in which it will continue to set aside independent variables that have relationships with other independent variables during the analysis. Firstly, all variables included in the analysis will analyse all variables simultaneously, regardless of whether there is a strong relationship between the independent variables, which may result in multicollinearity problems. This stage is important in formulating the regression model so that the variations of variables independent of the dependent variable can be identified and explained.

4.   Result and conclusion

Through this research, it is hoped that a clear picture can be made about the supplying the adequate unit of high-cost housing market based on the implications of macroeconomic and microeconomic factors influencing the determination of high-cost housing supply involved in the housing development process by the developers. As such, this research is expected to benefit three major groups, which are housing developers, planning authority and academician. This research can be used as a guideline to developers in supplying adequate units of high-cost housing since this research will provide the economic factors influencing the determination of housing units in a way to minimize the oversupply issues. The findings are expected to be one of the

sources of reference to the housing supply sector as the determination of housing supplies is still less in Malaysia than in other developed countries.

Besides that, this research can assist planning authorities in determining the best allocation in the process of defining development standards and approving applications development of high-cost housing based on current market needs. Finally, this research as a whole can provide ideas and knowledge to academicians on developing a prediction model of demand or supply to minimize the vacancy unit problem appears among the properties due to the oversupply unit especially for the housing market by using macro factors as well as local factors. Therefore, the results of this research can be used as a basis for further research to a wider area in which it might involve market analysis across the country.

Acknowledgment

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