Factors Affecting Housing Price in Malaysia Using Structural Equation Modeling Approach

(Faktor Mempengaruhi Harga Rumah di Malaysia menggunakan Pendekatan Model Berstruktur Persamaan)

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ABSTRACT

House buyers are primarily concerned with house prices, on top of other aspects such as housing preferences, and housing financial. In Malaysia, the problem regarding housing issue is one that is regularly spoken due to sharp rise in housing prices which made that most houses are no longer affordable for most Malaysians. Thus, this study aims to identify the key factors influencing the price of houses in Malaysia. Data was collected by distributing a survey questionnaire to 245 respondents throughout the country. The data was then analyzed using the structural equation modelling (SEM) analysis via the IBM AMOS statistical software. The study instrument was evaluated using the exploratory factor analysis and confirmatory factor analysis techniques. The theoretical model was developed using the SEM technique. The findings derived are hoped to benefit policymakers, developers, urban planners, and contractors in developing strategies for materializing affordable house prices for homebuyers in Malaysia.

Keywords: Factor analysis; homebuyer; housing affordability; housing prices; structural equation modeling

ABSTRAK

Pembeli rumah amat mementingkan harga rumah selain aspek lain seperti pemilihan perumahan dan kewangan perumahan. Di Malaysia, masalah berkenaan perumahan seringkali diperkatakan berikutan kenaikan mendadak harga rumah yang menyebabkan kebanyakan rumah tidak lagi mampu dimiliki oleh kebanyakan rakyat Malaysia. Justeru, kajian ini bertujuan untuk mengenal pasti faktor utama yang mempengaruhi harga rumah di Malaysia. Data dikumpul dengan mengedarkan borang soal selidik kepada 245 responden di seluruh negara. Data tersebut kemudiannya dianalisis menggunakan analisis pemodelan berstruktur persamaan (SEM) melalui perisian statistik IBM AMOS. Instrumen kajian dinilai menggunakan teknik analisis faktor jelajah dan analisis faktor pengesahan. Model teori telah dibangunkan menggunakan teknik SEM. Penemuan yang diperoleh diharap dapat memberi manfaat kepada penggubal dasar, pemaju, perancang bandar dan kontraktor dalam membangunkan strategi untuk merealisasikan harga rumah mampu milik untuk pembeli rumah di Malaysia.

Kata kunci: Analisis faktor; harga rumah; pembeli rumah; pemodelan berstruktur persamaan; perumahan mampu milik

INTRODUCTION

The main concern for homebuyers in general is the price of houses. In major cities worldwide, owning a house is a rather difficult endeavour due to the exorbitant prices. This issue can substantially affect the demand for houses at the back of the rapid economic development in recent years. Economically, there is an increase in housing demand but there are difficulties in fulfilling it due to

limited resources. This in turn results in housing shortage and ultimately higher house prices each year. Globally, housing contributes 20% to 50% of capital and 2% to 10% of the gross domestic product (Nayeri & Rostami 2018).

In Malaysia, the most prominent issue is that the growth of household income is not at par with the growth in housing prices (Latif et al. 2020). In short, individual wages are so low to the extent that people cannot afford to own a house, while the price of houses continue to skyrocket. Although the price of houses is showing a downward trend now, property developers are still faced with the rising issue of overhang i.e., properties being vacant or unsold for a very long time.

Exorbitant house prices and the inability of people to own a house have now reached a critical level (Osmadi et al. 2015). According to Ismail (2019), the residential market in Malaysia has exceeded the affordability threshold of 3.0 times the median annual household income and has surpassed it 4.0 times consecutively from 2002 to 2016. Bank Negara Malaysia (2017) reported that as of 2016, houses in Malaysia remain unaffordable based on the Median Multiple 5.0 international standard. Based on estimations, an affordable house in Malaysia has a maximum median price of RM282,000 and below, but the actual median house price at present is RM313,000. In comparison, Malaysians have an average median monthly income of merely RM5,288.

House prices are determined by several variables as identified in past studies (Chen, Chien & Lee 2011; Monkkonen, Wong & Begley 2012). Based on the literature review conducted, a number of research items were identified and adapted to be used as measurement items in this current study. Table 1 lists all the 30 items.

TABLE 1. Items in housing price questionnaire

No	Factor	Measurement	References
1		I would consider the distance of shops when I purchase a house	
2		I would consider the availability of supermarket or retail centers when I purchase a house	
3		I would consider the existence of public infrastructures (health care centre) when I purchase a house	
4		I would consider the presence of schools when I purchase a house	
5		I would consider the distance travelled to work when I purchase a house	
6		I would consider the level of crime rate when I decide to purchase a house	
7		I would consider the safety of the neighborhood when I decide to purchase a house	
8	Housing Satisfaction	I would consider the level of pollutants (air, water, noise) when I decide to purchase a house	Sean & Hong (2014)
9		I would consider a society of the neighborhood when I decide to purchase a house	
10		I would consider the built-up size when I decide to purchase a house	
11		I would consider the size of the living area when I decide to purchase a house	
12		I would consider the number of bathrooms when I decide to purchase a house	
13		I would consider the number of rooms when I decide to purchase a house	
14		I would consider the internal structure of a house when decide to purchase a house	
15		I would consider the external structure of a house when I decide to purchase a house	

16		I realize the existence of National Housing Policy evolve by government	
17		I believe that National Housing Policy was established to provide adequate housing	
18	Housing Policy	I believe that National Housing Policy was established to provide comfortable housing	Bakar et al. (2016)
19		I believe that National Housing Policy was established to provide quality housing	
20		I believe that National Housing Policy was established to provide affordable housing	
21		I realize of every new changes made by the government on housing policy	
22		I would consider the effects of Real Property Gains Tax (RPGT) when I decide to purchase a house	
23		I would consider the Developer Interest Bearing Scheme (DIBS) given by developers when I decide to purchase a house	
24	Housing Financial	I would consider the Base Lending Rate (BLR) when I decide to purchase a house	Sean & Hong (2014)
25		I would consider the importance of Mortgage Loan to Value Ratio (LTV) before making a decision to purchase a house	
26		I would consider the property cooling measures set by the government when I make a decision to purchase a house	
27		I believe that my monthly income is insufficient to save on the housing deposit for purchasing the house	
28	Household Income	I believe that houses are not affordable because of my financial commitments	Zyed (2014)
29		I have difficulties to purchase a house because my income is not enough to secure a housing loan	
30		I have difficulties to purchase a house because my income is not enough to pay the monthly mortgage	

MATERIALS AND METHODS

SAMPLE OF STUDY AND DATA COLLECTION

A preliminary study was performed to achieve the primary research objective. The structured questionnaires created using Google Forms were distributed to the respondents, and a total of 245 questionnaires were returned. The questionnaire distribution and collection process transpired over a time period of three (3) months from August 2021 until October 2021. The research method is quantitative in nature. There are two stages involved in this study. Stage 1 entails a discussion on the research instrument development and the data collection method. Stage 2 entails a discussion on the sampling technique employed for the research instrument.

Following the questionnaire development, a pilot study was conducted in July 2021 to test the instrument involving a small group of 30 respondents. This pilot study was conducted to ensure that the instrument was free of semantic issues, ambiguity, and impreciseness including vague questions, lengthy items, and inadequate content and structure. The feedbacks received were used to improve the instrument. The questionnaires were compiled via web survey, whilst their distribution was conducted using social networks including Facebook, WhatsApp, and Telegram.

The study was designed and conducted nationwide. The sample size was determined based on the formula of Hair et al. (2010). The rule of thumb is that a minimum sample size of 200 is adequate enough for performing a maximum-likelihood based estimation i.e., a typical Structural Equation Modeling (SEM) estimation. The sampling technique could either be probability or non-probability based (Bajpai 2011; Bryman & Bell 2007).

This study employed the non-probability sampling technique i.e., a convenience sampling technique due to difficulties in identifying the sampling frame. The sample respondents were selected using the convenience sampling method as the researcher selected the samples conveniently at the location where the data collection process was carried out (Etikan, Musa & Alkassim 2015). In this study, the sample was chosen based on screening process to the target respondent to ensure that only the right person was participated and answered the questions.

THE INSTRUMENT (QUESTIONNAIRES)

There are four sections to the questionnaire. Section A is for capturing the demographic information of the respondents including their age, gender, ethnicity, marital status, and highest education level. Section B is for inquiring the respondents' current employment background i.e., their occupation, current gross monthly salary, gross annual salary, and total years of working experience. Section C is for capturing details about the respondents' current residence i.e., house type, total years of living there, and type of ownership i.e., self-owned, rented, or family-owned. If self-owned, two sub-sections ensue involving questions about house price, monthly mortgage, and its acquisition. Finally, Section D focuses on capturing the respondents' opinion regarding specific housing attributes and their effect on house prices. A 5-point Likert scale was used to measure the responses i.e., from 'strongly disagree' to 'strongly agree'. Past studies had indicated that a 5-point Likert scale is more intelligible for respondents for the purpose of expressing their views (Marton-Williams 1986). This scale can also increase the rate and quality of responses apart from lessening the respondents' 'frustration level' (Babakus & Mangold 1992). The intended 'frustration level' in this study is that the respondents become less confusing to read out and select the answers because this five-point scale is quite simple for the interviewer rather than other scale.

MEASUREMENT AND ASSESSMENT OF GOODNESS OF MEASURES

In this study, data analysis was performed by employing the Statistical Program for the Social Sciences (SPSS) and Structural Equation Modeling (SEM), aided by the Analysis of Moment Structures (AMOS) software version 28. SPSS and AMOS can effectively reduce data and test the models in behavioral and social science research towards achieving the research objectives.

Model development and result presentation were carried out using the exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). EFA identifies the questionnaire items that define each variable scale the best, omitting items with no contribution to any variable scales and correlating items which contribute to a specific variable scale in the same direction. According to general consensus, each individual item should have a factor loading with a minimum value of .60 and above to guarantee retention (Awang, Lim & Zainudin 2018; Ehido et al. 2020; Yahaya et al. 2018).

Meanwhile, CFA validates and confirms the factor measuring variables so as to estimate the factor structures in the measurement model. This is carried out to determine the fitness of the model to the data (Zainol 2018). Among the measures for doing so are the assessments on data normality, regression weight, standardized regression weights, square multiple correlation (R^2), variance, residual covariance, correlations, covariance and outliers. For large sample sizes, the chi-square (X^2) of the estimated model is typically statistically significant. Hence, the model fit measurement cannot be restricted to its usage. Other model fit measurements have been proposed (Hair et al. 1995; Tanguma 2001) including the Goodness-of-Fit Index (GFI) ratio, Comparative Fit Index (CFI), Parsimonious Comparative Fit Index (PCFI), Root Mean Square Error of Approximation (RMSEA), and Akaike Information Criterion (AIC) as presented in Table 2. The path analysis measures the contribution of each factor in the SEM.

MODIFICATION INDEX

The measurement model was modified to enable its estimation using the latent variables. The modification may be done via three approaches. The first entails the elimination of items which do not contribute to the variable scale, have no theoretical significance, or have low communality (Bian 2011). The second approach entails correlating items which contribute to the variable scale in the same direction because a common unmeasured latent variable has an effect on both (Schumacker & Lomax 2004). The third approach entails combining the two aforementioned approaches to enhance the data fitness of the model (Arbuckle 2013; Loehlin 2004). Regardless of the approach chosen, the modification must be theoretically grounded to ensure true measurement or theoretical enhancement (Hair et al. 2010). The current study utilized the second approach i.e., correlating items which contribute to the variable scale in the same direction.

TABLE 2. Recommended criteria for fit indices

Category	Fit Indices	Authors	Recommended Value
Parsimonious fit Index	Chi-Square/df	Awang, 2012; Bentler 1990	<3.0 Good; <5.0 Sometimes Permissible
	GFI	Chau & Hu 2001	0.80 is the acceptable value
Incremental Index	CFI	Chau & Hu 2001; Hair et al. 2010	0.80 is the acceptable value
	PCFI	Meyers, Gamst & Guarino 2005	>0.50
Absolute fit index	RMSE	Meyers, Gamst & Guarino 2005; Byrne 2001	<0.08 good fit

RESULTS AND DISCUSSION

DEMOGRAPHICS PROFILES

The demographics profile of the 245 respondents is illustrated in Table 3. Out of 245 respondents, majority were female 174 (71.0 per cent), whereas 71 (29.0 per cent) were male respondents. Majority of the respondents were from the Public Sector Employee

TABLE 3. Respondent's profile

Profile	Frequency	Percentage
Gender		
Male	71	29.0
Female	174	71.0
Occupation		
Self-employed	22	9.0
Private Sector Employee	52	21.2
Public Sector Employee	161	65.7
Other	10	4.1
Age		
24 years old or below	2	.8
25-34 years old	51	20.8
35-44 years old	115	46.9
45-54 years old	62	25.3
55-64 years old	15	6.1
Above 65 years old	0	0
Education Level		
Bachelor Degree	82	33.5
Master's Degree	110	44.9
Doctor of Philosophy	30	12.2
Others	23	9.4
Years of Service		
Less than 1 year	4	1.6
1-5 years	27	11.0
6-10 years	39	15.9
11-15 years	70	28.6
16-20 years	41	16.7
Above 20 years	64	26.1

(65.7 per cent), followed by the Private Sector Employee (21.2 per cent), Self-Employed (9.0 per cent) and finally Others (4.1 per cent). In terms of age, majority (46.9 per cent) of the total respondents were between 35-44 years old followed by 25.3 per cent aged between 45-54 years old. The other age groups are almost evenly distributed as follows: 25-34 (20.8 per cent), 55-64 (6.1 per cent) and 24 years old or below (0.8 per cent). Majority of the respondents (44.9 per cent) are Master's degree holders, 33.5 per cent Bachelor degree holders, 12.2 per cent are Doctor of Philosophy holders and only 9.4 per cent with a Diploma holders or lower level. From the perspective of the years of service, 28.6 per cent of the total respondents have 11-15 years of working service, 26.1 per cent are working more than 20 years old and the rest of the respondents working at 16-20 years, 6-10 years, 1-5 year and less than 1 year are evenly distributed

to 16.7 percent, 15.9 percent, 11.0 per cent and 1.6 per cent, respectively. Based on the information collected, this study is able to identify several key demographic characteristics of the respondents was the public sector employee with the middle aged between 35-44 years old with at least 10 years of working service in the present organization.

EXPLORATORY FACTOR ANALYSIS (EFA)

This technique was conducted using SPSS software to determine the factors that significantly affect the affordability of houses. Pilot study had been carried out prior to the actual work. The reliability test in Table 4 shows that the Cronbach's alpha values range from 0.896 (HI) to 0.958 (HS). All the values meet the requirement since Cronbach's alpha is greater than 0.7 (Nunnally 1978).

TABLE 4. Reliability test for pilot study

Construct	Cronbach's Alpha
Housing Satisfaction (HS)	0.958
Housing Policy (HP)	0.943
Housing Financial (HF)	0.942
Household Income (HI)	0.896

Next, the study proceeds to determined data suitability and sampling adequacy by running Barlett's test of sphericity and the KMO of sampling adequacy. In this study, the KMO value is 0.945 which is above the proposed threshold of 0.6 (Kim & Mueller 1978). Bartlett's Test of Sphericity was found to be significant (p < .000), thus, indicating that the correlations between the items are adequately large for the EFA. The usage of EFA was justified via the aforementioned parameters, leading to the application of the principal component analysis technique. Based on the latent root criterion, a total of four factors with 76.161% variance were extracted (eigenvalues beyond 1). The loadings of the 30-item variables were determined by performing the EFA. Item attributes with coefficients equal to or more than 0.60 were deemed significant for analysis. Hence, items with factor loadings below 0.60 were omitted. As shown in Table 5, the total of 30-item variables consist

of the four factors that affect the price of houses namely House Satisfaction (HS) with 15 items, Housing Policy (HP) with 6 items, Housing Financial (HF) with 5 items, and Household Income (HI) with 4 items. The factors were grouped using the varimax orthogonal rotation of principal component analysis.

Based on the EFA result as presented in Table 5, the latent variable was identified. A latent or unobserved variable, construct or factor refers to a non-directly measured variable (Groenland & Stalpers 2012). Latent variables can either be exogenous or endogenous. An exogenous variable is an independent variable in a model in which an endogenous variable acts as the dependent variable (Zainol 2018). In this study, the dependent variable is housing price whilst the independent variables are the four factors of housing satisfaction, housing policy, housing financial, and household income. These variables are presented in Table 6.

TABLE 5. Result for exploratory factor analysis

Item	Rescaled component			
	A	B	C	D
Housing Satisfaction - Factor 1				
I would consider the distance of shops when I purchase a house	.700			
I would consider the availability of supermarket or retail centers when I purchase a house	.754			
I would consider the existence of public infrastructures (health care centre) when I purchase a house	.748			
I would consider the presence of schools when I purchase a house	.698			
I would consider the distance travelled to work when I purchase a house	.806			
I would consider the level of crime rate when I decide to purchase a house	.732			
I would consider the safety of the neighborhood when I decide to purchase a house	.786			
I would consider the level of pollutants (air, water, noise) when I decide to purchase a house	.755			
I would consider a society of the neighborhood when I decide to purchase a house	.728			
I would consider the built up size when I decide to purchase a house	.787			
I would consider the size of the living area when I decide to purchase a house	.688			
I would consider the number of bathrooms when I decide to purchase a house	.715			
I would consider the number of rooms when I decide to purchase a house	.790			
I would consider the internal structure of a house when decide to purchase a house	.639			
I would consider the external structure of a house when I decide to purchase a house	.677			
Housing Policy - Factor 2				
I realize the existence of National Housing Policy evolve by government		.718		
I believe that National Housing Policy was established to provide adequate housing		.866		

I believe that National Housing Policy was established to provide comfortable housing	.873		
I believe that National Housing Policy was established to provide quality housing	.873		
I believe that National Housing Policy was established to provide affordable housing	.852		
I realize of every new change made by the government on housing policy	.716		
Housing Financial - Factor 3			
I would consider the effects of Real Property Gains Tax (RPGT) when I decide to purchase a house		.771	
I would consider the Developer Interest Bearing Scheme (DIBS) given by developers when I decide to purchase a house		.761	
I would consider the Base Lending Rate (BLR) when I decide to purchase a house		.758	
I would consider the importance of Mortgage Loan to Value Ratio (LTV) before making a decision to purchase a house		.801	
I would consider the property cooling measures set by the government when I make a decision to purchase a house		.790	
Household Income - Factor 4			
I believe that my monthly income is insufficient to save on the housing deposit for purchasing the house			.717
I believe that houses are not affordable because of my financial commitments			.822
I have difficulties to purchase a house because my income is not enough to secure a housing loan			.932
I have difficulties to purchase a house because my income is not enough to pay the monthly mortgage			.898

TABLE 6. Definition of variables

Variables	Definition	Variable
HS	Housing Satisfaction	Exogenous
HP	Housing Policy	Exogenous
HF	Housing Financial	Exogenous
HI	Household Income	Exogenous
Price	House Price	Endogenous

CONFIRMATORY FACTOR ANALYSIS (CFA)

CFA establishes the link and strength of the factors in the measurement model for the purpose of validating and confirming the variables measuring the factors. The structures of the factors must be examined to determine the fitness of the measurement model to the data. The variables influencing the price of houses were converged as an unobserved latent factor for the purpose of measuring each factor based on the EFA result. Each factor has at least three indicators for identification to be strong and stable; otherwise, the factor generally weak and unstable (Anderson & Rubin 1956). The measurement model was modified to ensure its fitness to the data i.e., by eliminating items with no contribution to the variable scale, no theoretical significance, or low communality (Bian 2011) and by correlating items which contribute to the variable scale in the same direction due to the fact that a common unmeasured latent variable affects both (Awang 2012).

MEASUREMENT MODEL ANALYSIS

According to Hair et al. (2010), validity and reliability can be measured using Composite Reliability (CR) and Average Variance Extracted (AVE). To establish reliability, Ramayah, Lee and Mohamad (2010) suggest that CR should have a minimum value of 0.7. To establish convergent validity the AVE should be greater than 0.5 (Awang 2012). According to the results for this study, all factor loading values were significantly higher than the suggested value of 0.50, whereby the CR value for each factor was 0.969 for housing satisfaction, 0.913 for housing policy, 0.866 for housing finances, and 0.926 for household income. As shown in Table 7, not only are all scales within the acceptable ranges, but the CR of all latent constructs also exceeded the 0.7 cut-off value, indicating that the measures are accurate and thereby ensuring strong convergent validity (Ramayah, Lee & Mohamad 2010). Additionally, the AVE value of each factor as shown in Table 7 has been greater than 0.5, demonstrating strong convergent validity and reliability.

TABLE 7. The convergent and discriminant validity test

	CR	AVE	HS	HP	HF	HI
HS	0.969	0.659	0.812			
HP	0.913	0.676	0.778**	0.822		
HF	0.866	0.584	0.334**	0.310**	0.764	
HI	0.926	0.682	0.661**	0.616**	0.270**	0.826

STRUCTURAL MODEL ANALYSIS

This study hypothesized that housing satisfaction, housing policy, housing financial and household income have a significant effect on the price of houses in Malaysia. As shown in Figure 1, 'House Price' is used as the latent variable in the model, with the analysis presented in Table 8. The model fit was found to be better and acceptable whereby the Chi-square = 2.286, GFI = 0.801, CFI = .934, PCFI = .838 and RMSEA = .073. These results indicate the fitness of all the indicators to the data of the 245 respondents, and hence the model is acceptable.

According to the previous study that had been done by Sarkam et al. (2022), the p-values considered to be significant if the value is less than 0.05. Based on the results of this study, it has been proven that the factors of housing satisfaction (HS) and household income (HI) are practically significant to housing prices since the p-values are less than 0.05 and the values of path coefficient is 0.882 and 0.363, respectively. Meanwhile, housing policy (HP) and housing financial (HF) pose no practical significance to the price of houses since the p-values are greater than 0.05 with path coefficient values is -0.038 and 0.003, respectively. Table 9 shows the summary of hypothesis testing results.
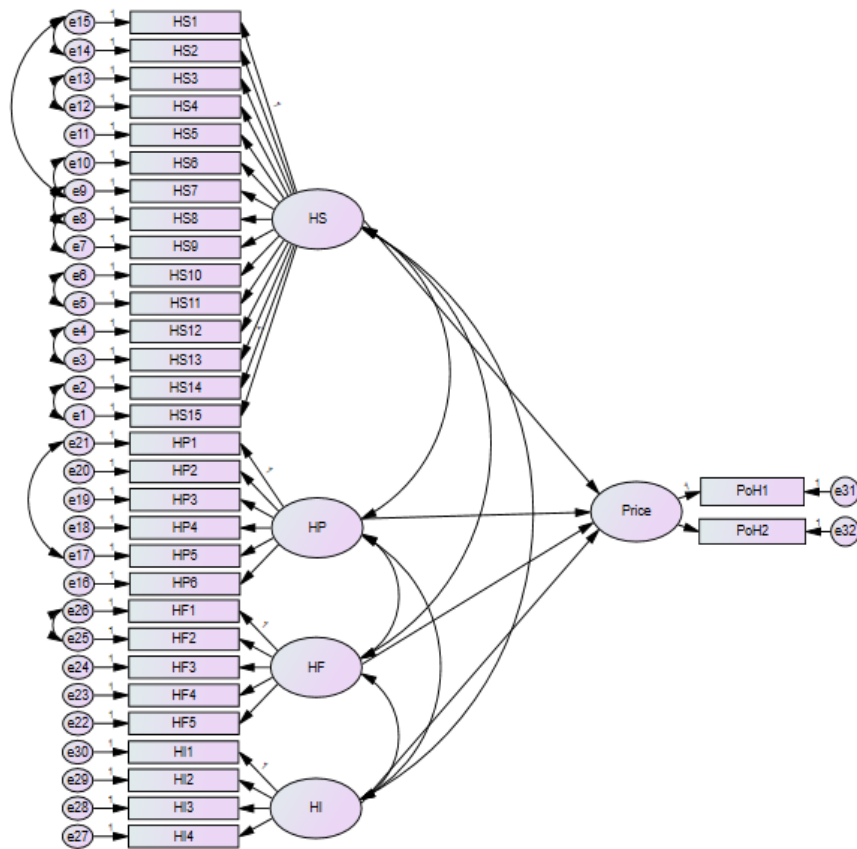
FIGURE 1. The final structure equation model to illustrate the factor affecting housing price in Malaysia

TABLE 8. Goodness of fit summary final model

Category	Fit indices	Index value	Comment
Parsimonious fit Index	Chi-Square/df	2.286	Achieved
	GFI	0.801	Achieved
Incremental Index	CFI	0.934	Achieved
	PCFI	0.838	Achieved
Absolute fit index	RMSE	0.073	Achieved

TABLE 9. Summary of hypothesis testing results

Influence of the Path	Estimate	P	Results
Housing Satisfaction	0.882	***	Supported
Housing Policy	-0.038	0.639	Not Supported
Housing Financial	0.003	0.978	Not Supported
Household Income	0.363	***	Supported

Based on the hypothesis testing results, housing satisfaction and household income were found to affect housing price, whilst housing policy and housing financial do not affect housing price in any way. When purchasing residential properties, house buyers mainly look at the house structure, the immediate environment, the existing facilities, and the distance to their workplace. Osmadi et al. (2015) agreed that house prices in Malaysia are affected by the factors of location, physical features, accessibility, developer, material cost, income, and neighbourhood features. But the most significant factor of all is income distribution. House price and income have been positively linked in past studies. Deng, Ma and Chiang (2009) agreed that household income is a more significant factor affecting the price of houses as compared to external market conditions. Likewise, Bank Negara Malaysia (2017) stated that low household income in comparison to the price of houses is the primary factor causing the inability of people to purchase a house. Due to that, Government of Malaysia did the right decision by focusing on the bottom 40% (B40) of the population by improving the cost of living, quality of life, and wellbeing (Abu et al. 2020; Razak & Shahabuddin 2018). House buyers also focus on the financial attributes. Fortunately, the government and financiers have made it easier for house buyers to own a property. The government has allowed contributors to withdraw a certain amount of money from their Account 2 EPF (Employment Provident Funds) to pay for the house deposit. Meanwhile, financiers have provided competitive interest rates and longer loan tenures for house buyers to choose from (Zairul 2013). Buyers hence have the choice of whether or not to buy a house. Additionally, the government should ensure housing management and production efficiency based on the housing policies (Hassan 2011). According to Bakhtyar et al. (2013), the global housing policy documents have confirmed the obligation of governments and planners in ensuring full housing accessibility for the citizens. It has been shown that government housing programs for the low- and mid-income groups have not been flourishing due to house price speculations perpetrated by the developers to gain higher profit margins (Daud et al. 2017). Government efforts to make houses affordable especially for the low-income group have been futile due to poor planning.

CONCLUSIONS

Various internal and external factors have been associated to house price accessibility, with their respective effects whether directly or indirectly. The findings indicate that housing satisfaction and household income significantly affect housing prices. Housing satisfaction is hence concluded as a significant factor affecting the price of houses i.e., if the developer intends to provide an excellent house structure, facilities and environment for buyers. Additionally, household income also affects the price of houses via the buyer's commitment in securing the needed money to purchase a house. Despite having no direct effects on the determination of housing prices, the factors of housing policy and housing financial must still be taken seriously by the key industry players. Policymakers, for instance, must ensure that developers provide a decent, safe, comfortable and convenient housing environment for every household on top of proper security, privacy and health facilities. For house buyers, this study can be used as a guideline when buying a house. In summary, all households should be able to buy and own an affordable house with ease.

REFERENCES

Abu, A., Hamdan, R. & Sani, N.S. 2020. Ensemble learning for multidimensional poverty classification. *Sains Malaysiana* 49(2): 447-459.

Anderson, T.W. & Rubin, H. 1956. Statistical inference in factor analysis. *Proceedings of the Third Berkeley Symposium on Mathematical Statistics and Probability*. pp. 111-150.

Arbuckle, J.L. 2013. *Amos 22 User Guide*. Amos Development Corporation.

Awang, Z. 2012. *A Handbook on SEM Structural Equation Modelling: SEM using AMOS Graphic*. 5th ed. Kota Bharu: Universiti Teknologi MARA Kelantan.

Awang, Z., Lim, S.H. & Zainudin, N.F.S. 2018. *Pendekatan Mudah SEM-structural Equation Modelling*. Bandar Baru Bangi: MPWS Rich Resources.

Babakus, E. & Mangold, W.G. 1992. Adapting the SERVQUAL scale to hospital services: An empirical investigation. *Health Services Research* 26(6): 767.

Bakar, A.A., Osman, M.M., Bachok, S. & Ibrahim, M. 2016. Investigating rationales of Malaysia quality of life and wellbeing components and indicators. *Procedia-Social and Behavioral Sciences* 222: 132-142.

Bakhtyar, B., Zaharim, A., Sopian, K. & Monghimi, S. 2013. Housing for poor people: A review on low-cost housing process in Malaysia. *WSEAS. Trans. Environ. Dev.* 9: 126-136.

Bank Negara Malaysia. 2017. Imbalances in the property market. *Box Article in 3rd Quarterly Bulletin.*

Bian, H. 2011. *Structural Equation Modelling with AMOS II.*

Bryman, A. & Bell, E. 2007. *Business Research Method.* Oxford: Oxford University Press.

Bajpai, N. 2011. *Business Research Method.* Delhi: Pearson Education India.

Bentler, P.M. 1990. Comparatives fit indexes in structural models. *Psychological Bulletin* 107: 238-246.

Byrne, B.M. 2001. *Structural Equations Modeling with AMOS: Basic Concepts, Applications, and Programming.* New Jersey: Lawrence Erlbaum Associates.

Chau, P.Y.K. & Hu, P.J.H. 2001. Information technology acceptance by individual professionals: A model comparison approach. *Decision Sciences* 32(4): 699-719.

Chen, P.F., Chien, M.S. & Lee, C.C. 2011. Dynamic modeling of regional house price diffusion in Taiwan. *Journal of Housing Economics* 20(4): 315-332.

Daud, N.M., Nor, N.M., Ali, U.N., Yusof, M.A. & Munikanan, V. 2017. Affordable housing system: A review on issue of housing affordability. *The Social Sciences* 12(7): 1281-1287.

Deng, C., Ma, Y. & Chiang, Y.M. 2009. The dynamic behavior of Chinese housing prices. *International Real Estate Review* 12(2): 121-134.

Ehido, A., Awang, Z., Halim, B.A. & Ibeabuchi, C. 2020. Developing items for measuring quality of worklife among Malaysian academics: An exploratory factor analysis procedure. *Humanities and Social Sciences Reviews* 8(3): 1295-1309.

Etikan, I., Musa, S.A. & Alkassim, R.S. 2015. Comparison of convenience sampling and purposive sampling. *American Journal of Theoretical and Applied Statistics* 5(1): 1-4.

Groenland, E.A. & Stalpers, J. 2012. Structural equation modeling: A verbal approach. Nyenrode research paper series, Breukelen, *The Netherlands: Nyenrode Business Universiteit* 12(2).

Hair, J.F., Black, W.C., Babin, B.J. & Anderson, R.E. 2010. *Multivariate Data Analysis: Overview of Multivariate Methods.* Seventh Edition. Pearson Prentice Hall: Upper Saddle River, New Jersey: Pearson Education International.

Hair, J.F., Anderson, R.E., Tatham, R.L. & Black, W.C. 1995. *Multivariate Data Analysis with Readings.* 4th ed. New Jersey: Englewood Cliffs.

Hassan, G.F. 2011. The enabling approach for housing supply: Drawbacks prerequisites Egyptian experiences. *Alexandria Eng. J.* 50: 421-429.

Ismail, S. 2019. *Rethinking Housing: Between State, Market and Society.* Kuala Lumpur: Khazanah Research Institute.

Kim, J.O. & Mueller, C.W. 1978. *Factor Analysis: Statistical Methods and Practical Issues.* California: SAGE Publications.

Latif, N.S.A., Rizwan, K.M., Rozzani, N. & Saleh, S.K. 2020. Factors affecting housing prices in Malaysia: A literature review. *International Journal of Asian Social Science* 10(1): 63-67.

Loehlin, J.C. 2004. *Latent Variable Models: An Introduction to Factor, Path, and Structural Equation Analysis.* 4th ed. New Jersey: Lawrence Erlbaum Associates.

Marton-Williams, J. 1986. Questionnaire design. In *Consumer Market Research Handbook,* edited by Worcester, R. & Downham, J. New York: McGraw-Hill.

Meyers, L.S., Gamst, G.C. & Guarino, A.J. 2005. *Applied Multivariate Research: Design and Interpretation.* Thousand Oaks: Sage Publications.

Monkkonen, P., Wong, K. & Begley, J. 2012. Economic restructuring, urban growth, and short-term trading: The spatial dynamics of the Hong Kong housing market, 1992-2008. *Regional Science and Urban Economics* 42: 396-406.

Nayeri, M.D. & Rostami, M. 2018. Tehran housing price analysis: System dynamics approach. European Institute for Research and Development. *3rd International Academic Conference on Economics, Business and Social Science "Contemporary Academic Issues in Modern Society".*

Nunnally, J.C. 1978. An overview of psychological measurement. In *Clinical Diagnosis of Mental Disorders: A Handbook*, edited by Wohnan, B.B. Boston: Springer. pp. 97-146.

Osmadi, A., Kamal, E.M., Hassan, H. & Fattah, H.A. 2015. Exploring the elements of housing price in Malaysia. *Asian Social Science* 11(24): 26.

Ramayah, T., Lee, J.W.C. & Mohamad, O. 2010. Green product purchase intention: Some insights from a developing country. *Resource Conversation and Recycling* 54(12): 1419-1427. doi: http://dx.doi.org/10.1016/j.resconrec.2010.06.007

Razak, F.A. & Shahabuddin, F.A. 2018. Malaysian household income distribution: A fractal point of view. *Sains Malaysiana* 47(9): 2187-2194.

Sarkam, N.A., Razi, N.F.M., Mohammad, N.H., Jamil, N.I. & Kurniawati, L. 2022. Attitudes, security, and perceived ease of use influence the consumers' decision to use an e-payment system. *System* 12(3): 357-368.

Schumacker, R.E. & Lomax, R.G. 2004. *A Beginner's Guide to Structural Equation Modeling,* 2nd ed., edited by Riegert, D. New Jersey: Lawrence Erlbaum Associates.

Sean, S.L. & Hong, T.T. 2014. Factors affecting the purchase decision of investors in the residential property market in Malaysia. *Journal of Surveying, Construction and Property* 5(2): 1-13.

Tanguma, J. 2001. Effects of sample size on the distribution of selected fit indices: A graphical approach. *Educational and Psychological Measurement* 61(5): 759-776.

Yahaya, T., Idris, K., Suandi, T. & Ismail, I. 2018. Adapting instruments and modifying statements: The confirmation method for the inventory and model for information sharing behavior using social media. *Management Science Letters* 8(5): 271-282.

Zainol, Z. 2018. *Structural Equation Modeling Using AMOS: A Step by Step Approach.* ISBN: 978-967-16417-0-5

Zairul, M. 2013. Housing dilemma among young starters in Malaysia. *Elixir Sustain* 58: 14923-14926.

Zyed, Z.A.S. 2014. Assessment of housing affordability problems among younger working households in greater Kuala Lumpur. PhD dissertation. University of Malaya (Unpublished).

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