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Consumption and Housing Wealth: A Malaysian Case that Demonstrates a Negative Relationship

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ABSTRACT

Fluctuations in house values over recent years (2000 – 2012) have led to an economic policy debate on the effects of housing wealth on determining household consumption behaviour. This paper investigates the strength of housing wealth and its effects on consumption using time series data in Malaysia and the cointegration test, Vector Error Correction Model (VECM), and Granger Causality. There is a mounting amount of literature as well that reveals a strong relationship between housing wealth and consumption, and our paper consistently finds that the price variation in the Malaysia housing market is associated with consumer spending, but in a different manner when compared with most of the existing literature. House wealth which is represented by housing price was found to be affecting consumption negatively in the long-run due to both financial regulation and consumers' perception.

Key words: Cointegration, VECM, housing wealth, household consumption, financial regulation and Malaysia

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Any remaining errors or omissions rest solely with the author(s) of this paper.

INTRODUCTION

Housing being the largest part of household net wealth has lately brought about a heated discussion worldwide on its possible influence on the level of consumer spending. The simple logic behind this thinking is that when house prices increase, people will believe that they are richer than they were. Such belief, or for discussion purposes the 'perception of wealth', then encourages more consumption spending and thus helps grow a country's economy. This growth is due to financial innovation and, therefore, the purpose of purchasing a house now may not be for residential purposes alone. Home owners may refinance or speculate on property to boost consumption under such financial innovation.

The role of housing wealth and its effects on consumption have been most extensively studied in the United States (U.S.) and Europe as well as in the increased amount of literature that supports the housing wealth-consumption effect. There is empirical research on how the housing market in a country has enough strength to push a weak economy into further recession or, if managed carefully, can facilitate the recovery of a nation already in recession (Chen 2006; Reinhart and Rogoff 2008). The sub-prime crisis, which was caused by the Mortgage Equity Withdraw (MEW) and mortgage backed securities, is a good example of how a housing market can bring down the entire economy of a nation.

Chen (2006) has noted that housing wealth could possibly be the main reason for Sweden's smooth recovery during the stock market crash in 2001. As such, is it possible, and if so, how possible for housing wealth to counter any negative effects of recession such as happened in Sweden? Will the same be possible in a Malaysian context? In other words, can housing wealth significantly influence this country's economy through the household consumption channel? The previous literature has focused primarily on the effect of housing wealth on household consumption. This paper, however, will not adopt such a strategy, but rather allow for a more liberal point of view on the relationship between housing wealth and household consumption. Is consumption actually a function of housing wealth? Thus, this paper becomes more interesting, as the reader will learn how the end result seems to take a twist from the outcome stated in the literature which does focus entirely on the housing wealth effect.

The work of Lettau and Ludvigson (2004) does not distinguish between housing wealth and financial wealth. Unlike traditional research on wealth effect and consumption, this paper breaks down total wealth into two main components, namely, housing wealth and financial wealth. The rationale for this choice is that by breaking down the wealth component, more insight can be gained about these

two different wealth channels. In addition, financial innovation reduces financial constraints. Accumulation of bank capital through bank consolidation in the late 1990s, credit cards, and various other types of financial products produced easy access to lending, especially for consumer loans. Thus, bank lending should share the limelight in this current research.

The aim of this paper then is to analyze the relationship between housing wealth and household consumption using time series data from Malaysia. The next section briefly reviews the previous literature on the same topic, followed by a theoretical framework and an econometric model, and then discusses the data used in this analysis regarding consumption. Finally, the paper discusses the results of the research and offers a conclusion and discussion.

AN OVERVIEW OF PREVIOUS STUDIES

Wealth and Consumption

The idea that household consumption is affected by wealth has long been known and agreed upon by both the literature and common sense (Permanent Income Hypothesis, PIH). Without wealth, there really isn't much for us to spend on. As early as the work of Modigliani (1971), that author a suggested that consumer spending increases at about five cents for every dollar increase in wealth (holding fixed labour income). Lettau and Ludvigson (2004) reported that most changes in asset value are not permanent (transitory) and thus uncorrelated to consumption. The wealth channel only exists when changes in income or wealth are permanent (PIH holds). Having clarified this wealth-consumption relationship, one can then focus on the main concern of this paper. The previous studies of wealth, consisted of only two components. In this paper, housing and financial wealth are discussed and compared in order to determine which impact is greater. Beside wealth, credit constraints are also considered and carefully examined.

The relationship between financial wealth and household consumption has long been known and agreed upon by many researchers. The rationale behind this thinking is that a crash in stock prices will in turn decrease spending and push an economy further into recession. Housing wealth, however, has only recently entered the limelight and is now believed to play a major role in an economy. Brueckner and Pereira (1996) note that many commentators identified the trend that falling house prices will decrease homeowner wealth and in turn cause a more severe secondary decrease in household consumption than the original effect of income lost. Still, the housing wealth effect is not just bad news.

Among the studies on household consumption and total wealth, the marginal propensity to consume (MPC) out of total wealth ranges from 0.02 to 0.08 in the U.S., Canada, United Kingdom (U.K.), France, Italy, and Japan[1]. Laumas and Porter-Hudak (1992) also discovered similar result; PIH holds in India.

Housing Wealth and Financial Wealth

According to Klyuev and Mills (2006), an increase in house prices will encourage spending and thus reduce saving so as to achieve a desired wealth level. Skinner (1989) also believes in the relationship between housing and savings and notes that the windfall in housing prices could possibly have been the ignition spark for the savings slowdown in the U.S. during the late 1970s and the 1980s. Fernandez-Corugedo et al. (2002) found that a sizable transitory component of wealth by using U.K. data, and the adjustment of consumption thus occurred through wealth and income.

On the issue of consumption and housing wealth, numerous researchers have to date confirmed and acknowledged the existence of that circumstance. Muellbauer and Murphy (1990) and Dvornak and Kohler (2007) both argue that housing price increases stimulated growth in consumption in the U.K. and Australia, respectively. Carroll et al. (2006) concluded that house price fluctuation affects consumer spending in only a small amount or about 2 cents for every dollar, but then increases over several years to the 4- to-10- cent range.

Chen (2006) has noted that the housing market is possibly the explanation for the comeback of Sweden's economy during the stock market collapse in 2001 by upholding the performance of household spending. Chen (2006) examined the relationship between Sweden housing and consumption, using VECM and PT shock decomposition and found that cointegration exists between consumption, disposable income, housing wealth, and financial wealth with long-run elasticity present for consumption and housing wealth of 0.11.

There are several studies that have found that housing wealth outweighs financial wealth. That evidence was mentioned by a few studies, and further, there are some that argue that housing wealth outperforms financial wealth due to the fact that there are more people who buy houses than people who speculate in the stock market[2]. In addition, Case *et al.* (2001) conducted panel data analysis on 14 developed countries, and these authors found that the elasticity of consumption

[1] Examples are Boone et al. (1998); Boone et al. (2001); Macklem (1994); Paiella (2007); Tan and Voss (2003); and Šonje et al. (2014).

[2] For example, there is Dvornak and Kohler (2007); Bostic et al. (2005) and Pichette and Tremblay (2003).

with respect to housing wealth outperformed stock market wealth, with housing ranging from 0.11 to 0.17 and the latter from 0.05 to 0.09 only. These studies reflect the situation prevalent in the pre- sub-prime crisis, where investors and speculators found the housing market to be more attractive than any other financial market.

On the contrary, there are a few similar studies that also found that there was only weak correlation or no correlation between housing and financial wealth. For instance, Elliot (1980) found that nonfinancial wealth had no impact on consumption, and Levin (1998) found no relationship between housing wealth and consumption in a micro-data study. Further, the paper by Phang (2004) investigated the effect of housing wealth on consumption in Singapore with only an insignificant result. The author states that the restriction on property refinancing imposed by government authorities limits the collateral effect and thus limits the wealth channel. This argument was criticized by Edelstein and Lam (2004), who state that insignificancy only happened for private housing, not public housing, when there was a MPC of 0.06 from 1990 to 1997 and 0.37 from 1997 to 2000. Notably, in the study by Boone, *et al*. (2001), there was a negative housing wealth effect in Italy, but the authors did not interpret this finding, which thus contradicted most of the other studies.

The Credit Constraints

Why consumer credit one might ask? Although the main concern of this paper is to look at the housing wealth effect on consumption, consumer credit is important from a financing point of view. Today various types of consumer loans are open for consumers, and credit card issue from different banks and loans are replacing cash as a common medium of transaction. Consumers can obtain a loan and credit cards easily today. Bacchetta and Gerlach (1997) argue that credit constraints do affect consumption negatively. This view has proven to be significant in the case of the U.S. by using CM regression. The existence of various consumer credit types from banks, such as personal loans and credit cards, helps those consumers who demand credit, especially those with liquidity constraints. Once these consumers obtain liquidity assistance from a bank, they spend it and thus increase consumption.

Through examining the previous literature, many researchers have concluded that housing wealth significantly affects household consumption in the long-run. Their rationale is that when house prices increase, home owners will then perceive themselves as being richer as they now hold a more expensive asset. However, further research is needed before one can assume the same scenario for Malaysia. Unlike the U.S. or U.K., Malaysia has a slightly stricter financial structure. The financial structure there does not allow one to ‘cash out’ their perceived earnings

easily unless a house is actually sold or refinanced. Also, selling and refinancing require a longer period to complete the required procedures. Thus, homeowners are unable to enjoy the appreciation in their housing investment immediately.

Moreover, many homeowners in Malaysia are ignorant of their housing wealth, as general information on the housing market there is rarely discussed. The only time Malaysians actually update themselves on how much their property is worth is when they are about to sell it. This is simply because most Malaysians still fail to recognize that their house is an investment and not merely a home. So the results offered in this paper might generate different outcomes that indeed will contrast with those from previous studies.

METHODOLOGY AND DATA

Theoretical Framework

Traditional Keynesian consumption function is shown as below:

$$CONS = c_0 + \beta\ (GDP) \tag{1}$$

where is total consumption, is autonomous spending, is MPC, and represents disposable income. This function is also known as the absolute income hypothesis, and consumption is based only on current income. As this consumption function ignores other sources of permanent income that can influence consumption behaviour, Milton Friedman and Irving Fisher developed the Permanent Income Hypothesis and Life Cycle Hypothesis to capture the wealth effect from various kinds of assets. Chen (2006) separated wealth into two components, namely, housing wealth () and financial wealth () as follows:

$$CONS = c_0 + \beta_1\ (GDP) + \beta_2\ (HW) + \beta_3\ (SM) \tag{2}$$

where β_1, β_2 and β_3 are the MPC of *GDP*, *HW*, and *SM* respectively. Accordingly, β_1, β_2 and β_3 are expected to carried positive sign. This consumption function can capture the income and wealth effects that affect consumption positively; yet, this equation is still not sufficient. Credit constraints will also affect consumption. Bacchetta and Gerlach (1997) state that credit constraints indeed affect consumption negatively as follows:

$$CONS = c_0 + \beta_1\ (GDP) + \beta_2\ (HW) + \beta_3\ (SM) + \beta_4\ (LEN) \tag{3}$$

where β_4 is parameter for credit constraints. By adding in credit constraints as a supporting variable, the model can capture the changes in consumption when

consumers are facing a different level of credit constraints and thus enhance the explanatory power of the system. Higher consumer lending indicates lower credit constraints in this case. Hence, shall be positively sign.

METHODOLOGY

Our aim is first to ascertain the existence of a long-run relationship among the variables and we do this by using Johansen multivariate cointegration techniques. The stationary aspect of data will let the model perform well because the stationary aspect of a series can strongly influence its behaviour and properties. Therefore, a unit root test is a pre-requisite test before any cointegration analysis. The augmented Dickey-Fuller (ADF) and Phillips-Perrons (PP) tests were thus employed to determine the order of integration.

Cointegration Analysis and the Vector Error Correction Model

The time series analysis begins with the concept of cointegration. When there are two or more series that share the same stochastic trend in common, we can call this phenomenon as cointegrated. A cointegration relationship indicates co-movement among trending variables that are then used to detect long-run equilibrium relationships that exist within the system. To detect this cointegration relationship, a Johansen multivariate cointegration test was applieddue to its capability of determining the number of long-run relationships among the variables. The cointegration relationship between consumption, housing wealth, and financial wealth, has a theoretical justification based on the previous research (Case et al., 2001; Chen, 2006). In order to check for robustness of the estimated long-run coefficients, cointegrating equations are estimated with alternative methods. In fact, to this end, our paper applies the Autoregressive Distributed Lag (ARDL) bound approach, fully modified ordinary least square (FMOLS), and dynamic ordinary least squares (DOLS) due to the presence of cointegration relationship.

After the cointegration relationship was ascertain, this paper proceeds to vector error correction model (VECM).The VECM approach was chosen because, as Chen (2006) states, the VECM does not require the weak exogenous condition of independent variables as the single-equation ECM does. The VECM also provides a direct test of the level of exogenous of one variable to another. The VECM reduced-form for the variables can thus be written as:

$$\Delta Y_t = \tau_1 \Delta Y_{t-1} + \ldots + \tau_{p-1} \Delta Y_{t-p+1} - \prod Y_{t-p} + e_t \qquad (4)$$

where τ are the coefficient matrices, and the Π matrices are the error correction terms. The error correction term is the adjustment of the time series model, which contains the long-run relationship for the variables in the vector. The structure lag is determined by using non-autocorrelated residual lag length selection. In the model, the reduced form of equation (4) can be represented explicitly as:

$$\Delta Y_t = \tau_1(L)\Delta Y_{t-1} + \Pi Y_{t-p} + e_t \quad (5)$$

where ΔY_t is the 5 × 1 vector of the first difference of log (*CONS*, *GDP*, *HW*, *SM*, *LEN*), τ_1 (L) is the vector of lag operator, and Π is the matrices of the error correction term with rank $1 \leq r \leq 4$. In this equation, real consumption is represented by *CONS*, real housing wealth represented by *HW*, real GDP represented by *GDP*, the stock market index represent by *SM*, and real consumer lending represented by *LEN*. All variables are converted into a log form.

Data

Quarterly data from years 1999 to 2011(post Asian financial crisis) were collected from a variety of sources: *Monthly Statistical Bulletin* (MSB) published by Bank Negara Malaysia (BNM), *International Financial Statistics* (IFS), published by International Monetary Fund (IMF) and *Malaysian House Price Index* (MHPI), published by Valuation and Property Services Department (JPPH).

Household consumption and GDP were obtained from the IFS country table. The composite index, which represents stock wealth, and the consumer loan amount, which represents credit constraint were obtained directly from MSB. The house price index, which represents housing wealth, was obtained from MHPI. Household consumption, GDP, the house price index, and consumer loans were adjusted to real data by using the consumer price index (CPI, base = 2000) obtained from MSB.

EMPIRICAL RESULTS

The results of the ADF and PP unit root tests are presented in Tables 1 and 2. The test statistics clearly show that the null hypothesis of a unit root cannot be rejected for all variables in their levels, except for PP test for CONS. However, the null hypothesis is rejected at 5% level when all variables have been tested in their first-differences. To address the inconsistency result on CONS, an additional unit root

test, namely Kwiatkowski–Phillips–Schmidt–Shin (*KPSS*) test had been performed. KPSS test on level CONS provides test statistic of 0.215 (optimal bandwidth 4) which is greater than the 5% critical value of 0.146. Thus, we can reject the null-hypothesis of trend-stationarity. But KPSS test on first difference CONS provides test statistic of 0.0486 (optimal bandwidth 2) which is smaller than the 5% critical value of 0.146. Thus, we cannot reject the null-hypothesis of trend-stationarity. The result supports that the unit root exists in level form for CONS, and there is no unit root after the first difference. Since all the variables are integrated as Order One, it is feasible to proceed with the cointegration analysis.

Table 1 Result of ADF test statistics

First difference	Level		First difference	
	Constant without trend	Constant with trend	Constant without trend	Constant with trend
CONS	0.947 (4)	–3.479 (3)	–4.091** (3)	–3.723** (3)
HW	–1.636 (0)	0.447 (0)	–5.757** (0)	0.447** (0)
SM	–0.663 (1)	–3.402 (2)	–8.337** (0)	–8.238** (0)
GDP	–0.118 (5)	–2.726 (5)	–4.741** (4)	–4.667** (4)
LEN	1.042 (4)	–2.299 (4)	–3.884** (1)	–5.022** (1)

Note: The null hypothesis of ADF test is unit root. The 5 percent significance is shown as **. The figures are t-statistic and SIC lag length in parenthesis.

Table 2 Result of PP test statistics

First difference	Level		First difference	
	Constant without trend	Constant with trend	Constant without trend	Constant with trend
CONS	–0.778 (16)	–4.226** (16)	–10.50** (24)	–10.74** (24)
HW	1.417 (2)	–0.008 (3)	–5.862** (3)	–5.997** (2)
SM	–1.868 (3)	–3.457 (3)	–8.166** (3)	–8.144** (3)
GDP	–1.205 (32)	–3.484 (13)	–9.790** (23)	–9.499** (35)
LEN	–3.295 (2)	–2.492 (1)	–5.914** (3)	–6.945** (1)

Note: The null hypothesis of PP test is unit root. The 5 percent significance is shown as **. The figures are adjusted t-statistic and Newey-West bandwidth in parenthesis.

The Johansen Cointegration test was adopted. That result is shown in Table 3 and as Equation 6. The values of the trace test and the Maximum Eigen value test were adjusted using the small sample correction factor proposed by Reinsel and Ahn (1992)[3]. In summary, both results rejected the null hypothesis of r = 0 and failed to reject r = 1 at a 5% significant level, which indicates that there is one long-run relationship between the variables.

Table 3 Result of Johansen Cointegration Test

Rank	Eigenvalue	Trace			Maximum Eigenvalue		
		Statistic	Adjusted statistic	Critical value (5%)	Statistic	Adjusted statistic	Critical value (5%)
r = 0	0.742	128.7**	91.56 **	69.82	65.00**	46.25 **	33.88
r = 1	0.503	63.65**	45.29	47.86	33.55	12.87	27.58
r = 2	0.252	30.10**	21.41	29.80	13.95	9.926	21.13
r = 3	0.231	16.15**	11.49	15.49	12.60	8.964	14.26

Note: Model included 3 lags on each variable as suggested by AIC VAR order selection. The 5percent significance is shown as **

The estimated long-run equations by Johansen multivariate cointegration test and the robustness checks by ARDL, FMOLS, and DOLS are showed in Table 4. The results showed that most of the methods yield similar signs except for SM and HW from FMOLS, thus increases the confidence in the robustness of these estimates.

Table 4 The estimated long-run equations

Method	GDP	HW	SM	LEN
Johansen	0.730**	-0.383**	0.097**	0.144**
ARDL	0.697**	-0.318	0.106**	0.159
FMOLS	0.720**	0.112	-0.119**	0.266**
DOLS	0.511**	-0.111	0.050	0.283**

Note: 5 percent significant is shown as **. The chosen optimal lag length for ARDL is (4,3,4,3,4) as showed in Appendix A1; for FMOLS is (0); lead and lag for DOLS is (1,3).

[3] Following Reinsel and Ahn (1992), the trace and maximal eigenvalue statistics have been adjusted by a factor (T – np)/T, where T is the effective number of observations, n is the number of variables and p is the lag order.

Equation (6) presented the estimated long-run equation by Johansen cointegration test:

$$CONS = 1.875 + 0.73\ (GDP) - 0.383\ (HW) + 0.097\ (SM) + 0.144\ (LEN) \quad (6)$$
$$\qquad\qquad [5.936] \qquad [-2.666] \qquad [2.759] \qquad [2.855]$$

Note: t-statistic calculated values in parentheses

From Equation (6), we can observe that the entire long-run coefficients are significant at a 5% level. Most of the variables behave as in the previous literature, where income remains as the most influential factor that affects the consumption decision (0.73). Inversely, this result also shows that the marginal propensity to save in Malaysia within the period was 0.27, which is consistent with Malaysian conventional saving levels that ranged from 25 to 35 percent in the recent decade (Mansur *et al*., 2011). Further, our result indicated that consumption will increase 0.097 cents for every dollar earned from the stock market. This is also consistent with the result obtained by Case et al. (2001), where they found that consumption will increase ranged from 0.05 to 0.09 cents for every dollar earned from the stock market. The positive sign for LEN suggested that the relaxing of credit constraints also causes a positive impact on consumption. This is consistent with the result obtained by Bacchetta and Gerlach (1997), where relaxing of consumer credit affects consumption positively ranged from 0.03 to 0.215.

Surprisingly, housing wealth showed a negative impact on consumption in Malaysia. This result contradicted most of the previous studies. The housing wealth indicator used in the model was the house price indicator, which can represent wealth as well as price. In this case, the price effect is greater than the wealth effect from the consumer's point of view. Since a house is a necessity, and there is no substitute, increasing a house price will cause a potential house buyer to save more by decreasing consumption in order to buy the house, rather than "cash out" the property to increase consumption. Further an increasing house price also will increase the transaction costs of a house, such as a down payment, stamp duty, legal fees, property valuation cost, and so on. All these transaction costs are based on the value of the property, and this increase will further burden the potential house buyer. This finding is also consistent with that of Paiella (2001), where an increasing house price will depress renter spending if the renter is saving to buy a house. It will also weaken the housing wealth effect of the house owner's positive effect on consumption. By looking at saving perspective, Lin and Lai (2003) argue that mortgage loan repayments should consider as "forced saving". House buyers' income will channel to 'force saving' at the moment they purchased house

by mortgage; thus, will reduce consumption. The monthly mortgage repayments in Malaysia doubled from 2 billion in 2006 to 4.317 billion in first quarter 2012 (BNM).We believe that one of the reasons for these drastic increases, is led by the increasing house price.

Indeed, this finding is somewhat similar to Phang (2004), where government intervention in the housing market leads to positive, but insignificant result. Different financial regulations may lead to a different outcome, however, when estimating consumption in Malaysia. In the developed countries for instance, the U.S. and U.K., the MEW process is more relaxed when compared to Malaysia due to the Malaysian strict regulations. In addition, mortgage-backed securities enable investors to obtain their capital gain for a property by selling off that security in a highly liquid and developed market. In Malaysia, the only way to "cash out" is to sell off or refinance property, and this process involves high transaction costs, which help keep house owners from doing so; thus, the wealth channel is stifled and not realised by the house owner.

These short-run results were obtained and shown in Table 5. Figure 3 summarizes the result for VEC Granger Causality (Table 5) and provides a clearer picture of the short-run relationship between the variables. The negative error correction term (ECT) suggests that the system will converge to equilibrium in the long-run with an adjustment speed of 0.727. Income, stock wealth, housing wealth, and credit constraints do affect household consumption in the short-run. Further, there is a unidirectional relationship that runs from stock wealth to income and

Table 5 Result of VEC Granger Causality

Independent variable	**ΔCONS**	**ΔGDP**	**ΔHW**	**ΔSM**	**ΔLEN**	**ECT**
Dependent variable						
ΔCONS	-	41.47**	41.50**	9.282**	14.84**	-0.727**
ΔGDP	6.181	-	3.052	14.06**	1.076	0.015
ΔHW	2.602	0.188	-	4.583	1.924	0.159
ΔSM	6.033	4.309	5.431	-	0.986	0.092
ΔLEN	12.16**	4.038	6.371	7.311	-	0.134
Diagnostic Tests						
Normality test		Jarque-Bera		17.87		
LM test		LM-statistic		26.22		
White test		Chi-square		457.9		

Note: Figures presented VEC Granger Causality Chi-square test, t-statistic calculated values for ECT and 5 percent significant is shown as **

from income to credit constraints. Diagnostic tests are presented below Table 5. The results of the diagnostic tests indicate that the residuals are normally distributed, free from serial correlation and the model was possessed homoscedasticity.

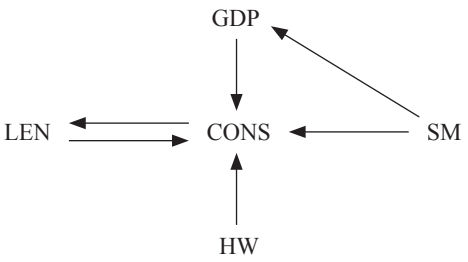

Figure 1 Result of VEC Granger Causality

CONCLUSION

The house market in Malaysia still remains a market that provides housing service more than wealth gain within the sample periods studied in this research. Thus, price effect will take place to affect consumption in a negative way, but not wealth effect, which affects consumption positively. This outcome was totally different from previous studies, especially the research done in the developed countries. Developed countries are equipped with an advanced financial system and more financial freedom; thus more financial services are provided with minimum restrictions, such as MEW and mortgage-backed securities, which allow the investor to withdraw the capital gained from housing. Although Malaysian consumers are allowed to refinance their property, the strict governance of BNM and the high transaction costs often prevent them from doing so. Thus, the housing wealth channel is stifled, and the price effect takes place.

There are two implications from these findings. First, in order to boost consumption through the housing wealth channel, financial deregulation is needed. This change will allow consumers to withdraw their house value gains to support spending and boost the economy. Second, house prices should be controlled if financial deregulation is not the agenda of BNM. Higher house prices will lead to lower consumption, followed by economic stagnation.

The role of the housing market is becoming ever more important today. Most advanced countries are aware of this phenomenon and have started to implement various types of policies to ensure that market stability. For instance, Singapore has implemented higher down payments for a second purchase and higher taxes for foreign buyers; China has implemented more restrictions on every housing

purchase and property taxes and increased the new supply of low- cost property to curb their house prices and prevent a housing bubble. This study does provide a clearer picture of the precise housing market effect on consumption and can thus assist in the formation of a better housing policy in Malaysia.

APPENDIX

ARDL Process

Table A1 Statistics for selecting the optimum lag order for the ARDL bound cointegration test

$LRCONS_t = f(LRGDP_t, LRHW_t, LKLCI_t, LTL_t)$	AIC	SBC	Autocorrelation	Normality	F-statistic
Lag = 1	–3.951	–3.492	22.254 [0.000]***	0.204 [0.903]	5.293**
Lag = 2	–5.173	–4.517	6.543 [0.038]**	2.562 [0.278]	19.614***
Lag = 3	–5.609	–4.752	1.704 [0.427]	0.317 [0.853]	14.359***
Lag = 4	–5.775	–4.712	4.129 [0.127]	1.004 [0.605]	5.575**

Significance level	Critical Value	
	Lower bound	Upper bound
1%	3.955	5.583
5%	2.900	4.218
10%	2.435	3.600

Notes: *, **, and *** denote significant at 10%, 5%, and 1% significance levels, respectively. Critical values are cited from Narayan, P. (2005) table Case III: Unrestricted intercept and no trend for without trend models. The figures in brackets […] refer to the P-value for the Diagnostic checking. Where, the Autocorrelation is tested by the Breusch-Godfrey Lagrange Multiplier (LM) Test and the Normality is checked by the Jarque-Bera Approach.

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