Determinants of Malaysia Household Debt: Macroeconomic Perspective

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Abstract: Malaysia household debt to Gross Domestic Product (GDP) has increased to 86.6% at the end of 2013 compared to the previous year at 75.8% in 2010. This current study employs an autoregressive distributed lag model (ARDL) in examining the determinants of Malaysia household debt through classifying as consumer debt and mortgage debt. This study is using quarterly data over the period April 1996 to April 2013 for the six variables such as Gross Domestic Product (GDP), Consumer Price Index (CPI), Housing Price Index (HPI), interest rate, consumption and personal disposable income in modelling the determinants of household debt. The result shows that GDP was significantly contributing to the higher consumer debt and mortgage debt. This finding indicates that, the higher GDP, in which reflected a positive economic growth and directly in the higher earning become a proven theory for the two parties in taking and issuing more debt.

Key word: household debt; secured debt; unsecured debt; ARDL

JEL code: G

1. Introduction

Families in Malaysia have experienced a significant increase in household debt. Various measures were taken to overcome this problem. These include tightening of lending guidelines and policy revisions such as narrowing loan tenures for personal financing and property purchases. Malaysian household debt to Gross Domestic Product (GDP) has increased to 86.6% by the end of 2013 (Central Bank of Malaysia, 2013), which is a substantial increase from 60.4% of GDP in 2008. In comparison with other Asian countries, household debt is as follows: South Korea 86%, Thailand 84%, Taiwan 82%, Singapore 72%, Hong Kong 62%, Philippine 35%, China 25%, Indonesia 16% and India 15% (World Bank, 2014). This indicates that the Malaysian household debt to GDP is one of the highest in Asia's developing economies. The Debt Service Ratio of household is 43.9%, which means on average households use more than two fifths of their monthly disposable income to service their debt. Especially worrisome is household debt among civil servants, where the debt service ratio is 60%, twice the acceptable debt service ratio of 30%. This means that most civil servants are using more than half of their salary to pay off their debts. Moreover, statistics from the Insolvency Department reported 1086 civil servants who were declared bankrupt in 2009 and had their salary deducted for installment payments (The Sun, 3 March 2011). Some of the households withdraw their Employee's Provident Fund (EPF) to smooth their consumption and there is a growing concern regarding the amount of savings available after retirement. Alarming statistics such as this is the

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impetus for this study.

The development of household debt is good for supporting economic growth (Palley, 1994; Cecchetti, Mohanty, & Zampolli, 2011), and improving social welfare by smoothing consumption in response to changes in household income.

However, to a certain extent, the increase in household debt can be a threat to the economic system if the debt reaches at an unsustainable level. Mian (2009) provides empirical support that household debt is the best predictor of financial crisis and economic recession. Indeed, the implication of continuously increasing household debt is a reduction in saving and investment (Hull, 2003), private consumption, and declining demand in the housing market (Debelle, 2004). This is because households will be paying for their outstanding loans and therefore the economic growth might be retarded.

The high level of household debt creates vulnerabilities not only to the economy, but also it gives a negative impact on financial stability (Charpe & Flaschel, 2013). Excessive debt can result in default of payment or bankruptcy when the debt becomes unpayable. There is also the risk of being caught in a credit bubble, similar to the sub-prime crisis in the U.S in 2008, which resulted in numerous foreclosures and the collapse of several major financial institutions (i.e., Lehman Brother and Merrill Lynch).

According to a Malaysia Department of Insolvency (MDI) report, 60 Malaysians declare bankruptcy every day, most of them being young adults between the ages of 18 and 35 (Credit Counselling and Debt Management Agency, or AKPK). This shows that young adults are struggling to pay credit card debt in order to meet their financial needs.

The reasons for households taking on debt is to smooth their consumption and a dependence on future income (Life cycle Theory), the behaviour and attitude of the individual himself (i.e. living beyond their means) (Ahmed, Ismail, Sohail, Tabsh, & Alias, 2010), cost of borrowing is lower due to financial deregulation (Hull, 2003), easy to get credit facilities which encourages spending on credit (AEON credit, Court Mamorths, etc.), cost of living and housing price increases, and continued economic growth at a strong pace has all made households more comfortable in taking on debt.

Precautionary measures need to be taken in order to avoid risks such as asset price shocks, unemployment shocks, and shock from income (Meniago, Mukuddem-Petersen, Petersen, & Mongale, 2013). Financial distress or even a housing bubble in Malaysia could occur if household debt cannot be resolved from an early stage. Using a macroeconomic perspective through classifying into secured debt (i.e., mortgage debt) and unsecured debt (i.e., consumer debt), this study will extend the knowledge from previous studies to examine the influencing factors that affect the rising Malaysian household debt. The rationale for this was that the effect of a variety of different approaches is required to assess the situation in each of the different levels.

There were numerous international studies and researches that document the determinants of household debts at the macro level (Kim, Lee, Son, & Son, 2014; Meng, Hoang, & Siriwardana, 2013; Meniago et al., 2013; Ganga, 2010), but only a few specifically addressed the Malaysian experience. The current study is significance because currently Malaysia is having an issue with the rising household debt to GDP ratio. Moreover, there was a study done by the World Bank that identified the ratio of household debt to disposable income in Malaysia at 140 percent, one of the highest in the world and above that of the U.S. at 123 percent and Thailand at 52 percent.

The current study contributes to the existing literature on household debt in several ways. First, since Malaysia has a different regulatory system, which reveals that findings in other contexts might not be applicable. In other words, the findings in other countries may be less relevant and applicable due to differences in the

regulatory structures in Malaysia. Secondly, this study provides suggestions for policymakers in order to maintain the household debt at a tolerable level that avoids any damaging effect, particularly in developing countries. Moreover, the past studies do not take an account of financial crisis on the model.

This study is structured with the following sections. The first section is an introduction. The second section reviews past studies on determinants of household indebtedness. Next is a section that represents the economic specification. Section 4 discusses the finding from the empirical model. Finally, Section 5 summaries and concludes this paper.

2. Composition of Household Debt

In the Malaysian context, the definition of household debt refers to the sum of loans for properties, loans for personal use, loans for securities, motor vehicle loans, credit cards among others (Central Bank of Malaysia, 2013). Household debt can be categorized into two types. The first type is called 'secured debts' such as mortgage debt. It is protected by the financial institution because if there is default payment, the mortgage can be a collateral. In terms of credit risks, mortgage debt has lower risk compared to consumer debt but the percentage of default payments is higher. The second type is "unsecured debts" and refers to consumer debts that consist of credit cards, personal loans, and auto loans. Consumer debts normally are used to finance the consumption of goods and services.
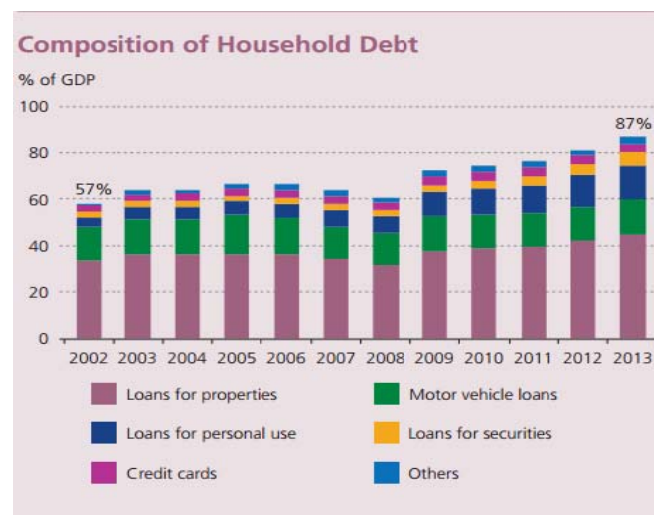

Figure 1   Composition of Household Debt

Note: *Properties: Includes residential and non-residential properties. Source: Central Bank, Malaysia 2013.

Referring to Figure 1 indicates that the major portion of household debt is properties loans followed by motor vehicle loans, personal loans, securities purchases and credit cards. Total loans for properties keep increasing due to rising house prices, especially in Kuala Lumpur, Selangor, Penang and Johor Bahru (NAPIC report 2013). Moreover, the government offers a new scheme "My First Home", which attracted more borrowers, especially young adults. Initiatives taken by financial institutions also encourage borrowing by offering low down payment options or a minus negative interest rate. A recent study done by Khazanah Research Institute (KRI) reported Malaysian affordable cost of housing is more than 3x annual median income. This means Malaysian houses are more expensive than those in Ireland and Singapore.

Currently household loans seem not to be a problem per se, but it might become an issue when a borrower's financial obligation exceeds their financial means and results in finally defaulting on their financial obligation. The increase in borrowing as depicted in Figure 2 could be an indication of the potential of default on a financial obligation.

3. Literature Review

The empirical investigation regarding the determinants of household debt is limited and this might be due to an insufficient amount of available data (Endut & Hua, 1997; Hull, 2003). Micro-level information such as household income, expenditures and wealth is essential to detect any vulnerability caused by rapid growth of household debt. The focal point of this study is to examine the determinants of household debt. Therefore, the discussion of the related literatures will focus on the main factors that influence the level of household debt in developed, developing and finally the Malaysian country.

4. Household Debt in Developed Countries

The rising household debt in developed countries and its economic and social impact has attracted the attention of economic analysts, academicians and policy makers. According to Debelle (2004), the rise in household debt in developed countries has exceeded income. Research done by the insurance company Allianz (2013), indicates that the United Kingdom (UK) has the fourth highest household debt in the world. Among studies on the determinants of household debt in UK are (Dinh, Mullineux, & Muriu, 2012; Gathergood, 2012; Tudela & Young, 2005). Using a Vector auto-regression model (VAR), Dinh et al. (2012) examine the effects of macroeconomic factors on variables such as write-offs of secured loans, house prices, interest rates, disposable income per head, and unemployment. They concluded that the macroeconomic factors that influence loan losses depends on the type of arrears and that the impact of macroeconomic factors on mortgage arrears is more pronounced than unsecured loans. Tudela and Young (2005) used a different approach, the overlapping generations (OLG) model, to explain the rise in borrowing. This study adopts a similar approach with Barnes and Young (2003) but in different countries. Barnes and Young conduct the study in United States (US) while Tudela and Young in the UK. These findings found that the rapid growth of household debt could be explained by interest rates, house prices, preferences, demographic and retirement income, and income growth expectations.

Kim et al. (2014) investigated the potential causes of Korean household debt which has grown sharply in recent years. Their model incorporated GDP, lending rate, inflation, leverage ratio, growth in deposits, NPL, call rate, stock price and housing price as the explanatory variables. The findings show the factors contributing to an increase of household debt is similar to advanced countries in terms of asset price hikes, financial deregulation, demographic change and a relatively robust macroeconomic environment.

A study in European Union (EU) member states done by Betti, Dourmashkin, Rossi, & Yin (2007) measures and characterises the extent of consumer over-indebtedness. The study used a subjective approach to evaluate consumer indebtedness and then provides valuable information to financial regulatory bodies.

The study by Mian, Rao, and Sufi (2011) and Mian and Sufi (2012), based on US country level data, explained the effect of cumulative household debt to employment and consumption during times of financial turmoil. The argument of marginal cumulative household debt in the years 2002 to 2006 blended with the slump in housing price at the beginning of the crisis. This assisted us in understanding the onset, severity, and the length

of the subsequent collapse in consumption.

Similar issues in Australian household debt were found by Cava & Simon (2003) in their study of factors affecting the financial constraints on Australian households. Meng et al. (2013) analyzed the determinants of household debt using Vector Autoregression (CVAR). The result suggested housing prices, GDP and the population have a positive effect on household borrowing. The negative factors that influence the rise in household debt are interest rates, the unemployment rate, and the number of new dwellings.

Jacobsen (2004) employed a flexible dynamic model and the Norwegian quarterly data from 1994 Q1 to 2004 Q1 to estimate the effects of various factors on household debt. Several factors were identified to effect household debt: housing stock, interest rates, the number of house sales, wage income, housing prices and unemployment rates. For household debt in Spain, Nieto (2007) considered explanatory factors of changes in household credit.

5. Household Debt in Developing Countries

There are also studies conducted on the determinants of household debt in developing countries. Moore, Thomas, Adams, Centre, & Bank (2010) reported that household debt in developing countries is rising fast. Several studies attempt to determine the increase of household debt in South Africa such as Aron and Muellbauer (2000), Kotzè and Smit (2008), Meniago et al. (2013). Using quarterly data from 1985:1 to 2012:1, Meniago et al. (2013) employed the VECM model to estimate the prominent factors that lead to increasing levels of household debt. They found that significant growth of household debt could be explained by housing prices, inflation (CPI), GDP, household consumption expenditures and household savings.

Thaicharoen, Ariyapruchya, & Chuched (2004) from Thailand investigated the cause and risk of household debt. The study claimed that low interest rates, demographics, and declining borrowing constraints, contributed to debt in Thai households. They suggested that current debt levels in Thailand did not pose a threat to financial stability and the macro-economy.

Abid & Zouari-ghorbel (2012) seeks to investigate determinants of household debt in Tunisia using a probit model. They used a probit model because it identifies the factor of household indebtedness by distinguishing the two groups of households. The groups are separated according to the number of credits either household obtained: one credit, two or more credits.

6. Household Debt in Malaysia

This study is not the first to emphasize the determinants of household debt in Malaysia. For example Mokhtar & Ismail (2013) analysed the trend of Malaysia Indebtedness from Q1:1997 until Q4:2011 using the Vector error correction Model (VECM). This work focuses on an Islamic finance perspective and they found that GDP, inflation and lending rates are leading variables. Mokhtar's paper might have been more convincing if the author had considered data from Islamic financial Institutions solely rather than using data from both Islamic and Conventional financial institutions. Supposedly the research makes comparisons between the Islamic and Conventional data. Another study discusses the issue of household debt based on an Islamic economic perspective (Zakaria et al., 2012). The study highlights debt and finance principles according to Islam for both households and financial institutions. In the current study, the data of household debt will cover both from Islamic and Conventional Financial Institutions.

Endut & Hua (2009) explained the trends of household debt in Malaysia, factor contributed, composition of household debt, implication to monetary policy and financial stability. The data were accumulated from 2000 to 2007 to describe the scenario of household debt in Malaysia. However all the explanations on their paper are not rooted in empirical analysis.

Another study on Malaysia is Abdul Ghani (2010) employed the Ordinary Least Squares (OLS) method using quarterly data from 2001 to 2009 to examine the determinants of household indebtedness in Malaysia. This study concerns the significance between debt and Non-performing loan (NPL). Based on the findings, there is a positive relationship between NPL with household indebtedness.

7. Literature GAPS

Even though there are studies done in determinants of household debt in Malaysia, the cause of increasing debt level in the household sector from the macroeconomic perspective is still limited.

The conclusion of the above mentioned discussion is as follows:

(1) No researcher has previously attempted to assess the household debt separately from consumer debt and mortgage debt.

(2) No researcher has previously taken into account the role of financial crisis.

Therefore this study improving the past studies by considering these two factors.

8. Research Methodology

8.1 Data Description

This paper employs the Autoregressive Distributed Lag approach (ARDL) because the variables are integrated of order (1) and (0). Eview 8 and Microfit 5 software were used to test the relationship between household debt and macroeconomic variables such as GDP, Consumer Price Index (CPI), House Price Index (HPI), Interest rate (R), Consumption (Cons) and Personal Disposable Income (PDI). These variables were selected based on the Life Cycle Hypothesis Framework developed by Andro and Modigliani (1963) and from previous literature that found the variables to be significant determinants of household debt. According to life cycle and permanent income theory, households prefer taking on debt to smooth their consumption based on the expected increase in future permanent income. The consumption depends on income growth: age, saving, interest rate and inflation. There is a criticism of this theory because it does not consider liquidity a constrained variable.

Since the record on household debt is only available for 1995 onward, the data of the current study covers a period between Q4 1995 to Q4 2013. The sources for these datasets are the Central Bank Malaysia (BNM), the National Property Information Center (NAPIC) and Department of Statistics. In this paper, household debts are categorized into two types: Secured Debt and Unsecured Debt. Secured Debt (MD) is measured by loan properties which includes residential and non-residential properties. Unsecured Debts (CD) are measured by the total sum of motor vehicles, personal loans, credit cards, loans for securities and other loans.

8.2 Econometric Modelling

To examine both the long run relationship and dynamic interaction for the equations, this study employs an Autoregressive Distributed Lag (ARDL) procedure. The advantages of this technique is that the test of stationary is applicable to the mixture of I(0) and I(1) data (Pesaran, Shin & Smith, 2001).

Table 1   Description and Source of Variables

Variable	Data Description	Sources	Unit	Abb
Secured Debt	Loan for properties	BNM, Monthly Statistical Bulletin	RM million	MD
Unsecured Debt	Motor vehicle Loans, Loans for personal use, Credit card, Loan for securities	BNM, Monthly Statistical Bulletin	RM million	CD
Real GDP	GDP at constant 2005 market prices	BNM Annual Report	Bil MYR	GDP
CPI	Consumer price index 2005=100	BNM Annual Report	x	CPI
HPI	House Price Index 2000=100	NAPIC	x	HPI
Interest rate	Lending interest rate	BNM, Monthly Statistical Bulletin	%	R
Private Consumption	Private consumption expenditure at constant 2005 market prices.	BNM Annual Report	Bil MYR	CONS

Note: Abb is a simplification of abbreviation.

The ARDL approach contains three steps in estimating the model. The first step is to estimate a standard log-log specification of the cointegrating long-run relationship. The ARDL model for Mortgage Debt and Consumer Debt can be written as follows:

$$\Delta LMD_t = \alpha_0 + \beta_1 LMD_{t-1} + \beta_2 LGDP_{t-1} + \beta_3 LCPI_{t-1} + \beta_4 LHPI_{t-1} + \beta_5 LR_{t-1} + \beta_6 LCONS_{t-1} + \beta_7 LPDI_{t-1} + \sum_{i=1}^{p} \delta_1 \Delta LMD_{t-i} + \sum_{i=0}^{q} \delta_2 \Delta LGDP_{t-i} + \sum_{i=0}^{r} \delta_3 \Delta LCPI_{t-i} + \sum_{i=0}^{s} \delta_4 \Delta LHPI_{t-i} + \sum_{i=0}^{t} \delta_5 \Delta LR_{t-i} + \sum_{i=0}^{u} \delta_6 \Delta LCONS_{t-i} + \sum_{i=0}^{v} \delta_7 \Delta LPDI_{t-i} + D_t + \varepsilon_t \qquad (1)$$

$$\Delta LCD_t = \alpha_0 + \beta_1 \beta_1 LCD_{t-1} + \beta_2 LGDP_{t-1} + \beta_3 LCPI_{t-1} + \beta_4 LHPI_{t-1} + \beta_5 LR_{t-1} + \beta_6 LCONS_{t-1} + \beta_7 LPDI_{t-1} + \sum_{i=1}^{p} \delta_1 \Delta LCD_{t-i} + \sum_{i=0}^{q} \delta_2 \Delta LGDP_{t-i} + \sum_{i=0}^{r} \delta_3 \Delta LCPI_{t-i} + \sum_{i=0}^{s} \delta_4 \Delta LHPI_{t-i} + \sum_{i=0}^{t} \delta_5 \Delta LR_{t-i} + \sum_{i=0}^{u} \delta_6 \Delta LCONS_{t-i} + \sum_{i=0}^{v} \delta_7 \Delta LPDI_{t-i} + D_t + \varepsilon_t \qquad (2)$$

Where Δ is a first different operator, while (p, q, r, s, t, u, v) is optimum lag and ε_t refer to the error term. D_t is a dummy variable, representing Asian Financial Crisis on year and the Global Financial Crisis. Where $D_t = 1$ (the financial crisis occurs) for period 1997.2–1998.4, 2007.1-2008.4 and $D_t = 0$ (no financial crisis). To examine the long run relationship between the variables, therefore, hypotheses null and alternative must be conducted using F-statistics. The joint hypotheses to be tested are: $H_0 = \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6$ (No long run relationship), $H_1 \neq \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq \beta_5 \neq \beta_6 \neq \beta_7$ (a long-run relationship exists).

F- Statistics results needs to be compared with the critical values tabulated by Narayan (2005). The sample size of this study is 69, which is less than 100, and therefore Narayan critical values were chosen. If the F statistic is greater than the upper bound value, this indicates that there is a long run relationship. Conversely, if the computed F – statistic is smaller than the lower bound value, it means that no long run relationship exists and that the null hypothesis cannot be rejected. However, if the F-statistic falls within the lower and upper bounds, one may conclude the result is inconclusive.

For the second step, is to test the existence of a long run relation between the variables. The equation of the LMD and LCD, can be estimated as below:

$$LMD_t = \alpha_0 + \sum_{i=1}^{p} \beta_1 LMD_{t-i} + \sum_{i=0}^{q} \beta_2 LGDP_{t-i} + \sum_{i=0}^{r} \beta_3 LCPI_{t-i} + \sum_{i=0}^{s} \beta_4 LHPI_{t-i} + \sum_{i=0}^{t} \beta_5 LR_{t-i} + \sum_{i=0}^{u} \beta_7 LCONS_{t-i} + \sum_{i=0}^{v} \beta_8 LPDI_{t-i} + D_t + \varepsilon_t \qquad (3)$$

$$LCD_t = \alpha_0 + \sum_{i=1}^{p} \beta_1 LCD_{t-i} + \sum_{i=0}^{q} \beta_2 LGDP_{t-i} + \sum_{i=0}^{r} \beta_3 LCPI_{t-i} + \sum_{i=0}^{s} \beta_4 LHPI_{t-i} + \sum_{i=0}^{t} \beta_5 LR_{t-i} + \sum_{i=0}^{u} \beta_7 LCONS_{t-i} + \sum_{i=0}^{v} \beta_8 LPDI_{t-i} + D_t + \varepsilon_t \qquad (4)$$

The lag orders of the variables are chosen either Akaike Information Criteria (AIC) or Schwarz Bayesian Criteria (SBC). In this study, the selection of optimum lags is SBC. The most important thing about selecting appropriate lag orders is to ascertain the true dynamics of the models.

The final step is to estimate an error correction model associated with the long run estimates, where φ is the short-run dynamic coefficients of the convergence of the model to equilibrium and ECM is the speed of adjustment. This is specified as follows:

$$\Delta LMD_t = \varphi_0 + v_1 ECM_{t-1} + \sum_{i=1}^{p} \varphi_1 LMD_{t-i} + \sum_{i=0}^{q} \varphi_2 LGDP_{t-i} + \sum_{i=0}^{r} \varphi_3 LCPI_{t-i} + \sum_{i=0}^{s} \varphi_4 LHPI_{t-i} +$$
$$\sum_{i=0}^{t} \varphi_5 LR_{t-i} + \sum_{i=0}^{u} \varphi_7 LCONS_{t-i} + \sum_{i-0}^{v} \varphi_8 LPDI_{t-i} + \varepsilon_t \qquad (5)$$

$$\Delta LCD_t = \varphi_0 + v_1 ECM_{t-1} + \sum_{i=1}^{p} \varphi_1 LCD_{t-i} + \sum_{i=0}^{q} \varphi_2 LGDP_{t-i} + \sum_{i=0}^{r} \varphi_3 LCPI_{t-i} + \sum_{i=0}^{s} \varphi_4 LHPI_{t-i} +$$
$$\sum_{i=0}^{t} \varphi_5 LR_{t-i} + \sum_{i=0}^{u} \varphi_7 LCONS_{t-i} + \sum_{i-0}^{v} \varphi_8 LPDI_{t-i} + \varepsilon_t \qquad (6)$$

9. Empirical Results

Before proceeding to long run and short run relationships, one must make sure that none of the variables are I(2) because this will invalidate the methodology. To investigate the presence of unit roots in a time series, this study selected the standard Augmented Dickey-Fuller (ADF) and Philips Perron (PP) test. These two tests were conducted to determine the order of integration of the variables. From 1996.4 to 2013.4, the empirical results indicate that the mortgage debt and consumer debt is integrated of order I(1), as well as independent variables except for GDP, HPI and Private Consumption, which is integrated of order I(0). The result is shown in Table 2.

Table 2   Unit Root Test

Variables	ADF		PP	
	I(0)	I(1)	I(0)	I(1)
Mortgage Debt	-3.093713	-7.241907***	-3.094315	-7.241907***
Consumer Debt	-2.028680	-9.172783***	-1.990911	-9.214017***
GDP	-3.896810**	-5.384143***	-4.111785**	-12.98075***
CPI	-2.949546	-6.263084***	-2.549299	-5.909008***
HPI	-7.774449***	-9.558000***	-7.774449***	-61.36658***
R	-2.779730	-5.262999***	-2.086579	-4.877000***
CONS	-6.776763***	-6.419669***	-5.995446***	-9.092399***
PDI	-2.793918	-3.655326**	-1.399605	-3.785394**

Notes: *Significant at 10%, ** Significant at 5%, Significant at 1%. All the variables are estimated in log form except for the Interest Rates (R).

After confirming none of the variables are I(2), the next step was to proceed with the three steps of the ARDL approach. To perform the ARDL bound test, a conditional Error Correction Model (ECM) is estimated with two and four lags for each model. Two and four lags were chosen because the data is on a quarterly basis.

Table 3 provides the results of the F-statistics to justify the existence of the cointegration or long run relationship among the variables. Model 1 shows that the null hypothesis is rejected at the 1 percent significance level. The computed F-statistic of 5.8181 is above the upper bound value of 5.248 at the 1 percent significance level. While for Model 2 that is consumer debt, the F-statistic is 5.1394 and falls between the bound value at the 1 percent level suggesting cointegration is present.

Table 3   Cointegration Tests for the Existence of a Long-Run Relationship

Model	F-statistic	
Model 1: MD = f (GDP, CPI, HPI, R, CONS, PDI)	5.8181	
Model 2: CD = f (GDP, CPI, HPI, R, CONS, PDI)	5.1394	
k = 7, n = 69		
Narayan (2005) Critical Value	Lower Bound	Upper Bound
1%	3.774	5.248
5%	2.913	4.168
10%	2.519	3.669

In sum, these indicate that there exists a long-run cointegration relationship among the household debt and the macroeconomic variables (GDP, Consumer Price Index, House Price Index, Interest rate, Consumption and Personal Disposable Income).

Next step is to estimate the equations (3) and (4). The result of long run relationship is reported in Table 4.

Table 4   Estimation of Long Run Coefficients

Regressors	Model 1 (Dependent Variable = LMD)		Model 2 (Dependent Variable = LCD)	
	Coefficient	Probability	Coefficient	Probability
LGDP	1.5757	0.121	1.8855*	0.064
LCPI	-1.3071	0.196	0.73072	0.468
LHPI	-1.9306*	0.059	-1.4017	0.166
R	-0.64597	0.521	3.53961**	0.001
LCONS	-0.31959	0.751	1.7701*	0.082
LPDI	2.3331**	0.023	-0.17983	0.858
D	-0.84031**	0.404	-1.3409	0.185

Note: ARDL for model 1 (1,0,0,0,0,0,0,0) and for model 2 (1,0,0,0,0,0,0,0,0) lag for each variable is selected based SBC. ***, **, * is the significance level at 1%, 5% and 10% respectively.

For Model 1 of Table 4, two variables, namely GDP and Personal Disposable Income, are positively affected by Mortgage Debt. This indicates that in the long run, GDP and Personal Disposable Income would affect Mortgage Debt. HPI and Personal Disposable Income are statistically significant at the 1 and 5 percent significance level in influencing Mortgage Debt.

Meanwhile, for Model 2 of Table 4, GDP, CPI, interest rate and consumption is found to positively affect Consumer Debt. Only GDP, Consumption and Interest rate are statistically significant at 1, interest rate at 5 percent level influencing Consumer Debt.

Regarding the dummy variable for Model 1, the estimation result for both models indicates that it has no impact and is not significant.

Table 5 indicates the estimation results of the short run model using ARDL (1,0,0,0,0,0,0,0). As shown in Model 1, GDP and Personal Disposable Income are positive in effect on Mortgage Debt. HPI and Personal Disposable Income are significant at the 1 and 5 percent level influencing Mortgage Debt. In other words, an increase in housing price and personal disposable income will further increase the debt. While for the Model 2, GDP, CPI, Interest rate and consumption are positive influencing Consumer Debt.

The ECM variable which explains the speed of the adjustment is also significant at 1 percent significance level for both Models. This indicates that there is long run causality in Mortgage Debt and Consumer Debt.

Table 5   Estimation of Short Run (VECM) Model

Regressors	Model 1 (DV = LMD)		Model 2 (DV = LCD)	
	Coefficient	Probability	Coefficient	Probability
ECM	-3.35161**	0.001	-0.41008***	0.000
ΔLGDP	1.5909	0.117	1.9831*	0.052
ΔLCPI	-1.4339	0.157	0.70909	0.481
ΔLHPI	-1.9579*	0.055	-1.3688	0.176
ΔR	-0.60701	0.546	2.4377**	0.018
ΔLCONS	-0.32237	0.748	1.6827*	0.098
ΔLPDI	2.2090**	0.031	-1.181651	0.857
D	-0.86052	0.393	-1.84621	0.184
R-Square	0.23541		0.34010	
Durbin Watson	2.1154		2.3705	
F-Statistic	(8, 57) 2.1937		(8, 57) 3.6721	
Prob (F-statistics)	0.041		0.002	

Note: ARDL (1,0,0,0,0,0.0,0) lag for each variable is selected based on SBC. The dependent variable is ΔLMD. ***, **, * is the significance level at 1%, 5% and 10% respectively.

For the diagnostic check, the F-statistic for both models is significant. This means the independent variable jointly can influence dependent variables.

10. Conclusion

Although the determinants of household debt were examined extensively in the previous studies, to my knowledge no study thus far has empirically tested mortgage and consumer debt separately. Therefore the objective of this study is to investigate the relationship between macroeconomic variables and Mortgage Debt and Consumer Debt separately. The selected macroeconomic variables are GDP, HPI, CPI, Interest Rate, Consumption and Personal Disposable Income.

To conclude, GDP is associated with an increase in Consumer Debt and Mortgage Debt either in the long run or short run relationship. The higher GDP, which is reflected from positive economic growth and directly in the higher earning become a supported theory for the two parties in taking and issuing more debt.

Based on these findings this study proposes some suggestions that can be done to mitigate excessive household debt. Firstly, activities involving real estate speculation should be controlled. Since a housing loan comprises a major portion of household debt, it might be time for policymakers to pay more attention to the bank lending policy for households. Rising housing prices are a cost burden to the new home buyer. The increase in housing prices is not in tandem with the increase in average household income. For those who want to start new families there are no affordable ways to buy houses and purchases might depend on government schemes such as the My First Home Scheme or (Perumahan Rakyat 1 Malaysia) PR1MA. The existence of PR1MA to assist the lower income group to have their own house is a good move by the government. The Government's effort taken to curb the extensive housing price is through that move. However, a leeway is given to the borrower, such as 110% financing instead of 90% financing raised a concern if the buyer is financially sound to take up the loan.

11. Future Direction of Research

Future research should consider analyzing data on student debt together with another variable. Educational loans, such as National Higher Education Fund Corporation (PTPTN), MARA loan or any personal loan for them to further study either in local (public or private institutions) or overseas. They need to repay these loans after finishing graduate school and nowadays, PTPTN is under CCRIS. The analysis is important to discover the impact of student debt burden to the individual himself, economy and also to the society.

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