Determinants of household financial vulnerability in Malaysia and its effect on low-income groups

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ABSTRACT

Household financial vulnerability is an important area of research in household economic studies. Hence, a number of studies have attempted to identify the factors that make households vulnerable to financial shocks. In Malaysia, the research is scant on this topic especially when it comes to low-income households. Therefore, the study aims to identify the macroeconomic factors that make the household vulnerable to financial shocks. For this purpose, the study uses the autoregressive distributed lag modelling approach as an estimation technique. The results revealed that household debt, prices of goods, interest rate and unemployment have a positive long-run relationship with household financial vulnerability while income has a negative relationship. Further analysis confirms that these predictors of financial vulnerability also affect the low-income groups. This study would be of interest to the academicians and policy makers in the area of household economics.

1. Introduction

Financial vulnerability is a condition that defines the ability of a household to recover from sudden financial shocks. This includes sudden loss of income due to unemployment or increase in expenditure due to uncontrollable factors. Therefore, knowing the factors that make a household vulnerable to financial shocks is vital in household economic research. However, due to high costs of maintaining household data, developing countries are yet to offer such data to the public which has resulted in limited research of the

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topic. In Malaysia, household-related data is made available to the public but is not comprehensive enough to serve as concrete empirical evidence regarding its effect on the low-income households. As far as the research related to identifying the macroeconomic factors of household financial vulnerability in Malaysia is concerned, Abdul Ghani (2010) pointed out a few of the monetary factors that affect the households in Malaysia. However, when it comes to the factors that affect the low-income household in Malaysia, such research is next to non-existent.

Due to the current rise in household debt in Malaysia, the question arises regarding the financial sustainability of households in the case of financial shocks. Studies have shown that due to the low cost of borrowing, people are encouraged to borrow from the banks thereby landing them into household debt (Hofmann, 2004; Meng, Hoang and Siriwardana, 2013; Mokhtar and Ismail, 2013). In line with the global trend, Malaysia is also seeing a rise in household borrowing. The question is whether it is the household debt that makes the household vulnerable to financial shocks or whether there are other contributing factors. Moreover, do these factors threaten low-income households as well? Therefore, this study will attempt to identify the factors that render Malaysian households vulnerable to financial shocks and assess how these factors would affect the low-income groups.

For this purpose, the literature is reviewed for a descriptive analysis of the variables of interest. The method of simulation is discussed in the methodology section whereas the results and discussion section portray the findings of the simulation and its effect on the macro and low-income household levels.

1.1 Background

Household debt has seen an increasing trend since the portfolio shift of banks from the corporate sector to household sector. Figure 1 shows a hike in a debt-to-GDP ratio from 67.2% to 89.1% in 2015.
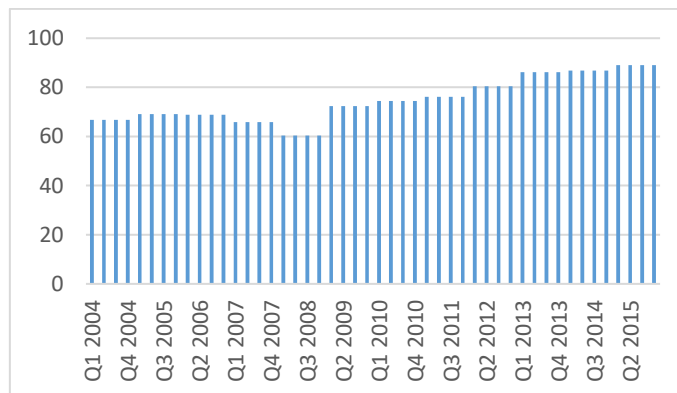

Source: Financial Stability and Payment Systems Report 2004-2015

Fig. 1. Household debt-to-GDP Ratio (2004-2015)

A constant increase can be seen in GDP (Figure 2). The GDP growth rate increased from 5.58% in 2006 to 5.73% in 2014 (see Figure 3). However, a decrease in growth is observed since 2015, and the growth rate is as low as 3.95% as of 2016 Q2. Similarly, an increase in the prices of goods can be observed since 2006 (see Figure 4). Moreover, many studies confirm a negative relationship between the prices of goods and growth. For instance, Mamo (2012) used panel data from Sub-Saharan African countries and found a

negative relationship between economic growth and price of goods and services. Similarly, Gokal and Hanif (2004) used time-series data for Fiji and found a weak but negative relationship between both variables. It shows that with the increase in the prices of goods and low growth (a proxy for income), there are higher chances that the household especially B40 may default on loans.

Apart from that, unemployment affects the household's ability to repay the loans (Fuenzalida and Ruiz-Tagle, 2010). When a household suffers from sudden employment shock, it affects its capability to earn which results in resorting to savings to meet expenditures or increased borrowing to cover the expenses. In such a case, the household is unable to repay the loans (Rinaldi and Sanchis-arellano, 2006). A study conducted in Chile has shown a significant effect of unemployment on the capability of the household to repay their loans (Fuenzalida and Ruiz-Tagle, 2010).
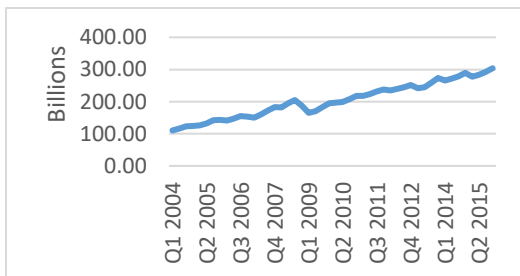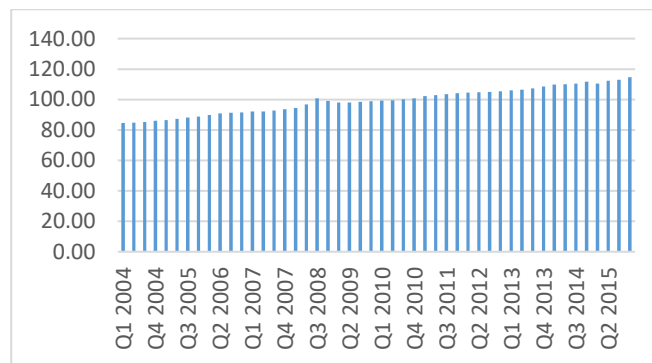
Source: International Financial Statistics, IMF

Fig 2. GDP Malaysia (2004-2015)
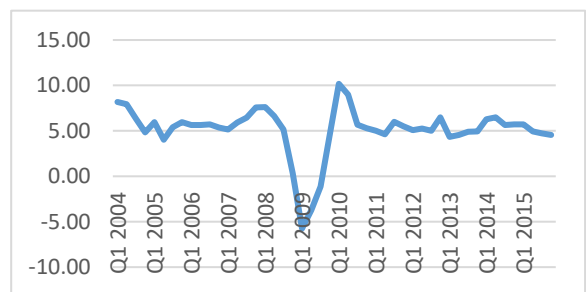
Source: International Financial Statistics, IMF

Fig 3. GDP Growth Malaysia (2004-2015)

Source: International Financial Statistics, IMF

Fig 4. Consumer Price Index (2004-2015)
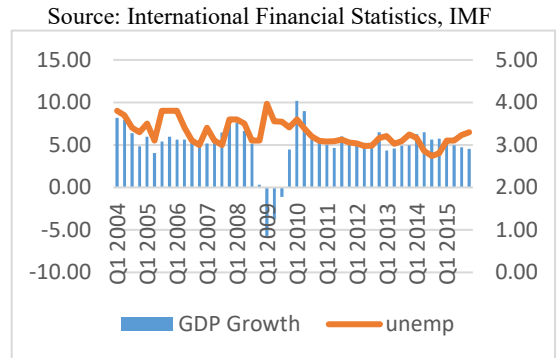
In Malaysia, a low unemployment rate is observed since 2009 until 2014. A rise in unemployment can be seen from 2014 onwards despite increased in GDP (see Figure 5). However, a more complete picture can be observed from Figure 6 where low GDP growth is observed since 2014 which increased the unemployment. The low-income growth or an increase in the unemployment rate can hurt the B40 more

than the top income groups as the low-income groups borrow for consumption purposes whereas the top-income groups borrow for purchasing real estate or financial assets (Salih, 2014). Due to borrowing for consumption purposes, low-income households usually have low or no savings when unemployed whereas the top income groups have financial assets on which to depend in the case of financial shocks.

Source: International Financial Statistics, IMF
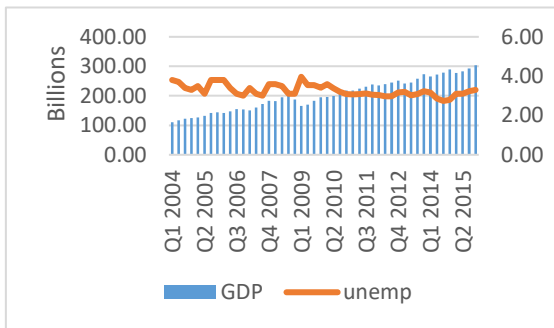
Source: International Financial Statistics, IMF

Fig. 5. A comparison between GDP and unemployment rate 2006-2015

Fig. 6. A comparison between GDP growth and unemployment rate 2006-2015

The bank's lending rate is another factor that can influence a household's capability to repay their loans in Malaysia (Abdul Ghani, 2010). With the increase in interest rate, the borrower will pay more from their income which may affect their ability to repay the loan (Dey, Djoudad and Terajima, 2008; Anderloni, Bacchiocchi and Vandone, 2012; McDonald and Chris, 2016). In the case of Malaysia, since 2006 the interest rates have undergone a decreasing trend as can be seen from Figure 7. However, the empirical evidence shows that the interest rate affects household financial vulnerability positively (Abdul Ghani, 2010).
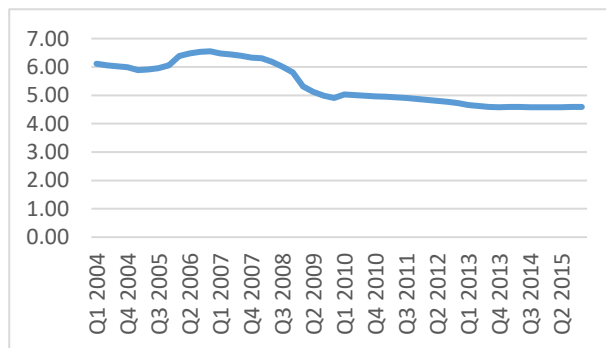
Source: World Bank Data

Fig. 7. Average lending rate in Malaysia 2006-2014

2.   Literature review

The lifecycle model of Modigliani and Brumberg (1954) illustrates household behaviour over a given period by smoothing the consumption through borrowing and saving in a perfect functioning capital market. Hence, the household takes loans for smoothing their consumption with the expectation of an increase in future income. However, looking at the current trends, the households take loans to overcome the financial and economic difficulties in response to local circumstances (Anderloni, Bacchiocchi and Vandone, 2012). Hence, instead of smoothing their consumption, they lose their savings which may lead to financial vulnerability (Vandone, 2009).

However, there is no agreed index for a financial vulnerability that can be used for empirical analysis. This has resulted in limited research on the determinants of household financial vulnerability. For instance, Fuenzalida and Ruiz-Tagle (2010) used unemployment as a proxy for financial vulnerability in Chile due to labour income being the primary source of their livelihood. On the other hand, Dey, Djoudad, and Terajima, (2008) used debt-service ratio (DSR) as a proxy for household financial vulnerability. In contrast, Anderloni et al.(2012) used survey data to come up with the determinants of financial vulnerability. In addition, non-performing loans are used as a proxy for financial vulnerability (Rinaldi and Sanchis-arellano, 2006; Abdul Ghani, 2010). In our case, non-performing loans (NPL) is a better proxy for financial vulnerability as it reflects the potential of the household to pay back the principal loan or instalments in 90 days.

NPL can be used as a proxy for a bank's credit risk arising from the borrower's capability to repay the loan (Abid, Ouertani and Zouari-Ghorbe, 2013). For instance, Louzis, Vouldis and Metaxas (2012), Joseph et al. (2012) as well as Salas and Saurina (2002) combined both macro and microeconomic variables to explain the determinants of NPL. As far as the household financial vulnerability is concerned, Rinaldi and Sanchis-arellano (2006) used panel data from seven euro-zone countries and using panel group FMOLS cointegration estimation they identified as disposable income, monetary conditions and unemployment as the main determinants of NPL. Similarly, Abdul Ghani (2008) using OLS estimation found that household debt, income and other monetary conditions are the main determinants of NPL.

However, the data in most countries is available at the macro level rather than at the household group level or micro level. This is one of the reasons for the difficulty of simulating the determinants of household financial vulnerability for low-income groups. Therefore, in this study, the empirical approach is adopted at the macro level, and for its effect on low-income groups, published reports are referred. The studies on low-income groups' financial conditions suggest that they do not have enough savings which lead them to borrow personal loans from the financial institutions rather than purchase financial assets (Department of Statistics, 2014; Salih, 2014; BNM, 2016). One of the reasons for their default on loans is their low financial literacy (Abdullah and Chong, 2014; Khazanah Research Institute, 2016). Similarly, urban poverty is considered a more severe problem in Malaysia because of the rising prices of goods and accommodation while incomes have increased only marginally (Nair and Vaithilingam, 2013). Therefore, it is important to identify the factors that render the low-income groups financially vulnerable so that proper policies could be introduced.

3. Methodology

The data is obtained from Bank Negara Malaysia and International Financial Statistics IMF. The data is selected from 2004Q1 to 2015Q4 which makes 48 observations. The following model is developed for further investigation.

$$LNPL = \beta 0 + \beta 1\,LDGDP + \beta 2\,GDP + \beta 3\,CPI + \beta 4\,ALR + \beta 5\,UNEMP + \varepsilon \qquad (1)$$

(1)

Where LNPL is the log of non-performing loans which is used as proxy for financial vulnerability among the households, LDGDP is the log of household debt-to-GDP ratio, LGDP is the log of Gross Domestic Product which is used as proxy for income, CPI is the log of Consumer Price Index, ALR is the Average Lending Rate, UNEMP is the Unemployment Rate and ε is the error term.

This study aims to apply ARDL estimation techniques. Based on the variables defined in Equation 1, Equation 2 is given as

$$\Delta LNPL = \beta_0 + \sigma_1 LNPL_{t-1} + \sigma_2 LDGDP_{t-1} + \sigma_3 LGDP_{t-1} + \sigma_4 LCPI_{t-1} + \sigma_5 ALR_{t-1} + \sigma_6 UNEMP_{t-1} + \sum_{i=0}^{p} \beta_1 \Delta LNPL_{t-1} + \sum_{i=0}^{p} \beta_2 \Delta LDGDP_{t-i} + \sum_{i=0}^{l} \beta_3 \Delta GDP_{t-i} \sum_{i=0}^{p} \beta_4 \Delta LCPI_{t-i} + \sum_{i=0}^{p} \beta_5 \Delta ALR_{t-i} + \sum_{i=0}^{p} \beta_6 \Delta UNEMP_{t-i} + \mathcal{E}_t \qquad (2)$$

Where Δ represents the first difference operator and p is the optimal lag length. Moreover, β represents the short-term dynamics of the model whereas σ denotes the long-run relationship of the model. Due to less observation in the data, the lag is set at four using AIC criteria. Once the ARDL model is estimated, the equation of null hypothesis is estimated through the Error Correction Model (ECM). The equation is given as

$$\sum LNPL_t = \sum_{i=1}^{p} \beta_1 \Delta LNPL_{t-i} + \sum_{i=1}^{p} \beta_2 \Delta LDGDP_{t-i} + \sum_{i=1}^{p} \beta_3 \Delta LGDP_{t-i} + \sum_{i=1}^{p} \beta_4 \Delta LCPI_{t-i} + \sum_{i=1}^{p} \beta_5 \Delta ALR_{t-i} + \sum_{i=1}^{p} \beta_6 \Delta UNEMP_{t-i} + \lambda ECT_{t-1} + \mathcal{E}_t \qquad (3)$$

Where β_1 to β_6 are the short-run dynamic coefficients of the model's convergence to equilibrium and λ is the speed of adjustment. It must carry a significant negative sign with the value between 0 and 1.

In order to analyse the situation of low-income groups, two types of reports are accessed. These reports include Financial Stability and Payment Systems Reports of Bank Negara Malaysia which are the most authentic source of evaluating the household's financial conditions and Household Income Survey Reports published by the Department of Statistics which offers a more in-depth analysis of household income. The first source of reports provide information about the borrowings and financial assets, while the Household Income Survey Reports details the income of households. The third type of reports is the Household Expenditure Survey published by Department of Statistics Malaysia, which provides the breakdown of household expenditures or consumption. The information in these reports are descriptive and not fit for empirical analysis. The information of these reports is deemed important in the context of our study as discussed in the next section.

4. Findings

The model is tested by adopting the Ordinary Least Square (OLS) model. However, most of the predictors produced insignificant effect on financial vulnerability. Moreover, the R-square is obtained as 99%. To further explore such unusual results, Augmented Dickey-Fuller (ADF) unit root test is performed for each of the variables and five out of six variables in the study are stationary at first difference while unemployment rate is stationary at level. In this case, the most appropriate regression model is Autoregressive Distributed Lag (ARDL). According to Pesaran, Shin and Smith (2001), ARDL can be used when some variables in the model are I(0) and I(1). Moreover, ARDL is suitable for small samples (Pesaran and Shin, 1999; Narayan, 2005; Khan, Abdullah and Samsudin, 2016). In the case of this study the number of observation was limited to 48 and five variables are stationary at first difference while 1 is stationary at level.

First, the ADF unit root technique is performed where the maximum lags are four and selected through Akaike Information Criterion. The ADF technique is introduced by Dickey and Fuller (1981) and is used in the ARDL bounds test based on the assumption that all the variables in the model must be integrated either I(0) (at level) or I(1) (at first difference). The results of the test are given in Table 1.

Table 1. ADF Unit root test

Variables		Lag AIC	Length	t-statistics	Critical values at 5%	P-value
				Augmented Dickey and Fuller test		
LNPL*	I(1)	2		-8.83	-2.929	0.0001
LDGDP*	I(1)	3		-4.42	-2.931	0.0060
LGDP*	I(1)	1		-7.20	-2.928	0.0001
LCPI*	I(1)	1		-6.17	-2.927	0.0001
ALR*	I(1)	3		-3.45	-2.931	0.0144
UNEMP*	I(0)	1		-3.57	-2.925	0.0061

*model with intercept

The estimation of Equation 2 is performed through ARDL (LDGDP 3, LGDP 4, LCPI 4, ALR 4, UNEMP 3) while lags are selected through the AIC criterion (see Figure 8 on the next page). The results from the bound test as can be seen in Table 2 show that the value of the F-statistics is larger than the upper bound which confirms the existence of cointegration among the variables.

Table 2. Bounds Test

Critical Values at 5% significance level	F-Statistics
Lower bound 2.62	37.02
Upper bound 3.79	

The results based on the long-run model are shown in Table 3. The results confirm that the rise in household debt, price of goods, interest rate and the unemployment rate renders households vulnerable to financial shocks and affects the capability to repay the loans. However, with the decrease in household income (GDP used as a proxy), the chances of household financial vulnerability increases. The results are

similar to the study conducted by Rinaldi and Sanchis-arellano (2006) although their study was based on penal data and they estimated the model through FMOLS cointegration.

Table 3. Estimated Long-run Coefficients using ARDL Approach

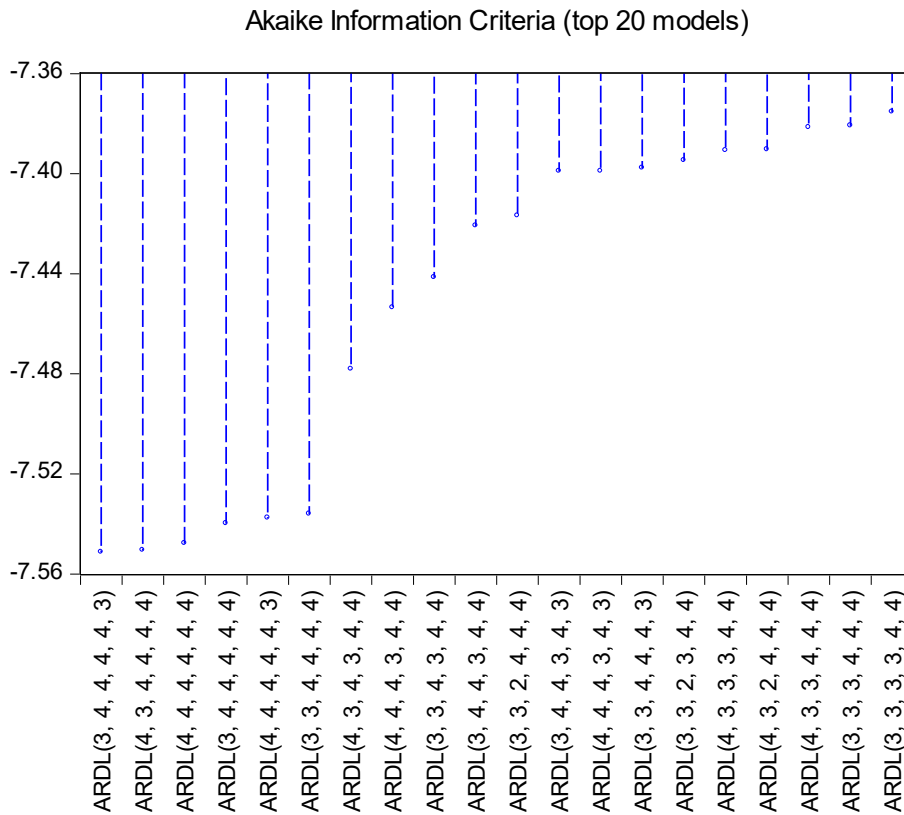| Variables	Coefficients	Significance
C	3.25	0.00001
LDGDP	0.08	0.00001
LGDP	-0.39	0.00001
LCPI	0.24	0.00001
ALR	0.11	0.00001
UNEMP	0.08	0.01650

Fig 8. Criteria Graph for ARDL based on AIC

Income has a strong effect on the non-performing loans as 1% decrease in income will increase non-performing loans by 0.39%. The impact of income and NPL is similar to the findings of Abdul Ghani (2010) where the NPL decreased by 0.38% in response to a 1% increase in income. However, the estimation was done through OLS regression. On the other hand, 1% increase in the prices of the commodity will increase the chances of household financial vulnerability by 0.24%. Similarly, 1% increase in the cost of borrowing will increase the bank's non-performing loans by 0.11% due to the failure of households to repay loans and to the high cost of borrowing. In addition, with 1% increase in the household debt or unemployment rate, a household's vulnerability to financial shocks increases by 0.08%.

Starting with the long-run, the coefficient in Table 4 on one lag error correction term is significant at the 1% level with the negative sign, which supports the results of the bound test for the existence of cointegration. The coefficient value of – 0.53 implies that the speed of adjustment to the equilibrium after deviation is high. For instance, 53% disequilibria from the previous quarter will converge back to the long-run equilibrium in the current quarter.

Table 4. ECM speed of adjustment

Variable	Coefficient
ECT (-1)	-0.53***

*** Variable significant at 1%

The model passes all the diagnostic tests against serial correlation and heteroscedasticity. Serial correlation is estimated through the Breusch-Godfrey LM test (see Table 5). The *p*-value of above 5% confirms that null hypothesis (no serial correlation) cannot be rejected at the standard level of significance. For testing heteroscedasticity, the study uses the Breusch-Pagan-Godfrey test. The result shows that the *p*-value is above 5%. Thus, it lends credence to the proposition that the model does not suffer from heteroscedasticity as the null hypothesis (no heteroscedasticity) could not be rejected.

Table 5. Serial correlation and heteroskedasticity test

Diagnostic Tests	Obs*R-square	Significance
Breusch-Godfrey Serial Correlation LM test	2.45	0.29
Breusch-Pagan-Godfrey Heteroskedasticity test	16.94	0.93

5. Discussion

Considering the results, income and prices of goods are the two main determinants that have a strong effect on the non-performing loans which represent the financial vulnerability of the household. It means that with the decrease in income and increase in prices of goods, the households are more exposed to the risk of financial vulnerability. In the current situation, the low growth in GDP (a proxy for income) and an increase in CPI (prices of goods) are observed in Malaysia which can lead the households to borrow for covering the consumption expenses. The interest rate produces the second strongest effect on financial vulnerability. However, data used for this study show that the interest rates are lower in Malaysia in the given period. The least important determinants in the model are unemployment and debt. Nevertheless, for low-income households, the rise in the prices of goods, high household debt and employment increase the probability of bankruptcy.

However, not all the households will suffer especially those who have large buffers of financial assets and real assets against their borrowings. The overall household debt analysis shows that the demand of borrowing for home purchases increased by 9.1% in 2016 but was lower than 11% in 2015. On the other hand, borrowings for purchasing cars and security reduced by 0.8% and 1.5 percent (+3.5% and +1.7% in 2015) respectively. However, the demand for personal loans and credit card loans increased by 4.8% and 3.4% respectively (+4.6% and +1.9% in 2015) (BNM, 2016). However, overall household financial and liquid financial assets stood tall against the debt at 2.1 and 1.4 times respectively. It shows that in the case of sudden financial shocks, the households are able to consume their financial assets rather than opting for borrowing.

Breaking down the household by income groups shows that top 20 income groups have largest share of debt (about 40%) which is mostly for the purchase of properties and investment assets. The borrowings of middle-income groups is for financial assets followed by motor purchases and personal financing. However, the debt of the bottom 40% comprise financial assets (about 50%) whereas the rest of the borrowings are for car purchases and personal financing. This group may face difficulties in servicing their debt in the event of economic shocks (BNM, 2016). This is because of the miniml difference between the income and expenditure for this specific group. Table 6 lists those occupation groups which are earning below RM 3,000 and have low saving buffers.

Table 6. Low-Income Households Income, Expenditure and Savings

Occupation Group	Income	Expenditure	Savings
Skilled Agriculture and Forestry and Fishery Workers	2758	2272	486
Craft and Related Trade Workers	3470	2696	774
Plant and Machine-Operators and Assemblers	3791	2791	1000
Elementary Occupations	3131	2378	753
Other Occupations	2298	2291	7

Source: Department of Statistics (2014)

The low-income groups are usually associated with the occupations where the risk of job loss is higher. These groups are usually associated with seasonal and contract based jobs due to which their income is uncertain. Hence, in the case of job loss and increase in the prices of goods, it is more certain that they will go for personal financing compared to borrowing for asset accumulation. The findings of Global Findex shows that as of 2014, about 58% of the bottom 40% faced problems in coming up with emergency funds. This means that the majority of the low-income class does not possess sufficient savings that can support them in the case of emergencies. Hence, they borrow to support themselves in the event of emergencies. According to Salih (2014), they borrow for the purpose of medical emergencies, schooling, and daily consumption. However, the top 60% borrows for the purpose of asset accumulation which in return generates profits. Due to low savings, there is the probability that these groups would be unable to service their debt and are thereby considered financially vulnerable. The evidence is provided by Credit Counselling and Debt Management Agency which shows that among those who defaulted on their loans were mostly from low-income groups (Khazanah Research Institute, 2016).

6. **Conclusion**

Household financial vulnerability is an important topic in economics. Unfortunately, it has been little researched due to the lack of data. This is particularly the case for low-income groups. To address this lacuna, this study has attempted to ascertain the determinants of household financial vulnerability and its effect on low-income groups in Malaysia. Hence, using the ARDL approach, the study found that decreases in income, an increase in household debt, increase in the prices of goods, interest rate and unemployment lead household towards financial vulnerability.

Comparing the results for household income group levels, the determinants of financial vulnerability are less important for the top income groups due to possessing large financial asset buffers which can support

them in times of financial shocks. Low-income groups have less financial assets and possess uncertain jobs. Their job uncertainty affects their income and an increase in the price of goods leads them to borrow from banks for personal use. This situation makes them more financially vulnerable than other income groups.

Future research on this topic may focus on the determinants of household financial vulnerability at the micro level (pertaining to the availability of the data) and provide a solution by means of which the low-income groups can avail interest-free loans which can help them in availing the opportunity to earn extra income.

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