

The Relationship between Household Debt Composition and GDP in Malaysia

Hafizah Hammad Ahmad Khan^{1*}, Hussin Abdullah² and Shamzaeffa Samsudin²

¹Faculty of Business and Management, Universiti Teknologi MARA, 08400 Merbok, Kedah, Malaysia

²School of Economics, Finance & Banking, Universiti Utara Malaysia, 06010 Sintok, Kedah, Malaysia

ABSTRACT

This study aims to investigate the link between household debt and GDP. By utilising the Toda-Yamamoto non-causality test, findings of this study reveal that there is a unidirectional causality that runs from the household debt to GDP which is consistent with the findings based on composition of debt. A Johansen cointegration test was also conducted and results confirmed that long run relationship exists with one cointegrating equation found for each model. Findings from this study can be useful for policymakers working on making Malaysia a high-income country by 2020.

Keywords: Causality, cointegration, consumer debt, GDP, household debt, Malaysia, mortgage debt

INTRODUCTION

Recently, household debt in Malaysia has begun to rise significantly. This study focuses on Malaysia where household debt especially after the Global Financial Crisis has taken on levels that are at par with developed nations such as the United States.

Section 2 of the paper explains the background of the study to be followed by a literature review in Section 3. In Section 4, the research methodology is highlighted and Section 5 discusses the results. The conclusion and recommendation of this study are presented in Section 6.

Background of the Study

According to Bank Negara Malaysia (2013), household debt is made up of loans for properties, personal use, credit cards, motor vehicles loans, loans for securities and others. It can be divided into secured and unsecured debt. Apparently, more than

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E-mail addresses:

hafizah0486@gmail.com (Hafizah Hammad Ahmad Khan),

hussin2141@uum.edu.my (Hussin Abdullah),

shamzaeffa@uum.edu.my (Shamzaeffa Samsudin)

* Corresponding author

half of the total household debt in countries all around the world are in the form of a mortgage debt (Pearce, 1985).

A comparison of household debt among countries shown in Figure 1 indicates Malaysia is among the highest with the debt-to-income ratio of almost 1.5 times higher than their income. The debt service ratio is also found to be the highest suggesting

households in the country allocate more than 40 percent of their income for debt servicing.

Based on central bank targets a debt service ratio which exceeds 30 percent suggests dependence on debts for everyday expenditure, thereby increasing the country's risk of plunging into a recession.

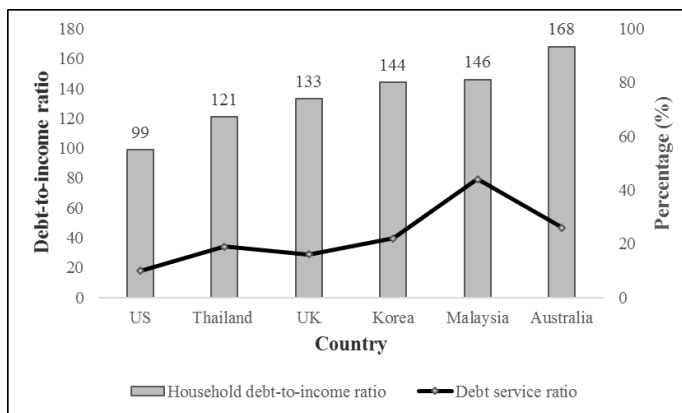


Figure 1. Household debt-income ratio and debt service ratio in year 2014
Source: CEIC data

Mian and Sufi (2014) in their book, “House of Debt” reveal that the U.S Great Recession which began in 2007 was caused by high levels of household debt that reached nearly 100% of GDP. During this period, the unemployment rate increased sharply and caused consumer demand to fall and asset prices especially for housing to drop, triggering a rise in default payment. Consequently, this incident has given a negative impact on other countries all over the world and caused the Global Financial Crisis in 2008 (Meniago, Mukuddem-Petersen, Petersen, & Mongale, 2013).

Although a household debt is necessary for the economy to grow, a high debt level, if not associated with the growth in income and productivity, will be harmful to the economy. This is because it may lead to a higher default rate. Unfortunately, since the past decade, household debt in Malaysia has been growing faster than the growth in GDP, which suggests that a rapid rise in the household debt has hindered economic growth. As illustrated in Figure 2, during the pre-crisis period, the trend in household and real GDP growth indicates an inverse relationship whereby the growth

The Relationship between Household Debt and GDP in Malaysia

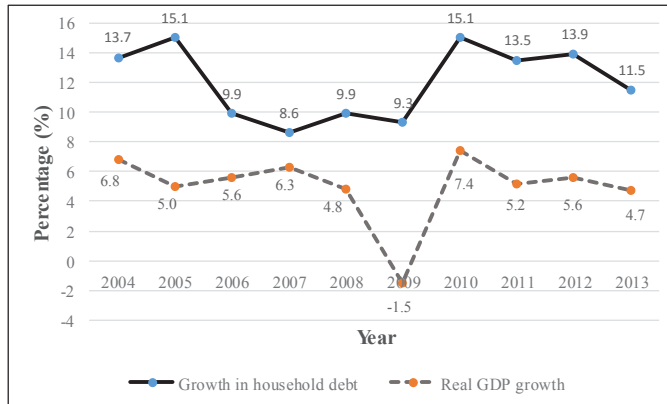


Figure 2. Growth in household debt and real GDP from 2004 to 2013
 Source: Department of Statistics Malaysia (2013) and Bank Negara Malaysia (2014)

in the household debt is associated with a decline in the GDP growth. However, the relationship has shifted significantly after the crisis, and the direction of causality between the two variables remains unclear, calling for further investigation on the subject.

From one perspective, the rise in debt level can partly be explained by the continuous rise in a household income since

the household will have a higher capacity to borrow since they can afford a higher debt level. Positive income growth also increases consumer confidence in the economy and may influence households to borrow. From the standpoint of lenders improvement in household income may influence them to increase loans based on the assumption that borrowers will be better able to service their debts.

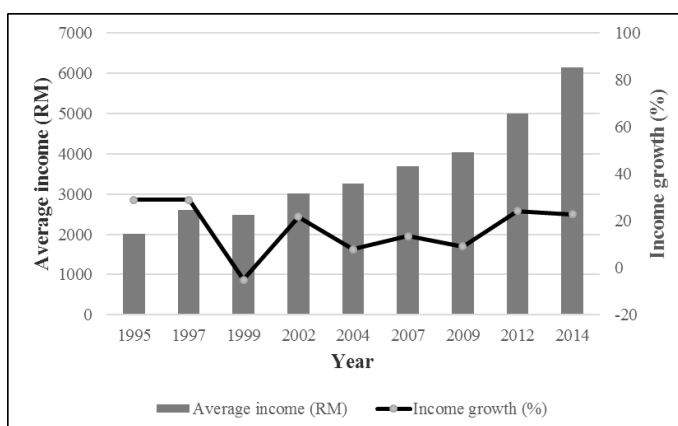


Figure 3. Mean monthly household gross income (1995- 2014)
 Source: Department of Statistics Malaysia (2014)

As illustrated in Figure 3, there is an increasing trend in the average household income since the past two decades as the income growth also shows an upward trend in the same period apart from 1998 and 2008. The income level as recorded by Gross Domestic Product (GDP) suggests that increases in economic growth will indirectly influence household debt to rise.

As Malaysia aims to achieve high-income status by 2020, it is important to sustain economic performance and avoid financial instability. Thus, the investigation of the link between a household debt and GDP is crucial aspect of policy formulation.

LITERATURE REVIEW

Based on the Life Cycle Model, a household will smooth their expenditure over time and choose to save when their income is high and spend when the income level is relatively low. Due to expectations that incomes will increase in the future, households will choose to borrow money in order to finance their current spending at the expense of future income (Modigliani & Brumberg, 1954). Thus, the income level plays important role in the household debt model.

Previous studies support the view that household debt and incomes are positively related, such that when incomes rise the amount of debt level also increases (Wasberg, Hira & Fanslow, 1992; Crook, 2001; Calza, Gartner & Sousa, 2003; Hofmann, 2004; Jacobsen & Naug, 2004; del Río & Young, 2006) This is due to a

higher income and wealth increase debt limits for the household and thereby may indirectly increase the demand for loans (Duca & Rosenthal, 1993).

Findings based on the two-period model of consumption show that a household that expects a higher future income growth will eventually have a higher level of borrowing (Fan, Chang & Sherman, 1993). Thus, a continuous improvement in a nation's growth and productivity has led to an optimistic expectations of the households on their future income growth and thereby results in a greater household debt (Meng, Hoang & Siriwardan, 2013; Moroke, 2014). Moreover, Barba and Pivetti (2008) state that the growth in household indebtedness in the United States is due to a response to stagnant wages in which the households have used the debt as a form of wage substitution.

A study conducted by Livingstone and Lunt (1992) in the United Kingdom highlights that household disposable income does not affect household indebtedness but it may affect the debt level through its impact on personal savings. Turinetti and Zhuang (2011) conclude that household income negatively affects household debt in the United States. In addition, evidence from the Survey of Consumer Finances has shown that income is negatively related to a debt which in the forms of a credit card debt (Chien & Devaney, 2001). Thus, the relationship between income level and household debt may differ according to the types of debt.

A study by Mokhtar and Ismail (2013) in Malaysia based on Vector Error Correction Model (VECM) suggests income is one of the leading factors which explains rising household debt level in Malaysia. This finding however has been contradicted by Rahman and Masih (2014) who showed that changes in income may not affect household debts. The inconsistencies found in both studies may be due to the measurement of the income level used. As supported by Meniago et al. (2013), there is a negative relationship between a household debt and real income and a positive correspondence with the real GDP.

A study conducted by Moroke, Mukuddem-Petersen and Petersen (2014) in South Africa reveals that there is a unidirectional causality between GDP and household debt. This is also confirmed by Puente-Ajovín and Sanso-Navarro (2015). Kim (2011) however showed that in the United States there is bidirectional positive feedback process between aggregate income and household debt.

Since the direction of causality between household debt and GDP remains unclear, therefore, further investigation based on the composition of debt could significantly contribute to the study of household debt. In addition, as Malaysia aims to become a high-income country by the year 2020, the high debt accumulation may hinder its economic performance and increase the

risk of the country to dive into a recession as what experienced by the United States during the Global Financial Crisis. Hence, the findings of this study could provide some guidelines to policymakers in their policy formulation to sustain the nation economic performance.

MATERIALS AND METHODS

The focus of this study is to investigate the direction of causality between household debt and GDP in Malaysia that is either the household debt has caused the GDP to change or vice versa. The data used in this study is from Bank Negara Malaysia (BNM). Using quarterly time series data from Q1:1999 to Q4:2014, this study employs the Toda-Yamamoto non-causality test to determine the direction of causality between the two variables. In addition, further analysis has been undertaken to determine the direction of causality based on the composition of debt.

In order to conduct the non-causality test, the following equations are specified to test the causality between the two variables. Specifically, this study follows Toda and Yamamoto (1995) by using the modified Wald test. This method is more suitable since it allows for variables with mixed order of integration. The null hypothesis of the Toda-Yamamoto non-causality test represents that the household debt does not Granger cause GDP and vice versa.

$$LHD_t = \alpha_0 + \sum_{i=1}^k \alpha_{1i} LHD_{t-i} + \sum_{j=k+1}^{dmax} \alpha_{2j} LHD_{t-j} + \sum_{i=1}^k \gamma_{1i} LY_{t-i} + \sum_{j=k+1}^{dmax} \gamma_{2j} LY_{t-j} + u_{1t} \quad [1]$$

$$LY_t = \beta_0 + \sum_{i=1}^k \beta_{1i}LY_{t-i} + \sum_{j=k+1}^{dmax} \beta_{2j}LY_{t-j} + \sum_{i=1}^k \delta_{1i}LHD_{t-i} + \sum_{j=k+1}^{dmax} \delta_{2j}LHD_{t-j} + u_{2t} \tag{2}$$

Where LHD and LY refer to the log of a household debt and the log of Gross Domestic Product respectively while d represents the maximum order of integration of the variables in the model. The optimal lag length, k , is chosen based on the Akaike Information Criterion (AIC). It is assumed that the error terms are not correlated. The null hypothesis for Equation 1 represents that the GDP does not cause the household

debt while the null hypothesis of Equation 2 represents that the causality does not run from the opposite direction.

Besides that, in order to determine the direction of causality based on the composition of debt, the following equations are tested to determine the direction of causality between a mortgage and consumer debt with the GDP.

$$LMD_t = \mu_0 + \sum_{i=1}^k \mu_{1i}LMD_{t-i} + \sum_{j=k+1}^{dmax} \mu_{2j}LMD_{t-j} + \sum_{i=1}^k \varphi_{1i}LY_{t-i} + \sum_{j=k+1}^{dmax} \varphi_{2j}LY_{t-j} + v_{1t} \tag{3}$$

$$LY_t = \sigma_0 + \sum_{i=1}^k \sigma_{1i}LY_{t-i} + \sum_{j=k+1}^{dmax} \sigma_{2j}LY_{t-j} + \sum_{i=1}^k \theta_{1i}LMD_{t-i} + \sum_{j=k+1}^{dmax} \theta_{2j}LMD_{t-j} + v_{2t} \tag{4}$$

$$LCD_t = \omega_0 + \sum_{i=1}^k \omega_{1i}LCD_{t-i} + \sum_{j=k+1}^{dmax} \omega_{2j}LCD_{t-j} + \sum_{i=1}^k \phi_{1i}LY_{t-i} + \sum_{j=k+1}^{dmax} \phi_{2j}LY_{t-j} + z_{1t} \tag{5}$$

$$LY_t = \pi_0 + \sum_{i=1}^k \pi_{1i}LY_{t-i} + \sum_{j=k+1}^{dmax} \pi_{2j}LY_{t-j} + \sum_{i=1}^k \tau_{1i}LCD_{t-i} + \sum_{j=k+1}^{dmax} \tau_{2j}LCD_{t-j} + z_{2t} \tag{6}$$

In particular, Equation 3 and Equation 4 test the direction of causality between a mortgage debt and GDP while Equation 5 and Equation 6 are used to examine the direction of causality between consumer debt and GDP. It is expected that the direction of causality between a mortgage debt and consumer debt with GDP will be consistent with the findings of the causality between a household debt and GDP.

Finally, in order to determine the validity of the result of the causality test, this study conducts the Johansen's cointegration test to determine the presence of cointegration between a household debt and the GDP. By following Johansen and Juselius (1990), the null hypothesis indicates that there is no cointegration among the variables, and rejection of the null hypothesis proves that a long run relationship exists between

household debt and GDP thus validating the results of the non-causality test.

RESULTS AND DISCUSSION

As a preliminary, this study conducts the unit root test to determine the level of integration of the variables. Particularly, the Augmented Dicky-Fuller (ADF) test is utilized and the results of the test presented in Table 1. In addition, this finding is also consistent when tested using the Phillips-Perron unit root test. Hence, the Toda and Yamamoto (1995)

non-causality test is appropriate to instead of the traditional Granger non-causality test which only suitable for variable that is stationary at levels.

Through the Toda and Yamamoto (1995) non-causality test with the maximum order of integration, *d*, is equal to 1 and the lag length, *k*, is chosen based on the AIC, the result of the direction of causality between the debt and GDP which is presented in Table 2.

Table 1
Unit root test

Variable	Level		1 st difference	
	Intercept	Intercept & trend	Intercept	Intercept & trend
ADF test				
LHD	-0.421314	-1.824109	-8.033114***	-7.988464***
LMD	-1.731678	-1.616500	-6.975987***	-7.230630***
LCD	1.071475	-3.269708	-7.014557***	-7.235036***
LGDP	-0.895629	-2.088691	-7.797334***	-7.760585***

Note: The lag selection for the ADF test is based on the Akaike Information Criterion (AIC)
*** indicates the significance level at 1%

Table 2
Toda-Yamamoto non-causality test

Direction of causality	df	Chi-square	Decision
Model 1:			
LY → LHD	2	1.505035	Do not reject H ₀
LHD → LY	2	10.30438***	Reject H ₀
Model 2:			
LY → LMD	3	1.185114	Do not reject H ₀
LMD → LY	3	12.58813***	Reject H ₀
Model 3:			
LY → LCD	2	2.467090	Do not reject H ₀
LCD → LY	2	4.660719*	Reject H ₀

Note: *** and * indicates the significance level at 1% and 10% respectively

Based on the result of the non-causality test for Model 1, the null hypothesis that GDP does not cause the household debt is rejected. On the other hand, the null hypothesis that household debt does not cause the GDP is rejected at 1 percent significance level, thus indicating there is a unidirectional causality that runs from a household debt to GDP.

Consistently, the findings based on the composition of debt as shown in Model 2 and Model 3 also indicate a unidirectional causality between mortgage and consumer debt to the GDP. The result obtained is found to be consistent with studies conducted by Puente-Ajovín and Sanso-Navarro (2015) based on OECD countries and Moroke et al. (2014) in South Africa.

Following Johansen and Juselius (1990), the result of the long run relationship is reported in Table 3. Result obtained for

this test indicate that for each of the models there is one cointegrating equation which is significant at 5 percent significance level. This validates the results of the non-causality test which found a unidirectional causality which runs from the household debt and its composition to the GDP.

The findings indicate that household debt plays an important role in the economy by influencing the GDP through its impact on aggregate demand. Although the household debt is necessary for the economy to grow, Malaysia should take a lesson from countries such as the United States which experienced a severe recession in 2008 as a result of high debt accumulation. To achieve high-income nation status by 2020 policymakers could target the credit market as one of their tools to promote economic growth.

CONCLUSION

This study investigates the link between household debt and GDP in Malaysia using the Toda-Yamamoto non-causality test. The findings of this study reveal that the direction of causality runs from the household debt to GDP, and is in line with the findings based on the composition of debt. The result of the cointegration test also supports the contention that there is a long run relationship between household debt and GDP. Based on the findings of this study policymakers attempting to influence economic growth should consider using the credit market since it will significantly influence the GDP. Given the limitations of this study, further analysis using the growth

Table 3
Johansen's Cointegration test

No. of CE(s)	Trace statistic	Critical value (5%)
Model 1: LHD		
None	32.66970**	20.26184
At most 1	6.403431	9.164546
Model 2: LMD		
None	22.65966**	20.26184
At most 1	7.546047	9.164546
Model 3: LCD		
None	31.65318**	20.26184
At most 1	5.134208	9.164546

Note: The lag is chosen based on Akaike Information Criterion (AIC)
** denotes the rejection of the null hypothesis of no cointegration at 5% significance level.

model is needed to determine the threshold level at which the debt will start to dampen the nation economic growth.

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