IJEM
International Journal of Economics and Management
Journal homepage: http://www.ijem.upm.edu.my

Income Inequality and Household Debt in Malaysia: Is There an Asymmetric Relationship?

SIEW-PONG CHEAH[a], LIN-SEA LAU[b] AND CHEE-KEONG CHOONG[b*]

[a]*Department of Finance, Universiti Tunku Abdul Rahman, Kampar, Malaysia*
[b]*Department of Economics, Universiti Tunku Abdul Rahman, Kampar, Malaysia*

ABSTRACT

Most past studies have assumed a symmetric relationship between income distribution and household indebtedness. Therefore, linear or symmetric modelling would miss possible asymmetric relationships between income distribution and household debt, resulting in misleading conclusions and policy suggestions. Thus, this study has explored the potential asymmetries between household debt and income inequality within long-run and short-run relationships. This study discovered that the association between income inequality and household debt was asymmetric in the long and short run using the nonlinear autoregressive distributed lag model. The results showed that only decreases in income inequality had a significant and positive effect on household debt, while increases in income inequality did not have a significant effect. The findings emphasised the need for policies to reduce income inequality to lessen debt among Malaysian households.

JEL Classification: D3, D63, G51
Keywords: Household debt; income inequality; asymmetric; NARDL; Malaysia

Article history:
Received: 6 October 2021
Accepted: 25 Febuary 2022

* Corresponding author: Email: choongck@utar.edu.my

INTRODUCTION

Interest in the linkage between household debt and income inequality has emerged since the eruption of the subprime mortgage crisis in the U.S. People observed that the increasing trend of income inequality correlated with rising domestic debt. Due to the global financial crisis of 2008/09, income inequality worsened in most countries globally, followed by an excessive accumulation of debt among households. According to Fisher (1933), mounting household debt could ultimately cause a recession in the economy. Against this backdrop, a debate has arisen whether the widening income gap leads to increased household debt, which could be a culprit for financial turmoil and economic instability (Koong and Lee, 2016; Cardaci, 2018; Bodea et al., 2021).

In Malaysia, the household debt level has portrayed a drastically rising trend over the past two decades, both in absolute terms and as a share of the GDP. Since 1997, household debt (measured as total household credit) has increased more than ten-fold, registering an average annual growth rate of 11.4% to reach RM1.098 trillion as of March 2021 (Bank Negara Malaysia, 2021). Correspondingly, household debt increased from 43.7% of the GDP in 1997 to 74.7% in September 2020. With the persistent increase in lending to the household sector, household credit accounted for 62.7% of private sector credit in 2021, surpassing business credit since 2004 (Bank Negara Malaysia, 2021).

Turning to income distribution in Malaysia, different indicators of income inequality have suggested different pictures of how income distribution has evolved. Taking the Gini index, for example, the net Gini coefficients from the standardized World Income Inequality Databased (SWIID) (Solt, 2020) indicated that income gaps had been steadily narrowing since the 1990s. The top income shares from the World Inequality Database (2020) have shown that the pattern of income distribution did not change much from 1996 to 2019. As shown in Figure 1, the 90th and 99th percentile income shares have been moving within the range of 42% - 46% and 14% - 19%, respectively.

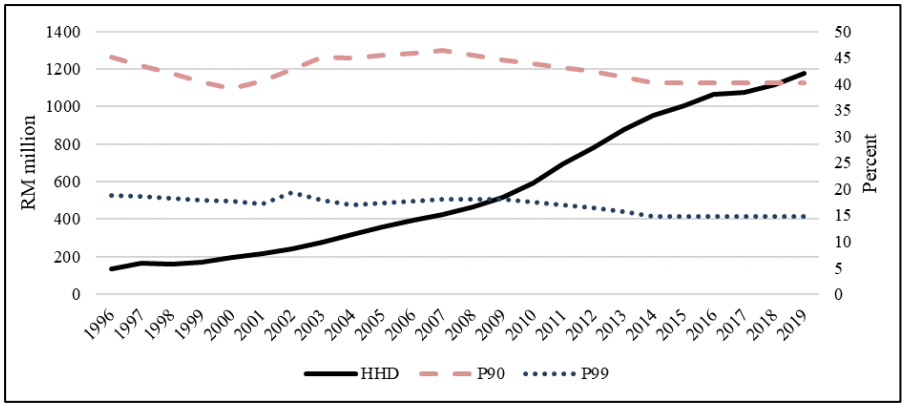

Figure 1 Household debt and top income shares in Malaysia, 1996 to 2019

Additionally, Figure 1 also displays that household debt has not always co-moved with changes in income shares in the same direction. This preliminary observation might signal that the relationship between household debt and income inequality has not necessarily been symmetric.

Despite growing interest in investigating the impact of income inequality on household debt among researchers over the past decades, the related empirical evidence has remained limited and inconsistent (see, among others, Perugini et al., 2016; Berisha and Meszaros, 2017; El Herradi and Leroy, 2020; Stefani, 2020; Bazillier et al., 2021). Additionally, most past studies have assumed a symmetric relationship between income inequality and household indebtedness. In this regard, Fasianos et al. (2017) questioned whether income distribution and household indebtedness were asymmetrically related and found supporting evidence in the U.S. The empirical work of Fasianos et al. (2017) might explain the inconsistency among the existing evidence of the household credit – income inequality relationship; however, relevant evidence of an asymmetric relationship remains scarce.

Thus, this study investigated the presence of asymmetric relations between household debt and income inequality in Malaysia. Specifically, this study examined (i) whether income distribution mattered for housing debt in the short-run and the long run and (ii) whether the short-run and long-run effects of income distribution on housing debt were asymmetric in the case of Malaysia.

The contributions of this study have been fourfold. First, the empirical results were expected to answer whether income distribution played an important role in determining household debt in Malaysia. Hence, this research could provide useful hints to the Malaysian government, related ministries, and other interested parties in explaining and managing changes in household debt. Second, the employment of asymmetric modelling in studying the distributional income effect on household debt has been the first in the Malaysian context to the best of the authors' knowledge. Thus, the empirical findings of the current study could contribute to the expansion of the related literature on household debt. Third, this study employed national income shares of the 90^{th} and the 99^{th} percentile of Malaysian households to measure the degree of income inequality. The alternative use of top income shares of different income brackets could assess the robustness of empirical results against different income inequality measures, including the most commonly used Gini index. Fourth and last, this study focused on Malaysia, a small and open economy that has experienced a steadily increasing trend in household debt over the past two decades. Malaysian data rather than more commonly used American data could show whether the finding of an asymmetric relationship by Fasianos et al. (2017) holds in a small and open Asian country.

The remainder of this paper is structured as follows. Section 2 discusses stylised facts regarding Malaysia's household indebtedness and income distribution. Section 3 elaborates on the data and methodology employed in this study. Section 4 reports and discusses the results. Section 5 concludes the study and provides some important policy recommendations.

LITERATURE REVIEW

Numerous past studies have been conducted on the relationship between income inequality and household debt. However, the empirical results of these studies have remained inconclusive. In particular, the existing literature has identified three channels through which income inequality relates to household debt. First, higher income inequality leads to a higher supply of credit, as the top income groups with higher propensities to save reinvest in loanable fund markets (Kumhof et al., 2015). Second, poorer households tend to maintain their living standards by borrowing due to stagnating real wages (Sukmana and Ibrahim, 2018; Iacoviello, 2008; Krueger and Perri, 2006). Third, as income inequality increases, low and middle-class households tend to borrow to keep their consumption at the level of the upper social classes (Christen and Morgan, 2005; Frank et al., 2014; Georgarakos et al., 2014; Carr and Jayadev, 2015), resulting in a phenomenon known as "keeping up with the Joneses".

By employing the Johansen co-integration methodology, Berisha et al. (2015) showed that household credit and income inequality shocks were positively and significantly related, using U.S. data from 1919 to 2009. Similarly, an earlier study by Christen and Morgan (2005) discovered that worsened income inequality led to increased consumer borrowing in the economy. The study also highlighted the fact that the widening of the income gap contributed to households' non-revolving debts, which were used to purchase durable goods. By focusing on nine industrialised nations, Klein (2015) researched the income inequality-debt nexus between 1953 and 2008. The results obtained from the panel co-integration technique indicated that income inequality and household debts were positively associated. Specifically, a 1 per cent rise in income inequality could lead to a 2-6 per cent increase in consumer borrowing. Likewise, El Herradi and Leroy (2020) suggested that households' credit expanded with increased income inequality in 12 developed economies. The study also stressed that the positive linkage between the income gap and credit expansion was particularly true for individuals in the high-income group.

Additionally, a study by Perugini et al. (2016) utilising a dataset of OECD countries from 1970 to 2007 revealed that income concentration could cause a rise in individuals' indebtedness. Similarly, Bahadir et al. (2020) found a positive association between income inequality and household credit in 32 countries using quarterly data between 1990 and 2017. According to the authors, the higher the Gini coefficient, the more households would face credit constraints.

On the contrary, a study by Berisha and Meszaros (2017) documented a significant and negative relationship between household debt and income inequality in the U.S. from 2003 to 2012. Some recent studies have offered different explanations to address the contradiction among the past studies on the income inequality-debt nexus. Bazillier et al. (2021), for instance, argued that the structure of income inequality

mattered. The results suggested that greater income inequality induced higher household borrowing, using a panel dataset consisting of 30 developed countries covering the period of 1970 to 2017. The effect was stronger when the top-middle income gap was wider than the top-low income gap.

On the other hand, Coiboin et al. (2020) used micro-level data. They showed that low-income households in high-inequality regions accumulated less debt relative to their income than low-income households in lower inequality regions. Most recently, Loschiavo (2021) used survey data to investigate the association between regional income disparities and household debts among Italian households. The study discovered that income inequality had an inverse impact on the likelihood of being indebted.

Previous studies on the income inequality-debt nexus in Malaysia remain scarce. A study by Yusop et al. (2020) utilising Johansen's co-integration test revealed that Malaysia's income inequality and household debts were positively correlated. By employing a time series dataset from 1994 to 2017, the Gini index was the major determinant for total debts borne by Malaysian households. Moreover, Soh et al. (2017) has been the only empirical study that has explored the effect of total household credit on income inequality in Malaysia. Using total household credit and mean-median income dispersion as the proxy, the authors found that household debt had a mixed effect on income inequality. In particular, a positive relationship was shown for the macro-level analysis, while a negative effect was found in the micro-level model.

Interestingly, all the studies reviewed above assumed a linear combination between the two variables. Fasianos et al. (2017) argued that the relationship could be asymmetric, where the impact of rising inequality on household debt could be different from the impact of declining inequality. Using U.S. data, the authors found that income inequality had a significant positive effect on household debt when the income distribution was worsening. Still, the effect was statistically insignificant when the income distribution was improving. This finding implied that linear models might produce misleading inferences for policymakers in the presence of asymmetry.

METHODOLOGY

The Model

This study applied the recently developed nonlinear autoregressive distributed lag (NARDL) model (Shin et al., 2014) to investigate the asymmetric short-run and long-run effects of income inequality on household debt to accomplish its research objectives,

Firstly, a long-run equation of household debt was formed as follows:

$$HHD_t = \alpha_0 + \alpha_1 INEQ_t + \alpha_2 Y_t + e_t \quad (1)$$

where *HHD* represents the household debt level in Malaysia, *INEQ* is the income inequality in Malaysia, *Y* denotes the level of economic growth of Malaysia, and e_t is the white noise error term of period *t*. The variable *Y* is included to control the effect of economic growth or development level on household credit, as suggested in Luo (2020) and Bazillier et al. (2021). Equation 1 is the linear or symmetric long-run model of household debt. The response of household debt was assumed symmetric to both the increases and decreases of income inequality in the long run. Within the context of a linear relationship, α_1 is expected to be positive given the priori (Christen and Morgan, 2005; Krueger and Perri, 2006; Iacoviello, 2008; Kumhof et al., 2015).

Following Shin et al. (2014), Equation 1 was extended to its asymmetric counterpart as:

$$HHD_t = \beta_0 + \beta_1 POS_t + \beta_2 NEG_t + \beta_3 Y_t + \varepsilon_t \quad (2)$$

where β_1 and β_2 represent the asymmetric impact of widening-inequality (*POS*) and narrowing-inequality (*NEG*) on household debt. The two variables are decomposed from *INEQ* through:

$$POS_t = \sum_{j=1}^{t} \Delta EX_j^+ = \sum_{j=1}^{t} \max(\Delta INEQ_j, 0) \quad (3)$$

$$NEG_t = \sum_{j=1}^{t} \Delta EX_j^- = \sum_{j=1}^{t} \min(\Delta INEQ_j, 0) \quad (4)$$

where *POS* is the partial sum of the positive increases in inequality while *NEG* is the partial sum of the negative changes in inequality, the existence of an asymmetric long-run relation can be assessed by testing the null hypothesis of no asymmetry, H_0: $|\beta_1| = |\beta_2|$. Rejection of the null at conventional levels of significance implies that the impact of income inequality on household debt is asymmetric. Finally, Equation 2 can be framed within a NARDL bound test structure as:

$$\Delta HHD_t = a_0 + a_1 HHD_{t-1} + a_2 POS_{t-1} + a_3 NEG_{t-1} + a_4 Y_{t-1} + \sum_{p=1}^{n1} \theta_1 \Delta HHD_{t-p} + \sum_{p=0}^{n2} \theta_2 \Delta POS_{t-p} + \sum_{p=0}^{n3} \theta_3 \Delta NEG_{t-p} + \sum_{p=0}^{n4} \theta_4 \Delta Y_{t-p} + \mu_t \quad (5)$$

where that captures both short-run and long-run asymmetries within the same framework. The existence of the co-integration can be evaluated by computing the Wald *F*-statistics from the null hypothesis of $a_2 = a_3 = a_4 = 0$. In line with the hypothesis of a positive relationship between household debt and income inequality, a_2 is expected to be positive while a_3 is expected to be negative. The optimal lag lengths p of each short-run dynamic is selected based on the Akaike information criterion (AIC). Finally, the estimation of Equation (5) is subject to the standard diagnostic tests of the ARDL model, which include; detection for serial correlation of residuals, conditional heteroskedasticity, parameter and error variance stability, and distribution of the error terms.

The Data

This study employed five variables and annual observations of Malaysia spanning from 1996 to 2019. The dependent variable *HHD* was measured by total household credit (in RM million). Income inequality was measured alternatively by the Gini index (*GINI*), the national income share of the top 1% income group (*P99*), and the income share of the top 10% income group (*P90*) in Malaysia. The control variable of economic growth (*RGDPPC*) was measured in real GDP per capita (2015 USD). The sources of data were the monthly statistical bulletin of Bank Negara Malaysia (2020) for total household credit, the Economic Planning Unit of the Prime Minister's department, Malaysia for the Gini index, the World Inequality Database (2020) for income shares, and the World Development Indicators for the real GDP per capita, respectively. All variables were expressed in their natural logarithm form before the inferential estimations.

Panel A of Table 1 reports the descriptive statistics of the variables. The range of *HHD* (RM133.25 billion to RM1.17 trillion) indicates the drastic increase in the household credit level over the observation period. In terms of the income shares, Malaysian households that belonged to the 99th and the 90th income percentile held 16.98% and 44.66% of total national income, respectively. In addition, the relatively low standard deviations of the Gini index and the top income shares implied that there had been no notable change in the shares of national income held by the top income groups since 1996.

Table 1 Descriptive Statistics and Correlation Matrix, 1996-2019

Panel A: Summary Statistics					
	HHD	***GINI***	***P99***	***P90***	***Y***
Mean	556.92	43.5862	16.9808	44.6625	8071.012
Maximum	1177.48	46.2000	19.2600	46.4000	11391.69
Minimum	133.250	39.9000	14.8700	42.6100	5802.878
Std. Dev.	359.72	2.2711	1.4477	2.3102	1719.830
Jarque-Bera	2.4957	2.5765	2.0855	2.2040	1.8590
Panel B: Pairwise Correlation					
	HHD	***GINI***	***P99***	***P90***	***Y***
HHD	1.0000				
GINI	-0.9464	1.0000			
P99	0.5695	0.9051	1.0000		
P90	-0.4752	0.6079	0.6265	1.0000	
RGDPPC	0.9887	-0.9211	0.4873	-0.4090	1.0000

Panel B of Table 1 shows the pairwise correlations between the variables. Interestingly, the correlation between *HHD* and *P99* was positive, consistent with the intuition that widening income inequality tends to associate with household credit. However, the sign of the correlation changed to negative when *P90* and *GINI*

were used to measure income inequality. While the correlation coefficient does not imply causation, the change in sign of linear correlation hinted at the possibility of the asymmetric response of household debt to changes in income distribution.

RESULTS AND DISCUSSIONS

As a preliminary exercise, all variables employed were subjected to unit root tests for determining their stationarity. Table 2 reports the results of the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests.

Table 2 Results of the ADF and PP unit root test

	Level		First Difference	
Variable	**ADF**	**PP**	**ADF**	**PP**
HHD	-0.8590	-0.5109	-3.9605***	-4.0237***
GINI	-2.4173	-1.8342	-2.9418*	-2.7611*
P99	-2.0557	-2.0977	-4.9225***	-5.0179***
P90	-1.5806	-1.6640	-3.4786**	-3.6744**
RGDPPC	-3.2407	-4.3542**	-5.5088***	-5.5192***

Notes: The test equations of the ADF test included a constant term and linear trend for variables at level and a constant term for variables at the first difference. Optimal lag length selections were based on the AIC. The bandwidth selections and the spectral estimations in the PP test were based on the Newey-West and Bartlett kernel approaches. *,**, *** denotes rejection of null hypothesis at the 10%, 5% and 1% significance levels, respectively.

As suggested from the results of the unit root tests, both the ADF and PP tests agreed that; *HHD*, *GINI*, *P99*, and *P90* were integrated at the first order or I(1), while *Y* was considered I(1) from the ADF test but I(0) from the PP test. Nonetheless, as all variables employed were integrated at an order of less than two, the data set employed satisfied the prerequisite of the ARDL bound test and model estimation.

Table 3 tabulates the results of the ARDL bound test for nonlinear co-integration. The result indicated a cointegrating relationship between income inequality and the determinants at the 1% significance level, regardless of whether income inequality was measured using the Gini index or the top 1% and 10% income shares. In conclusion, the unit root tests and the bound test results provided the foundation to proceed to the NARDL model estimation.

Panel A in Table 4 reports the estimated asymmetric long-run relationship between income inequality and household debt. Considering Model I, the estimated coefficients suggested a long-run relationship between income inequality and household debt in Malaysia. However, the long-run relationship was significant only when income inequality was declining. The estimated β_2 suggested that for each 1% decrease in the Gini index, total household credit in Malaysia would decline by 7.41% in the long run. This finding was consistent with the priori that improved income distribution could reduce the degree of household indebtedness. Turning to the case of increasing income inequality, however, the estimated β_1 was not significant at all conventional levels of significance. This outcome implied that the episodes of increasing income inequality had no significant long-run effect on household debt levels.

Table 3 ARDL bound test for Asymmetric Cointegration

Dependent Variable: *HHD*				
INEQ specification	F-Statistics	90% Upper Bound	95% Upper Bound	99% Upper Bound
GINI	13.505	3.586	4.306	5.966
P99	14.383			
P90	13.861			

Notes: The critical bounds were obtained from Narayan (2005) assuming restricted intercept and no trend (Case II, $k = 3$) given the small sample size.

Table 4 Results of estimated NARDL models and Diagnostic Tests

Dependent Variable: *HHD*						
	Model I INEQ = GINI		**Model II** INEQ = P99		**Model III** INEQ = P90	
Variables	Coefficient	*p*-value	Coefficient	*p*-value	Coefficient	*p*-value
Panel A: Long Run Relationships						
Constant	-7.0646	0.4216	-7.3316	0.3147	-8.7896	0.0438
POS	8.4502	0.2109	1.1877	0.4225	2.2464	0.1761
NEG	-7.4060	0.0231	-2.6525	0.0603	-2.8848	0.0026
RGDPPC	1.3181	0.2120	1.4628	0.0908	1.5975	0.0033
Panel B: Short Run Dynamics						
Δ*POS*	1.1656	0.3057	0.2278	0.2754	1.0063	0.1958
Δ*NEG*	-1.2219	0.0353	-0.7835	0.0365	-1.2397	0.0752
Δ*RGDPPC*	0.0670	0.0052	0.9592	0.0243	0.0143	0.0029
Panel C: Diagnostic Checking						
ECT(-1)	-0.2276	0.0001	-0.1553	0.0001	-0.2174	0.0004
JB	-0.3630	0.8339	0.7174	0.6985	1.8398	0.3985
LM(1)	-0.0158	0.8999	0.1362	0.7120	1.4788	0.2240
LM(2)	-4.1522	0.1254	1.9035	0.3861	4.3090	0.1160
ARCH(1)	-1.4964	0.2212	1.6056	0.2051	0.7952	0.3725
ARCH(2)	-1.3956	0.4977	1.7003	0.4273	1.9314	0.3807

Notes: The numbers inside parentheses are lag lengths. The optimal lag lengths selected for the NARDL model are based on the AIC.

Next, Models II and III report the estimated NARDL models with the top 1% and top 10% income shares as the indicator of the income gap. Both models showed similar results where the estimated β_2 were significant at the 1% significance level, while the estimated β_1 were insignificant. The household debt level was expected to decrease by 2.65% (2.88%), given a 1% decrease in the top 1% (top 10%) income share over the long run. Again, the results were consistent with the economic priori and showed an asymmetric response in Model II. The reported results from Models I, II, and III were similar in terms of sign and statistical significance. This outcome indicated that the finding of an asymmetric long-run relationship between the income gap and household debt level remained robust to different measures of income inequality, namely top income shares and the Gini index.

Panel B in Table 4 also reports the estimated short-run coefficient of each independent variable. The asymmetric responses of household credit against positive and negative changes of income inequalities existed in the short run. The reported short-run estimates from all NARDL models suggested that household debts reacted significantly only to declining income inequalities at the 5% level (Model I and II) and the 10% level (Model III) of significance.

Table 5 Results of the Wald test on Asymmetric Relations

Null Hypothesis	**Model I** INEQ = GINI		**Model II** INEQ = P99		**Model III** INEQ = P90	
	F-statistic	*p*-value	F-statistic	*p*-value	F-statistic	*p*-value
WALD (Short)	5.2282	0.0372	4.5688	0.0538	12.247	0.0032
WALD (Long)	4.8791	0.0473	4.3679	0.0586	25.315	0.0001

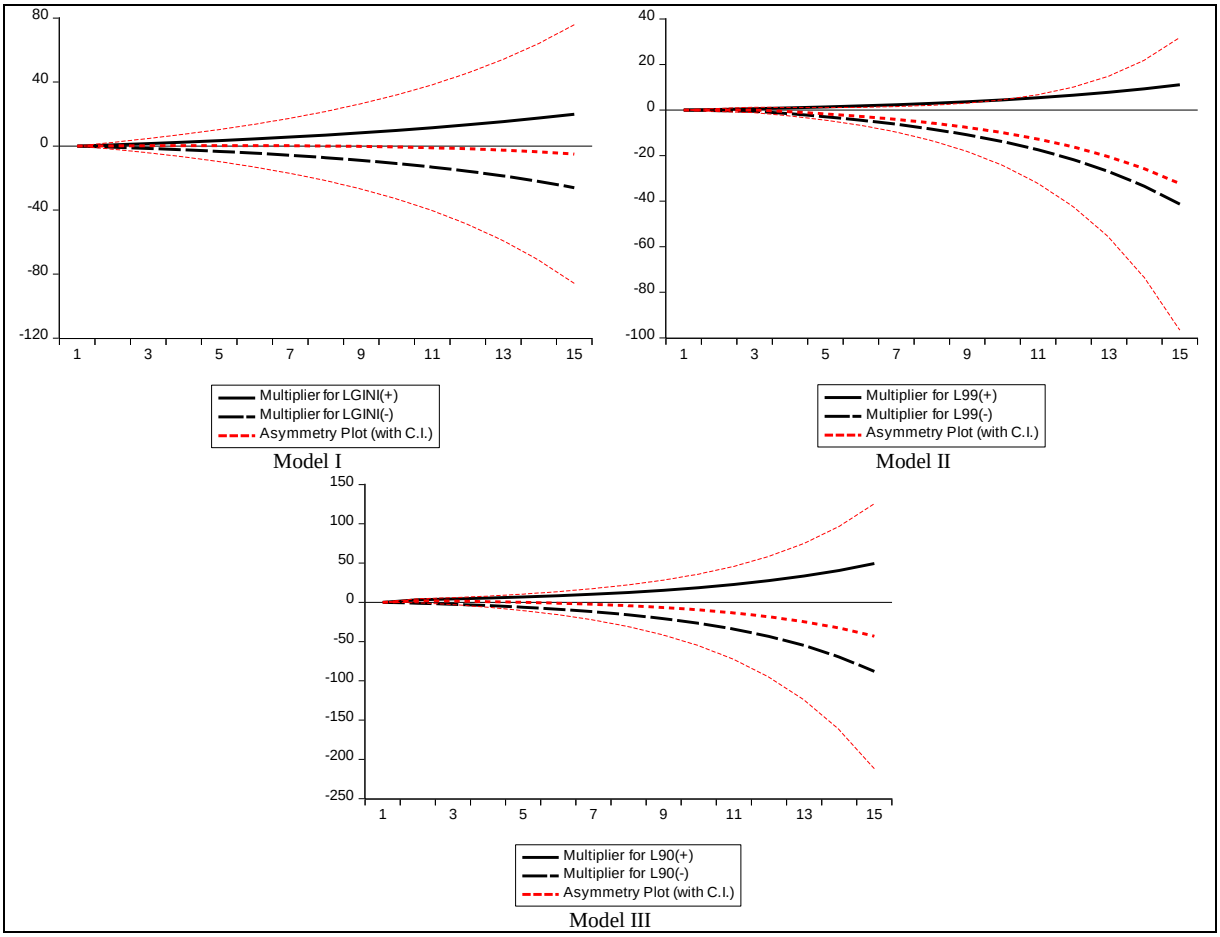

Figure 2 NARDL Dynamic Multipliers

To further confirm the discovered long-run and short-run asymmetries, this study performed Wald tests and generated NARDL dynamic multiplier graphs onto the estimated NARDL models. Table 5 tabulates the results of the Wald tests performed on both the short- and long-run estimates of the *POS* and *NEG*, which reaffirmed the asymmetric relationships between income distribution and household debt level across all models. The NARDL dynamic multiplier graphs of each model are depicted in Figure 2, which indicate the positive or negative effect of income inequality on household debt over time. The resulting asymmetry plots clearly show that negative income inequality changes induced larger impacts on household debt than positive changes in the income gap.

This study's results did not align with Fasianos et al. (2017), who also considered the asymmetric relationship between income inequality and household debt. The authors revealed that income inequality had a significant positive impact on household debt when income distribution deteriorated. Still, the effect turned out to be statistically insignificant when income distribution improved. More importantly, as this study was the first attempt considering the asymmetric association between household debt and income inequality in Malaysia, the findings of this study reflected the true picture of the inequality-debt nexus in the country.

Panel C in Table 4 and Figure 3 show the results of several misspecification tests for estimating the NARDL models (Equation 5). Fortunately, the results of all diagnostic tests suggested that the NARDL models were free from autocorrelation, conditional heteroskedasticity, parameter and error variance instability. Additionally, the error correction term coefficients suggested that the long-run relationships of all estimated models were valid correction instruments for any short-run deviations that occurred. Therefore, the empirical results obtained were appropriate for the policy implications in the next section.

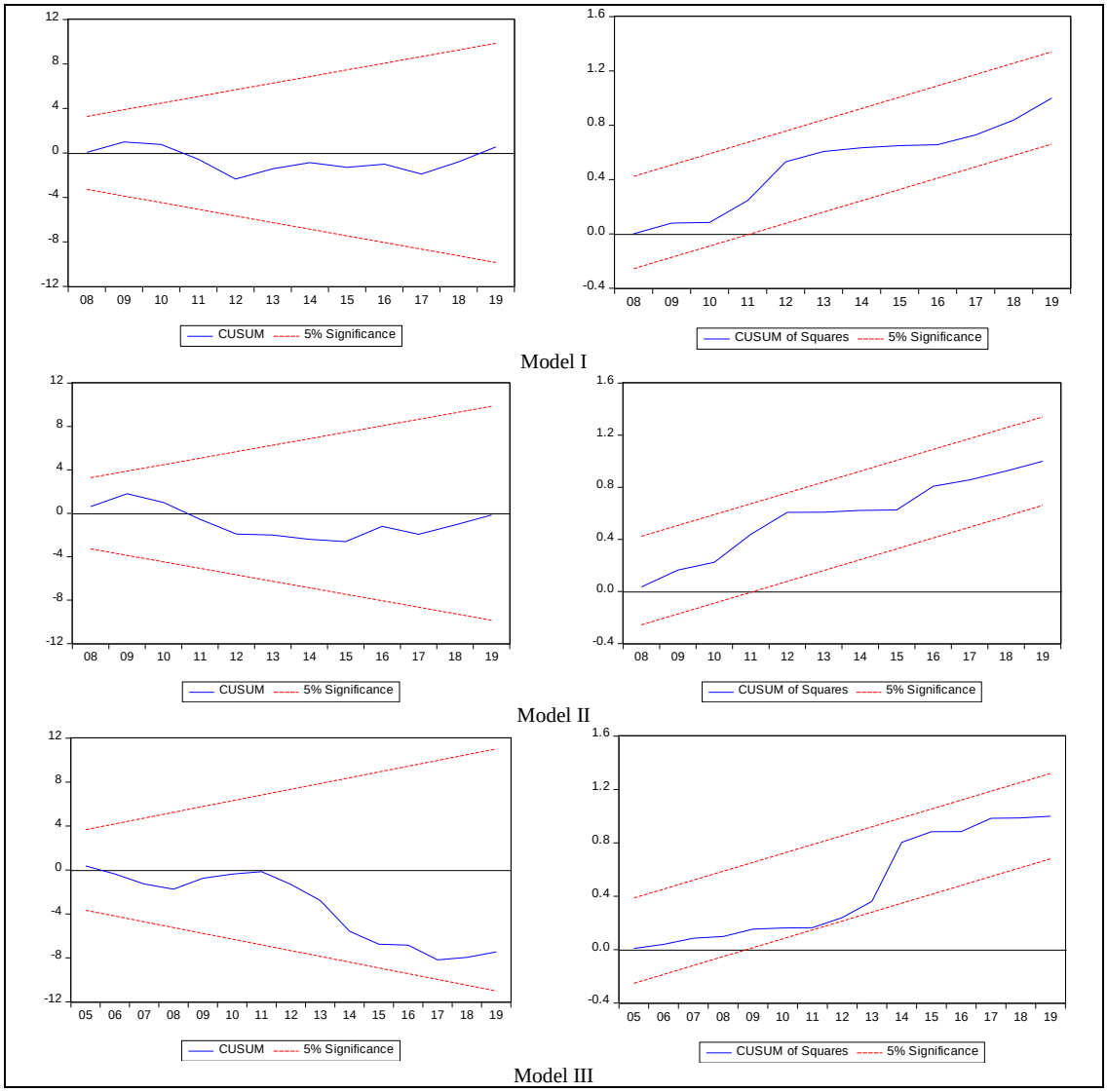

Figure 3 CUSUM and CUSUMSQ Models

CONCLUSION

This study assessed the potential asymmetric short- and long-run relationship between Malaysia's household debt and income inequality. The employment of the NARDL technique and yearly Malaysian data yielded some important findings. First, Malaysia had a significant cointegrating relationship between household indebtedness and income inequality. Second, it was evident that the cointegrating relationship was asymmetric. Specifically, household debt tended to decline when national income distribution improved but showed no significant response when income distribution worsened. The finding of this asymmetric response of household debt level to income inequality was robust to alternative measures of income inequality. It appeared in both the short- and long run.

The findings above implied that "keeping up with the Joneses" was far from a common phenomenon in Malaysia. However, as an improvement in income distribution tends to reduce overall household indebtedness in Malaysia, it is suggested that policies that could narrow income gaps would also reduce the high household debt level in Malaysia. Policymakers could consider adopting several strategies or tools in reducing economic inequality in Malaysian society. First, income redistribution is needed by acquiring income from the rich and providing financial aid to the lower-income groups. Thus, welfare programs designed for income redistribution (e.g. food stamps and housing subsidies) should receive additional funding from the government. The current progressive income tax system could finance welfare programs that tax the rich more than the poor. Second, existing employment-related policies, such as minimum wage laws and wage subsidies, should be enhanced to

increase the income of lower-income groups. Third, improving human capital is another way to close income gaps among Malaysians. In this context, the government should increase its investment in human capital by providing affordable or free job training and vocational education to lower-income earners who are mostly unskilled. Empirically, this study showed that the relationship between income distribution and household debt level is asymmetric, which should be considered for future studies.

Lastly, this study was limited in terms of the time series length employed due to total household credit data availability. While the empirical results obtained were free from serious misspecification problems, any reference to these findings should be cited with caution. Further studies with improved data availability are expected to enhance the robustness of the empirical results of this study.

ACKNOWLEDGEMENTS

This research was funded by UTAR Research Fund 2017-C2 from Universiti Tunku Abdul Rahman and was conducted under the project number: IPSR/RMC/UTARRF/2017-C2/C03.

REFERENCES

Bahadir, B., De, K. and Lastrapes, W. D., 2020. Household debt, consumption and inequality. *Journal of International Money and Finance*, *109*, p.102240.

Bank Negara Malaysia., 2021. *Monthly Statistical Bulletin* (various issues).

Bazillier, R., Héricourt, J. and Ligonnière, S., 2021. Structure of income inequality and household leverage: Cross-country causal evidence. *European Economic Review*, *132*, p.103629.

Berisha, E. and Meszaros, J., 2017. Household debt, economic conditions, and income inequality: A state level analysis. *The Social Science Journal*, *54*(1), pp.93−101.

Berisha, E., Meszaros, J. and Olson, E., 2015. Income inequality and household debt: a co-integration test. *Applied Economics Letters*, *22*, pp.1469−1473.

Bodea, C., Houle, C. and Kim, H., 2021. Do financial crises increase income inequality?. *World Development*, *147*, p.105635.

Cardaci, A., 2018. Inequality, household debt and financial instability: An agent-based perspective. *Journal of Economic Behavior and Organization*, *149*, pp.434−458.

Carr, M. and Jayadev, A., 2015. Relative income and indebtedness: evidence from panel data. *Review of Income and Wealth*, *61*, pp.759−772.

Christen, M. and Morgan, R. M., 2005. Keeping up with the Joneses: Analyzing the effect of income inequality on consumer borrowing. *Quantitative Marketing and Economics*, *3*, pp.145–173.

Coibion, O., Gorodnichenko, Y., Kudlyak, M. and Mondragon, J., 2016. Does greater inequality lead to more household borrowing? New evidence from household data. *Working Paper Series*. Federal Reserve Bank of San Francisco.

Coibion, O., Gorodnichenko, Y., Kudlyak, M. and Mondragon, J., 2020. Greater inequality and household borrowing: New evidence from household data. *Journal of the European Economic Association*, *0*(0), pp.1–50.

El Herradi, M. and Leroy, A., 2020. Do rising top incomes fuel credit expansion?. *Economic Letters*, *196*, p.109539.

Fasianos, A., Razaa, H. and Kinsella, S., 2017. Exploring the link between household debt and income inequality: An asymmetric approach. *Applied Economics Letters*, *24*, pp.404−409.

Fisher, I., 1933. The debt-deflation theory of great depressions. *Econometrica: Journal of the Econometric Society*, pp.337−357.

Frank, R. H., Levine, A. S. and Dijk, O., 2014. Expenditure cascades. *Review of Behavioral Economics*, *1*, pp.55–73.

Georgarakos, D., Haliassos, M. and Pasini, G., 2014. Household debt and social interactions. *Review of Financial Studies*, *27*, pp.1404−1433.

Iacoviello, M., 2008. Household debt and income Inequality, 1963–2003. *Journal of Money, Credit, and Banking*, *40*, pp.929–965.

Klein, M., 2015. Inequality and household debt: a panel co-integration analysis. *Empirica*, *42*, pp.391−412.

Koong, S. -S. and Lee, L. -E., 2016. Asymmetric adjustment between household credit and economic growth in Malaysia. *International Journal of Economics and Management*, *10*(1), pp.39−52.

Krueger, D. and Perri, F., 2006. Does income inequality lead to consumption inequality? Evidence and theory. *Review of Economic Studies*, *73*, pp.163–193.

Kumhof, M., Rancière, R. and Winant, P., 2015. Inequality, leverage, and crises. *The American Economic Review*, *105*, pp.1217–1245.

Loschiavo, D., 2021. Household debt and income inequality: Evidence from Italian survey data. *Review of Income and Wealth*, *67*(1), pp.61−103.

Luo, W., 2020. Inequality and government debt: Evidence from OECD panel data. *Economics Letters*, *186*, p.108869.

Narayan P. K., 2005. The saving and investment nexus for China: evidence from cointegration tests. *Applied Economics*, *37*, pp.1979–1990.

Perugini, C., Hölscher, J. and Collie, S., 2016. Inequality, credit and financial crises. *Cambridge Journal of Economics*, *40*(1), pp.227–257.

Shin, Y., Yu, B. and Greenwood-Nimmo, M., 2014. Modelling asymmetric cointegration and dynamic multiplier in a nonlinear ARDL framework. In *Festschrift in Honor of Peter Schmidt: Econometric Methods and Applications* by R.C. Sickles and W.C. Horrace, Eds., Springer: New York, pp.281−314.

Soh, J., Chong, A. and Chuah, K. P., 2017. Household credit, growth and inequality in Malaysia: Does the type of credit matter?. *BIS Papers No 91*.

Stefani, A. D., 2020. Debt, inequality and house prices: Explaining the dynamics of household borrowing prior to the great recession. *Journal of Housing Economics*, *47*, p.101601.

Sukmana, R. and Ibrahim, M. H., 2018. Financial access and inequality: A quantile assessment. *International Journal of Economics and Management*, *12*(2), pp.551−557.

UNU-WIDER., 2020. *The World Inequality Database*. Retrieved from https://wid.world/data/

Yusop, N., Nor, N. H. M., Chin, T. N., Beli, S. R. B. and Jasnie, F., 2020. The Linkages between Household Debt, Household Consumption and Income Inequality in Malaysia. *Global Business and Management Research*, *12*(1), pp.10−17.