The Determinants of Thai Household Debt: A Macro-level Study

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Abstract

During 2020-2021, COVID-19 precipitated a significant decline in Thai household income, causing the average household debt service ratio to rise above 30 per cent and household consumption to fall, followed by a slow economic recovery. Although the determinants of household debt in Thailand have already been studied, most research has focused on the micro-level. Therefore, this study aimed to evaluate the long-term link between Thai household debt and gross domestic product, unemployment rates, interest rates, and working-age population from Q1/2007 to Q1/2022. An Augmented Dickey-Fuller unit root test, an Autoregressive Distributed Lag Model bound test, and an Error Correction Model were applied. This study found that in the long run, gross domestic product and unemployment rates harm Thai household debt, while interest rates and working-age population have a positive effect. In addition, the working-age population has a statistically significant positive effect on household debt. Policymakers may need to develop policies for limiting household debt to an appropriate level. Implementing a programme to encourage private saving, investing, and financial planning would assist individuals in reducing debt.

Keywords: Household debt, Autoregressive Distributed Lag model, Bound test, Working-age population, Error correction model

1. Introduction

By one perspective, household debt occurs when household income cannot adequately support the expenses for necessary household consumption, and consequently the household must turn to bank borrowing. Conversely, household debt can be seen as a household's excessive consumption. In either case, it indicates a financial problem that may lead a household to default on its outstanding bank debt even as its borrowing continues. For the economy as a whole, rising household debt is a major concern of policymakers. As household debt in an economy keeps rising without limit, a point will be reached when large-scale defaults on loans occur and a financial crisis will be considered unavoidable.

In Thailand, household debt has risen steadily over the past two decades (see Figure 1). In addition to personal income not keeping pace with rising expenses, a major factor of such debt rising is government

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policies designed to appeal to voters by stimulating GDP growth. Stimulus policies that have led to rising household debt include cash refunds to households for the purchase of a first car, subsidies covering 50% of household expenses during the COVID-19 pandemic, and tax deductions for purchases of merchandise and travel.

The problem of inequality in Thai households has always existed and worsened after the spread of COVID-19, which affected the most vulnerable households more than others. During 2017-2021, the average income of all households was nearly 20 times higher than that of low-income households. This was reflected in the expenditure-to-income ratio of low-income households, which was as high as 2.5, compared with that of high-income groups at 0.7. The pandemic increased the financial vulnerability of low-income households after sudden income shocks that widened income inequality. According to a socio-economic survey, low-income households hold an average debt of 120,000 baht, of which more than one-third comprises borrowing for consumption. Most of this debt is short-term at high interest rates that result in high monthly payments, which weighs heavily on low-income households. In addition, such households carry a high percentage of agricultural debt, with debt service ratios (DSR[1]) as high as 73%. In contrast, high-income households hold long-term, low-interest debt with lower monthly payments, resulting in a DSR of only 24%. Although high-income households have 10 times more debt, almost half of it represents borrowing to accumulate wealth, such as debt for housing (Kongphalee, 2022).

The rapid increase in household debt during the pandemic has been observed in almost every country, including Thailand. Figure 1 shows that the Thai debt-income ratio (measured by loans from financial institutions to GDP) jumped from 80.4% in Q1/2020 to 90.9% in Q1/2021. The accumulated household debt level (represented by total liabilities) increased from 13.25 trillion baht in Q1/2020 to 14.04 trillion baht in Q1/2022. The analysis of the Bank of Thailand by using household socio-economic survey published by the National Statistical Office of Thailand indicates that a debt service ratio (DSR) of 30% represents a threshold beyond which debt will shift from stimulating to suppressing household consumption. Before the COVID-19 pandemic, the average household DSR was 28.6%, which was considered very close to the critical line. When the crisis broke out during 2020-2021, much household income disappeared. As a result, many households needed to borrow money to maintain their required consumption levels. This caused the average DSR to rise above 30%, thus suppressing household consumption and hampering economic recovery

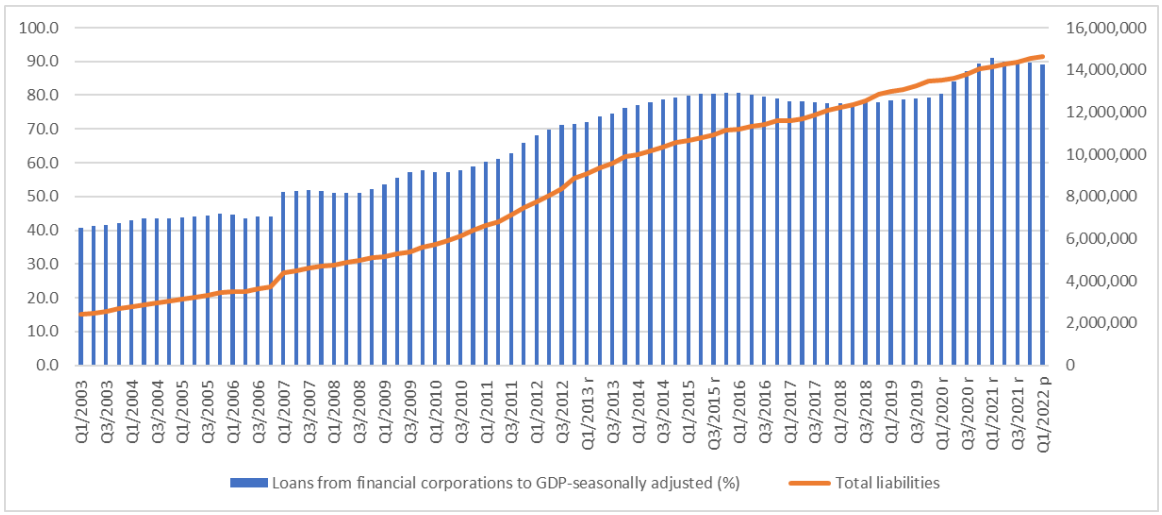
[1]In macroeconomics, the debt service ratio (DSR) is considered to be the primary indicator of a country's debt burden. It is also used in finance and accounting with specific method of calculation. For business loan, the debt service ratio is used for calculating a business's ability to repay its debt. It is the ratio of a business's net operating income to its debt-related obligations.

In this paper, the debt service ratio refers to the definition of the Bank of Thailand which is the ratio of the total amount of household debt to gross household income. In terms of financial heathy, a country is wealthier when a debt service ratio is low. (Ratchata Tangnararatchakit and Piraya Ronaparb, *Household debt: Problems of everyone to solve*. Bank of Thailand, 2022)

(Bank of Thailand, 2022). The accelerated growth of Thai household debt has generated much concern. Excessive household indebtedness, i.e., a DSR above 30%, would negatively affect Thai economic performance, with future household consumption decreasing. The ability to handle unexpected adverse situations is weakened when a person is laid off, which can lead to defaulting on debts. This may create risks to financial institutions or lenders and eventually harm the economy (Tangnararatchakit & Ronaparb, 2022).

Although borrowing can increase consumption and help raise GDP, its positive effect may be short-term. In the long-run, future household consumption may actually decrease when part of a household's future income must be set aside for loan repayment. This consequential reduction in disposable income may create a process of repeated borrowing and long-lasting indebtedness. Therefore, this situation has raised concern about the sustainability of household debt — one of the key indicators of a financial system's stability — and that of future economic development.

Figure 1: Thai debt-income ratio and household debt (total liabilities)



Source: Bank of Thailand (2022), authors' calculations.

Figure 2: Thai GDP Growth Rate (annual %)

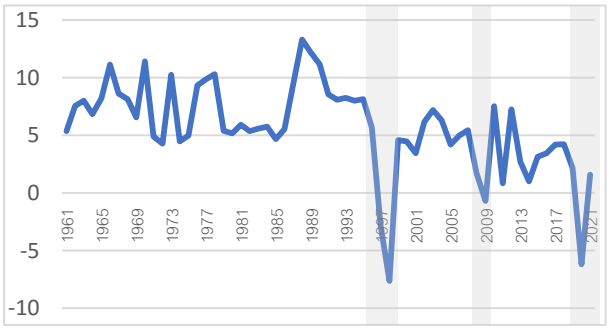


Figure 3: Thai Inflation Rate (annual %)

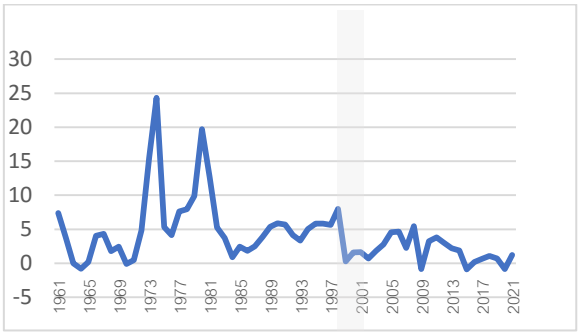


Figure 4: Thai Unemployment Rate (annual %)

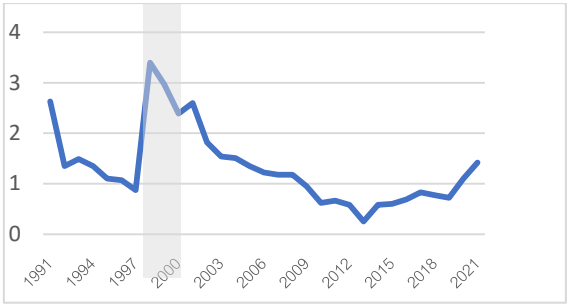


Figure 5: Thai Lending Interest Rate (annual %)

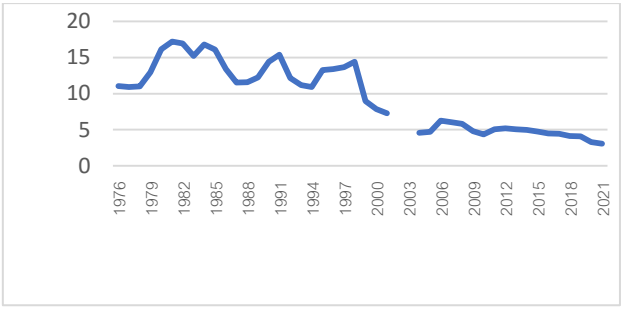
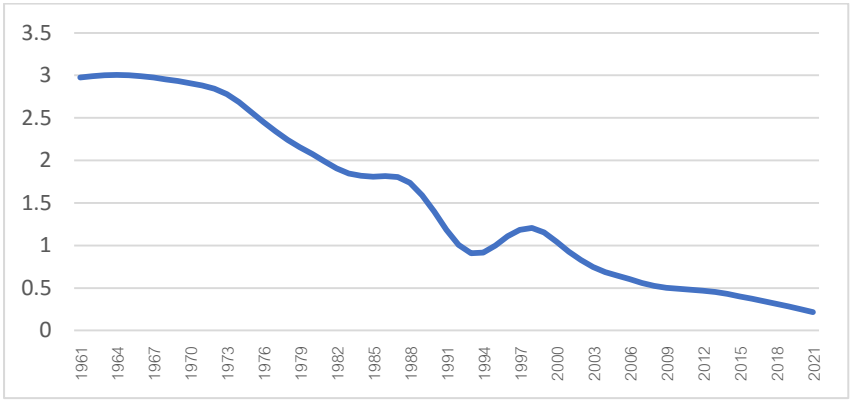


Figure 6: Thai Population Growth Rate (annual %)



Sources: World Bank (2022), authors' calculations.

This paper aims to analyze the determinants of Thai household debt and propose a guideline for limiting household debt to an appropriate level. The factors that determine household debt, i.e., the independent variables, are gross domestic product (GDP), consumer price index (CPI), unemployment rate, interest rate, and working-age population. These variables were selected based on the relevant theoretical framework, or drawn from existing research as explained in literature review below.

The data on the variables under study are also plotted on graphs in Figures 2, 3, 4, 5, and 6. From preliminary observation, the movements of these variables seem to show associations with the dependent variable (i.e., household debt). The associations among these variables will be investigated in detail by using an Autoregressive Distributed Lag (ARDL) model in the methodology section.

This paper is organized as follows: Section 2 reviews previous studies of household debt, while Section 3 discusses the construction of the dataset and methodology used. Section 4 presents the empirical results and their interpretation, and section 5 summarizes the main conclusions and provides policy suggestions.

2. Literature Review

Although the existing literature offers many studies on the determinants of household indebtedness, little research in this area has focused on Thailand. Studies that examined Thailand include research from the Fiscal Policy Office by Tulayasathien et al. (2015) on how household debt contributes to income inequality, which used a database related to household debt and income distribution data from a socio-economic survey in 2013. A binary logit model was employed to estimate the effect of different factors, including income, on the probability of a household becoming mired in debt. The results show that among the demographic, social, and income factors, holding other factors equal, income has the most effect on the probability of falling into debt. As higher income reflects a higher ability to service debt, households have more access to finance and a greater chance to accrue debt. Mettiyawong (2018), who studied the structure and factors determining provincial household debt in Thailand, showed that household expenditures, the level of product costs, and real interest rates play an essential role in their effect on overall household debt. Lerskullawat (2020) examined factors affecting household debt in 77 provinces across Thailand from 2009 to 2017 and revealed that household income, inflation rate, consumption expenditures, education, marriage, and a young population have significant effects on total household debt. Maneejuk et al. (2021) researched the determinants of household debt in Thailand at the regional and national levels using 2009-2017 panel data from 76 provinces. They found that various factors have shaped household indebtedness in different regions, and households in the same region with different levels of debt burden would experience different effects or outcomes. Thai borrowers use loans primarily for consumption purposes, followed by housing. The predominance of consumption loans reflects the high proportion of household debt in the personal loan, credit card, and auto loan sectors, which are considered short-term loans that rely on future potential income for current actual consumption.

At the international level, Debelle (2004) investigated household debt and the macroeconomy. The study indicated that lower interest rates and an easing liquidity constraint have led to a substantial rise in household debt over the past two decades. Moreover, the greater outstanding indebtedness has made the household sector more sensitive to interest rate, income, and asset price changes. Meniago et al. (2013) studied the prominent factors contributing to rising household debt in South Africa. Their results found a positive long-run cointegrating relationship between household debt and the consumer price index, gross domestic product, and household consumption. Khan et al. (2016) explored the determinants of household debt composition in Malaysia by using a bound test and ARDL modeling approach. Their findings revealed that over the long term, a change in income level, housing price, and population would have a positive impact on mortgage debt, while a rise in interest rates and cost of living would exert a negative influence. Bolibok (2018) investigated the key macroeconomic drivers of household debt-to-income ratio in the OECD countries using a panel data regression analysis to control for time-invariant country-specific effects. The findings indicated that the household debt-to-income ratio is positively related to average annual wages, the share of

the population aged 25-39, the share of the population with tertiary education attainment, and the magnitude of the wage-productivity gap. Swanepoel (2019) studied U.S. household debt determinants. The results indicated that the price of goods and unemployment negatively affect household debt, while the housing price index and lending rate positively impact household debt. Son C. & Park (2019) studied South Korean household debt sustainability in response to changes in U.S. interest rates. The results showed that the domestic policy rate would likely increase and then stagnate conditionally in line with U.S. policy rates. Furthermore, the projected trend of domestic interest rates could cause a rapid expansion in the ratio of vulnerable households, along with a series of combined adverse shocks such as highly concentrated principal repayment schedules, sharp declines in housing prices, and the occurrence of a crisis. Nomatye & Phiri (2018) investigated the macroeconomic determinants of household debt for the South African economy. They found that inflation and consumption are insignificantly related to household debt. GDP growth and housing prices are related to household debt only at moderate-to-high distribution levels. In contrast, interest rates and investment are related to household debt across all quantile distributions. Kereeditse & Mpundu (2021) analyzed household indebtedness in South Africa from Q1/2005 to Q4/2019. They found a significant positive relationship between household debt and the consumer price index, but an insignificant positive relationship between household debt and consumption and an insignificant negative relationship between debt and income. Low interest rates (2004-2011) and a general increase in household income have supported household consumption expenditures and sustained high household indebtedness in South Africa (Mutezo, 2014). Kurowski (2021) studied household over-indebtedness during the COVID-19 crisis among 1,300 Polish citizens by focusing on the role of debt and financial literacy. The results showed that people with higher financial and debt literacy were less susceptible to over-indebtedness. During the crisis, people with higher debt literacy were better prepared to manage their credit liabilities.

Although the determinants of household debt in Thailand have already been studied by some researchers, most of those studies focused on the micro-level (as shown in the first paragraph of this literature review). In this paper, the authors are interested in finding the macro determinants that affect Thailand's household debt. This study's findings may help support policymakers in monitoring and limiting household debt to an appropriate level.

3. Research Methodology

3.1 Data and description

Due to limits on the availability of data, this research employed quarterly figures from Q1/2007 to Q1/2022. The dependent variable is Thai household debt (DEBT), while gross domestic product (GDP), consumer price index (CPI), unemployment rates (UEM), interest rates (IR), and working-age population (POP) are the independent variables. Household debt and the interest rate figures were collected from the Bank of Thailand. DEBT represents loans to households or household outstanding loans with financial institutions, and IR is the policy rate. GDP figures are chain volume measures of national income in the

reference year 2002, which were collected from the office of the National Economic and Social Development Council of Thailand. CPI, UEM, and POP were gathered from the National Statistical Office of Thailand. GDP and POP have been transformed into logarithms — except for the consumer price index, the unemployment rates, and the interest rates — to reduce the problem of heteroscedasticity and obtain linearity. The following model specifications were developed for this study.

$$LDEBT_t = \beta_0 + \beta_1 LGDP_t + \beta_2 CPI_t + \beta_3 UEM_t + \beta_4 IR_t + \beta_5 LPOP_t + \varepsilon_t \quad (1),$$

where β_0 denotes a constant. $\beta_1, \beta_2, \beta_3, \beta_4$ are coefficients of exogenous variables. LDEBT, LGDP, CPI, UEM, IR, and LPOP represent household debt, gross domestic product, consumer price index, unemployment rates, interest rates, and working-age population, respectively. ε is an error term.

3.2 Analytical model

3.2.1 Unit Root Test

Firstly, this study employs Augmented Dicky-Fuller (ADF) unit root tests to check the variables' stationarity. The null hypothesis for the ADF test is that the series has a unit root (H_0: $\delta = 0$), and the lag will be chosen based on the Akaike Information Criterion (AIC). If the series is non-stationary at level, the first differences of the series should be taken to see if the series is stationary. The stationary series at level is denoted by I (0), and the stationary series at first differences are denoted by I (1).

3.2.2 Cointegration test: ARDL bounds testing procedure

Secondly, this study employs the ARDL modeling approach, initially introduced by Pesaran and Shin (1995) and later extended by Pesaran et al. (2001). The ARDL approach only requires some of the variables under investigation to be integrated in the same order. It can be used even if the regressors are integrated in any order, i.e., order one I (1) and zero I (0) or mutually integrated. The ARDL approach will determine the long-run relationship among the variables (Khan et al., 2016). The estimation equation for this paper is as follows:

$$LDEBT_t = \beta_0 + \sum_{i=1}^{p} \beta_1 \Delta LDEBT_{t-i} + \sum_{i=0}^{p} \beta_2 \Delta LGDP_{t-i} + \sum_{i=0}^{p} \beta_3 \Delta CPI_{t-i} + \sum_{i=0}^{p} \beta_4 \Delta UEM_{t-i} + \sum_{i=0}^{p} \beta_5 \Delta IR_{t-i} + \sum_{i=0}^{p} \beta_6 \Delta LPOP_{t-i} + \sigma_1 LDEBT_{t-1} + \sigma_2 LGDP_{t-1} + \sigma_3 CPI_{t-1} + \sigma_4 UEM_{t-1} + \sigma_5 IR_{t-1} + \sigma_6 LPOP_{t-1} + \in_t \quad (2),$$

where Δ is the first difference operator and *p* is the optimal lag length, with β_1 to β_6 representing the short-run dynamics of the model. σ_1 to σ_6 represents the long-run relationship. If the bound testing confirms the existence of the long-run relationship, the following error correction model is estimated:

$$\Delta LDEBT_t = \beta_0 + \sum_{i=1}^{p} \beta_1 \Delta LDEBT_{t-i} + \sum_{i=0}^{p} \beta_2 \Delta LGDP_{t-i} + \sum_{i=0}^{p} \beta_3 \Delta CPI_{t-i} + \sum_{i=0}^{p} \beta_4 \Delta UEM_{t-i} + \sum_{i=0}^{p} \beta_5 \Delta IR_{t-i} + \sum_{i=0}^{p} \beta_6 \Delta LPOP_{t-i} + \lambda ECT_{t-1} + \in_t \quad (3),$$

where λ is the speed of adjustment parameter. If it is found that λ is negative and statistically significant, it would represent the speed of adjustment and provide an alternative way to support cointegration between variables. In addition, the ECT accommodates the one-period lagged error correction term (Khan et al., 2016).

4. Empirical Findings and Interpretation

4.1 Descriptive Statistics

Table 1 shows the descriptive statistics of variables used in this study. The skewness values are close to zero. The positive and negative values indicate that the random variables are distributed to the mean's left and right sides. In contrast, the kurtosis values are less than and close to 3. The values of these two essential features of the data sets suggest that the variables have a normal distribution. Consequently, the Jarque–Bera test is conducted to confirm whether the data are normally distributed, and the test reveals that virtually all variables in this study, except CPI and UEM, have a normal distribution. After transforming these two variables into a logarithm, UEM becomes normal while CPI is still non-normal distribution, so CPI is omitted for testing in this study.

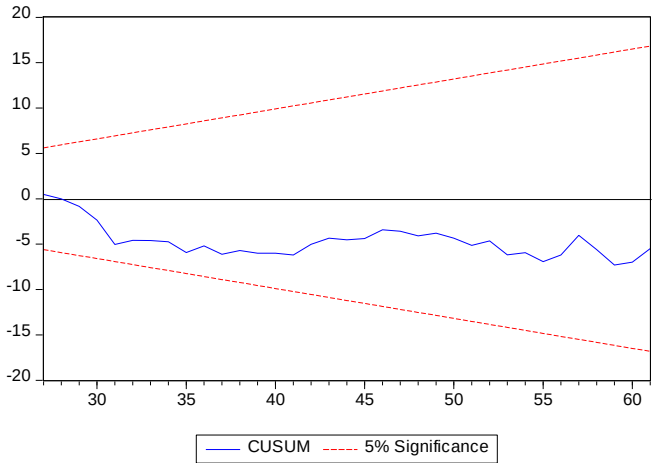
Table 1: Descriptive Statistics of Variable

	DEBT	GDP	CPI	UEM	IR	POP
Mean	9660893.	2318596.	94.47016	1.134865	1.926230	54809074
Median	10317682	2341617.	97.30000	1.003318	1.625000	55090322
Maximum	14645228	2845854.	103.9700	2.254747	4.625000	58513750
Minimum	4380473.	1829463.	80.40000	0.497551	0.500000	50824206
Std. Dev.	3311416.	298729.0	6.056387	0.418535	0.971033	1822082.
Skewness	-0.197063	0.008378	-0.821873	0.888874	0.500191	-0.521918
Kurtosis	1.663250	1.840195	2.389697	2.997088	2.646183	2.539255
Jarque-Bera	4.936514	3.419632	7.814024	8.032682	2.861788	3.308940
Probability	0.084732	0.180899	0.020100	0.018019	0.239095	0.191193
Observations	61	61	61	61	61	61

Sources: DEBT and IR from the Bank of Thailand, GDP from the office of the National Economic and Social Development Council of Thailand, CPI, UEM, and POP from the National Statistical Office of Thailand (Q1/2007-Q1/2022), authors' calculations.

Figure 7 plots the cumulative sum of recursive residuals (CUSUM) for the series model. The CUSUM illustrates the stability of the parameters in the model (Pesaran et al., 2001). The results from Figure 5 confirm the parameters' stability, given that all the coefficient values lie inside the critical bound values.

Figure 7: Plot of CUSUM for the model



4.2 Unit Root Test for Stationarity

Table 2 shows the results of the ADF unit root test. The results indicate that all variables are either I (0) or I (1). None of the variables is integrated at order two, I (2). Hence, this study proceeds with the ARDL bound test to determine the existence of a long-run relationship among the variables. The results of the F-statistics are shown in Table 3.

Table 2: Results of the ADF test

Variables	ADF					
	Level			First difference		
	No trend	Intercept	Trend and intercept	No trend	Intercept	Trend and intercept
LDEBT	1.266498	-2.890973*	-1.272786	-1.371943	-1.846397	-3.668669**
LGDP	2.213768	-1.720534	-0.071754	-1.809164*	-3.992310***	-4.355403***
UEM	-0.887494	-2.573625	-2.786739	-8.631593***	-8.556840***	-8.580571***
IR	-1.435513	-1.936014	-3.189202*	-4.911239***	-4.910341***	-4.698787***
LPOP	5.199772	-1.144828	-2.376036	-1.344196	-4.354247***	-4.124741***

Note: *, **, and *** denote rejection of the null hypothesis at the 10%, 5%, and 1% levels, respectively.

Sources: Authors' calculations.

4.3 Cointegration test: ARDL bounds testing procedure

The results of the F-bounds test in Table 3 confirm the existence of cointegration among the variables at the 1% significance level with the F-statistic value of 4.622329, more significant than the critical value of both lower and upper bounds at the 1% significance level.

Table 3: F-bounds test

Test statistics	Value	significance	I (0)	I (1)
			Asymptotic: n = 1000	
F-statistic	4.622329	10%	2.2	3.09
k	4	5%	2.56	3.49
		2.5%	2.88	3.87
		1%	3.29	4.37

In Table 4, the ARDL model was deemed acceptable to test for the existence of a long-run relationship among the variables. The automatic selection (using the Akaike Information Criterion) was used with a maximum of 4 lags for both the dependent variable and the regressor. Of the 2,500 models evaluated, the procedure selected an ARDL (4, 4, 4, 3, 4) model: 4 lags of the dependent variable, LOG(DEBT), and 4, 4, 3, 4 of LOG(GDP), IR, LOG(POP) and UEM, respectively.

Results from the ARDL- level equation indicate that gross domestic product and unemployment rates negatively affect household debt. In contrast, the interest rate and working-age population have a positive impact. However, a negative but insignificant coefficient is reported for GDP. The equation suggests that a 1% increase in gross domestic product and the unemployment rate will decrease household debt by 0.53% and 0.08%, respectively. In addition, an increase in the interest rate and working-age population by 1% will increase household debt by 0.05% and 12.92%. The results are supported by the earlier findings of Swanepoel (2019), who found that unemployment has a negative effect on household debt with a coefficient of -0.17%. Furthermore, Khan et al. (2016) found that an increase in the interest rate and working-age population positively influences consumer debt with coefficients of 0.05% and 12.92%, respectively.

Table 4: ARDL- Level Equation (long-run relationship)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(GDP)	-0.528943	0.370867	-1.426235	0.1632
IR	0.049905*	0.025799	1.934362	0.0617
LOG(POP)	12.92240***	1.658076	7.793610	0.0000
UEM	-0.082894**	0.032151	-2.578239	0.0146
C	-206.3248***	24.58355	-8.392799	0.0000

Note: *** is significant at 1%, ** is significant at 5%, * is significant at 10%.

Sources: Authors' calculations.

Table 5 presents the Error Correction Model (ECM) that tested for short-run adjustment to correct the disequilibrium, or deviation from long-run equilibrium, that might occur from an external shock. Since the ECM error correction term is statistically significant at the 1% level and presents a negative sign with a value

of -0.0931, this means that after the shock, any short-term deviation in household debt will be adjusted by 9.31% towards long-run equilibrium.

Table 5: ARDL error correction regression

Variable	Coefficient	Prob.
CointEq(-1)*	-0.093101***	0.0000

Note: *** indicates that the variable is significant at the 1% level.

Sources: Authors' calculations.

5. Conclusion and Policy Recommendations

This study aimed to determine the long-run relationship between Thai household debt and gross domestic product, unemployment rates, interest rates, and the working-age population. To achieve this objective, an ARDL model was developed and tested. Augmented Dicky-Fuller (ADF) unit root tests were conducted as a preliminary test to assure the stationarity of the variables. All the variables were found to be either I (0) or I (1). As such, the ARDL model was employed with household debt as the dependent variable. The Akaike Information Criterion (AIC) was used as the model selection method with a maximum of four lags of both the dependent variable and the regressors. The selected ARDL model is based on lag length (4, 4, 4, 3, 4). From the bounds test performed, it was concluded that cointegration amongst the variables existed at the 1% significance level. Furthermore, from the long-run model, it was confirmed that gross domestic product and unemployment rates have a negative effect on household debt. In contrast, the interest rate and working-age population positively impact Thai household debt. In addition, the speed of adjustment was tested with the Error Correction Model (ECM), which confirmed the existence of a long-run relationship among the variables. A short-run adjustment error correction with a negative coefficient of -0.0931 meant that any short-term deviation in household debt would be adjusted to its long-run equilibrium at the rate of 9.31% of the disequilibrium in each successive period after the shock occurs.

The finding that the working-age population has a positive statistically significant effect on household debt with a coefficient of 12.92% is worth attention. It may indicate that household debt is directly associated with working-age population. This would be in line with the study by Maneejuk et al. (2021), which indicated that as higher income reflects a higher ability to service debt, households have greater access to finance and more chances to accrue debt. Thai borrowers also used loans primarily for consumption purposes. When household expenditures and income increased, it led to a higher household debt level. The study of Tulayasathien et al. (2014) revealed that 92% of households use formal debt as their source of finance. In addition, such households tend to have higher borrowing values than households accruing informal debt. Income has the most effect on the probability of being indebted. When the working-age population increases, the number of households capable of finding income rises, leading to more household debt. As a result,

policymakers may need to examine the effective policies for limiting household debt to an appropriate level. The effective policy that previous researchers (Maneejuk et al., 2021; Tulayasathien et al., 2014; Kurowski, 2021) and this paper's authors recommend is to develop and provide more financial literacy. A program to promote private saving, investing and financial planning should be implemented to help people eliminate their debt and accumulate wealth. However, household indebtedness at present is considered to have reached a critical point. As such, the Bank of Thailand may have to impose measures to control the loan-to-value ratio, such as reducing lending from financial institutions to households. For further research, it would be interesting to focus on a qualitative study at the micro-level to find an appropriate financial literacy model for solving excessive indebtedness and improving the living conditions of all households.

References

Bank of Thailand. (n.d.). loans to household. https://www.bot.or.th/App/BTWS_STAT/statistics/ReportPage.aspx?reportID=775&language=eng

Bolibok, P. (2018). The Macroeconomic drivers of household debt-to-income ratio: Evidence from the OECD countries. *Copernican Journal of Finance & Accounting*, *7*(2). https://apcz.umk.pl/CJFA/article/view/18794

Debelle, G. (2004). *Household debt and the macroeconomy*. https://www.bis.org/publ/qtrpdf/r_qt0403e.htm*GDP growth (annual %)—Thailand* | *Data*. (n.d.). https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?locations=TH

Kereeditse, M. K., & Mpundu, M. (2021). Analysis of household debt in South Africa pre-and post-low-quality asset financial crisis. *International Journal of Economics and Financial Issues*, *11*(5), 114–121.

Khan, H. H. A., Abdullah, H., & Samsudin, S. (2016). Modelling the determinants of Malaysian household debt. *International Journal of Economics and Financial Issues*, *6*(4), 1468–1473.

Kongphalee, T. (2022) *The inequality of income and expenditure leads to financial traps.* https://www.bot.or.th:443/Thai/ResearchAndPublications/articles/Pages/Article_27Oct2022.aspx

Kurowski, L. (2021). Household's overindebtedness during the COVID-19 Crisis: The role of debt and financial literacy. *Risks*, *9*(4), 62. https://doi.org/10.3390/risks9040062

Lerskullawat, A. (2020). Factors affecting household debt in Thailand. *International Journal of Economic Policy in Emerging Economies*, *13*(4), 327. https://doi.org/10.1504/IJEPEE.2020.109584

Maneejuk, P., Teerachai, S., Ratchakit, A., Yamaka, W. (2021). Analysis of difference in household debt across regions of Thailand. *Sustainability*, *13*(21), 12253. https://doi.org/10.3390/su132112253

Meniago, C., Mukuddem-Petersen, J., Petersen, M. A., & Mongale, I. P. (2013). What causes household debt to increase in South Africa? *Economic Modelling*, *33*, 482–492. https://doi.org/10.1016/j.econmod.2013.04.028

Mettiyawong, P. (2018). *Structure and factors determining provincial household debts in Thailand* [Unpublished Master's thesis]. Ramkhamhaeng University.

Mutezo, A. (2014). Household debt and consumption spending in South Africa: An ARDL-bounds testing approach. *Banks and Bank Systems*, *9*(4). *https://businessperspectives.org/images/pdf/applications/* publishing/templates/article/assets/6095/BBS_en_2014_04_Mutezo.pdf

Nomatye, A., & Phiri, A. (2018). Investigating the macroeconomic determinants of household debt in South Africa. *International Journal of Economics and Financial Issues*, *8*(2), 62–69.

Pesaran, H., & Shin, Y. (1995). An autoregressive distributed lag modeling approach to cointegration analysis. *Econometrics and Economic Theory in the 20st Century: The Ragnar Frisch Centennial Symposium*, *31*. https://doi.org/10.1017/CCOL0521633230.011

Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, *16*(3), 289–326. https://doi.org/10.1002/jae.616

Son, J. C., & Park, H. (2019). US interest rate and household debt sustainability: The case of Korea. *Sustainability*, *11*(14), 3759. https://doi.org/10.3390/su11143759

Swanepoel, E. (2019). Auto-regressive distributed lag model for long-run US household debt determinants. *Investment Management & Financial Innovations*, *16*(3), 40–48. https://doi.org/10.21511/ imfi.16(3).2019.05

Tangnararatchakit, R., & Ronaparb, P. (2022). *Household debt: Problems of everyone to solve*. https://www.bot.or.th:443/Thai/BOTMagazine/Pages/25650157TheknowledgeHouseholdDebt.aspx

Tulayasathien, S., Kamlike, J., Wongchiwat, P., Srikam, P., Pattarasangthai,. T., Chombannpraw, N., & Rittiprasart, S. (2015). *Modeling micro-simulation to study the role of household debt concerning the income inequality of Thailand.* Fiscal Policy Office. https://www.fpo.go.th/eresearch/getattachment/28a10fa1-3d4e-42ca-adb4-5612378fd4ea/7726.aspx

The World Bank. (n.d.). *GDP growth (annual %) – Thailand*. https://data.worldbank.org/indicator/ NY.GDP.MKTP.KD.ZG?locations=TH

The World Bank. (n.d.). *Inflation, consumer prices (annual %) – Thailand*. https://data.worldbank.org/ indicator/FP.CPI.TOTL.ZG?locations=TH

The World Bank. *(n.d.). Lending interest rate (%) – Thailand.* https://data.worldbank.org/indicator/ FR.INR.LEND?locations=TH

The World Bank. (n.d.) *Population growth (annual %) – Thailand*. https://data.worldbank.org/indicator/ SP.POP.GROW?locations=TH

The World Bank. (n.d). *Unemployment, total (% of total labor force) (modeled ILO estimate) – Thailand*. https://data.worldbank.org/indicator/SL.UEM.TOTL.ZS?locations=TH