

Household Indebtedness: How global and Domestic Macro-economic Factors Influence Credit Card Debt Default in Malaysia

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Abstract: Malaysia has one of the highest household debts relative to gross domestic product in the Asia region. High indebted households have negative net worth and prone to default even during mild shocks. In most economies including Malaysia, household loan default is dominated by mortgages. In Malaysia, however, credit card debt default rate has been growing faster than mortgage default rate. Thus, this paper analyses how combined global and domestic macroeconomic factors impact on credit card nonperforming loan (NPLs) in Malaysia. Estimates from the Autoregressive Distributed Lags (ARDL) model highlights that in the long run, credit card NPLs are procyclical as strong domestic real output reduces credit card default. The study shows positive global crude oil price shocks reduces the credit card NPLs while a stressed global financial market condition has a reverse effect on credit card NPLs. Further, consumer price index negatively relates to credit card NPLs while monetary policy affects NPLs whereby a cut back of the overnight policy rate reduces credit card debt default.

Keywords: credit card nonperforming loans; Autoregressive Distributed Lags, global and domestic macroeconomic determinants, long run, Malaysia

JEL classification: E20, E32, E37, E44, E51, G21

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1.0 Introduction

Household credit expansion spurs economic growth but in the long term it has negative impact with household debt accumulation that results in sluggish growth. During periods of economic slump, high indebted

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households are more likely to cut their spending rapidly to contribute to slower economic growth. The ratio of household debt to gross domestic product in Malaysia remains high in 2015 at nearly 90%. According to Credit Counseling and Debt Management Agency (AKPK), during the first half of 2016, nearly 70% of individuals who seek counselling services have problems in paying their credit cards debts. This has motivated the current study to focus on one of the Malaysian household nonperforming loans (NPLs), namely credit card NPLs. The usage of credit card is similar to a loan which is defined by Samuelson and Nordhaus (2001) as “...*the use of someone else’s funds in exchange for a promise to repay at a later date.*” While majority of loans have predetermined fixed schedule payment, credit card payment is flexible where the credit card holders only pay minimum (affordable) monthly payment where the issuers earn interest on late payment. Additionally, credit cards are typically not secure as the issuer does not require the card holder to post a collateral. Credit card lending is a double edge sword where it improves banks’ profitability but at the same time contributes to credit risks. Credit card holder will face the burden of unpaid outstanding amount and the continuously revolving credit interest if they delay in making payment.

This study is concerned with the issue of rampant credit card delinquency that should not be underestimated as this would threaten business cycle, add debt burden to the household and consequently, the progress of Malaysia. Given that aggregate NPLs have been considered as the transmission channel of macroeconomic shocks to the banks’ balance sheet, macroeconomic fundamentals also have an impact on NPLs depending on different economic purposes. Therefore, this study investigates the relationships between macroeconomic determinants and credit card NPLs, from the global and domestic macroeconomic perspectives. According to a report published by Khazanah Research Institute (Kok, 2016), only 10.8% of Malaysian households are resilient to economic or financial shock indicated majority of them are poor in financial management. The hypothesis proposed in this study is any particular adverse event is prone to trigger financial distress, which in turn causes loan delinquency and impairment.

This study contributes to existing literature in terms of the factors antecedent to credit card NPLs by documenting how macroeconomic uncertainties affect credit cards NPLs. The study also provides valuable econometric information to relevant authorities for early mitigation approaches if there is an indication of financial or economic instability, for instance, to identify potential credit card market strain and to articulate adequate credit card loan loss provision in the banking system.

The structure of this paper is as follows: Section 2 contains a literature review of relevant studies on this topic. Section 3 describes data and

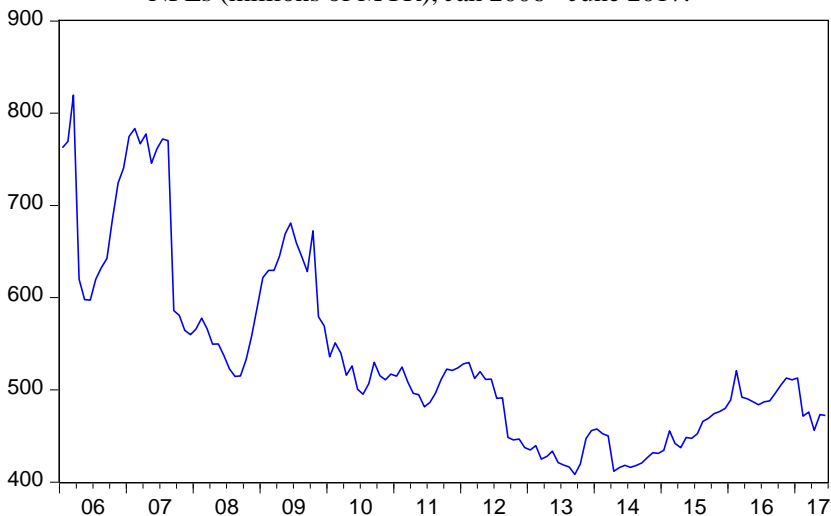
research methodology. This is followed by a discussion of empirical results in Section 4 while Section 5 summarises main findings and concludes the paper.

2.0 Related Literature

2.1 *The Context*

The credit card NPL in Malaysia has shown an increase since the second quarter of 2014 (See Figure 1). As reported in the Monthly Statistical Bulletin, central bank of Malaysia (BNM), growth of impaired credit card loan as of August 2016 is 4.5%, which is higher than mortgage loan default growth of 2.8% even though the latter dominates Malaysian household NPLs. Although the impaired loan ratio of credit card stays low, credit card default is the largest contributor to bankruptcy among Malaysians below age of 34, (according to statistics released by Department of Insolvency Malaysia in 2014). Despite the fact the current generation in Malaysia is the most educated, the Asian Institute of Finance (AIF) revealed more than one third of them did not pay debt on time. Additionally, in the first half of 2017, less than 50% of credit cardholders have fully settled their credit card debt; 43.6% paid at least five per cent of the outstanding balance during the same period while the remaining did not pay the outstanding balance of the minimum payment before or during payment date (Bernama, 2017).

Figure 1: The Malaysian NPLs based on economic purposes: Credit Card NPLs (millions of MYR), Jan 2006 - June 2017.



2.2 *Definition of NPLs*

According to IMF's compilation guide (2005), "A loan is nonperforming when payments of interest and/or principal are past due by 90 days or more, or interest payments equal to 90 days or more have been capitalized, refinanced, or delayed by agreement, or payments are less than 90 days overdue, but there are other good reasons—such as a debtor filing for bankruptcy—to doubt that payments will be made in full."

Based on the latest classification of Non-Performing Loans (NPLs) for substandard, bad and doubtful debts published by BNM in 2015, a loan is considered as impaired "where the principal or interest/profit or both of the loan/financing is past due for more than 90 days or 3 months". In the case of credit card facilities, the amount past due refers to minimum monthly payment.

2.3 *Determinants of Credit Card NPLs*

Econometric evidences ascertained that macroeconomic uncertainties influence the state of indebtedness which can lead to possible aggregate loan default (Chowla, Quaglietti, & Rachel, 2014). However, there were limited attempts made by the researchers in exploring the explanatory power of macroeconomic variables on specific type of loan delinquencies. Thus, the aim of the study is to establish macroeconomic factors with predictive powers of credit card NPLs to uncover the impact of macroeconomic conditions on household. Therefore, the study will focus on global and domestic macroeconomic determinants of loan default.

Empirical studies confirm the association between economic growth and NPL. Positive economic growth boosts the firms and household credit while debt grows along with economic growth. With increase in income during good times, loan repayments are easier, resulting in a decline in NPL ratio. During recession, bad loans grow due to financial distress and therefore, default rate is anticipated to be higher (Fernández de Lis, Martínez Pagés, & Saurina, 2000). Marcucci and Quagliariello (2008, 2009) claimed that the influence of business cycle on bad loans during times of recession is more than four times higher than during a period of boom. Cifter *et al* (2009) found a lagged impact of industrial production on the number of non-performing loans in the Turkish financial system. Bellotti and Crook (2009) also claimed that while there was no major recession in the sample period, the UK production growth is unremarkable in explaining the non-performance of credit card loans.

Besides business cycle fluctuations, interest rate and unemployment rate could explain the rate of NPLs as well. From the lenders' perspectives, interest rates represent the rate of return of the lending activities. In the

borrowers' point of view, interest rates represent the borrowing cost. A hike in interest rate normally curtails the ability of borrowers to meet their debt obligation, as such, nonperforming loans (NPLs) are positively affected by interest rate changes (Beck, Jakubik, & Piloju, 2015; Adebola, Yusoff, & Dahalan, 2011). However, Goel and Hasan (2011) showed different findings, i.e. higher (lower) default rate in economies with lower (higher) interest rates.

As per International Labor Organization (ILO), an unemployed person is someone who is actively looking for work but does not have a job. The unemployment rate is classified as one of the popular lagging indices. Grieb, Hegji, and Jones (2001) found that unemployment leads to a rise in credit card default rates. Borrowers rationally choose credit card default over default on other loan categories when they find themselves less capable of repaying debt. Similar results had been shown by Agarwal and Liu (2003). As a result of slow growth, the unemployed borrowers limit their spending due to less liquid in cash flow and which weakens their ability to meet their loan obligations. Job losses leads to negative impact on the household and they have trouble making payments. Therefore, resulting in impaired loans (see Castro, 2013; Messai & Jouni, 2013; Beck, Jakubik, & Polaiu, 2015).

Further, price level can be costly to the economy (Skarica, 2013). There are ambiguous relationships between inflation and NPLs (Skarica, 2013; Klein, 2013; Nkusu, 2011). On one hand, inflation is often caused by lower interest rate, and it devalues the real value of debt, stimulates more household spending and even reduces unemployment (Phillip Curves), thus produce a negative sign. On the other hand, inflation erodes real income value (as wages do not rise as inflation rises) which makes debt repayment more difficult as available funds are lesser and ultimately deteriorates the loan portfolio quality.

Most global financial shocks episode soften external demand and cause weaker output in the export-dependent country. Adverse global financial shock deteriorates domestic financing conditions, induce negative wealth effects and consequently lower real economic activity. Domestic credit conditions also become more restrictive as balance sheets of firms or households deteriorate (T'ng, 2013). Besides that, a decline in commodity prices can reduce commodity exporters' revenue, which in turn may affect the economy and policies to accommodate revenue shortfall. These disruptions thereby constraint the spending limit or consumption of households and firms which can lead to default (Poghosyan & Hesse, 2009). As evidenced by Villafuerte and Lopez-Murphy (2010) and IMF (2015), commodity (oil) price shocks are actually procyclical and provide feedback loop on the banks' balance sheet. Idris and Nayan (2016) found

crude oil price appreciates tend to improve the wealth position of borrowers and lower the chances of default.

In summary, this study attempts to establish macro covariates that are important in determining credit card default and these variables reflect the relationship between global-, domestic economic condition and credit default.

3.0 Data and Methodology

3.1 *Data Source and Measurements*

This study employs Autoregressive Distributed Lags approach (ARDL) to study the determinants of credit card NPLs. NPLs (in millions of Malaysian Ringgit, MYR) on credit cards (“CCNPL”) serve as endogenous variable is examined corresponding to the chosen determinants which have economic relevance. Global environment indicators comprise global crude oil price and global financial stress index while domestic market condition is represented by overnight policy rate, inflation rate unemployment rate and real output. Real production output represented by the Index of Industrial Production (IPI) covers the physical output of all stages of production in the manufacturing, mining, gas, and electric utility industries (McGuckin, 2000). Real production output is available on a monthly basis and displays strong co-movements with GDP (OECD, 2012). The changes in this indicator generally reflects similar changes in overall economic activity and it is more exhaustive compared with GDP in explaining economic growth on a monthly basis (Linda, 2007). These data were obtained from the central Bank of Malaysia (BNM) Monthly Statistical Bulletin, St. Louis Federal Reserve Banks and Department of Statistics, Malaysia.

The study period spanned over January 2006 to June 2017 with $n = 138$ and coincided with the global financial crisis and the global commodity price shock. Table 1 shows the measurement and the expected relationships of the explanatory variables.

Table 1: Variable measurements and expected relationship of the explanatory variables and credit card NPLs.

Explanatory Variables	Type of Indicators	Description/Unit	Expected Relationship
<i>Crude oil price (OIL)</i>	Global commodity price	Crude Oil (petroleum), simple average of three spot prices; Dated Brent, West Texas Intermediate, and the Dubai Fateh/ MYR per Barrel	Negative
<i>Real production output (OUTPUT)</i>	Domestic Macroeconomic	Total Industrial Production includes the change in output in Malaysian manufacturing, mining, construction, and electricity, gas and water/ Price value index	Negative
<i>Overnight Policy Rate (OPR)</i>	Monetary Policy	Target rate for the day-to-day liquidity operations of the BNM. An interest rate at which a depository institution lends immediately available funds (balances within the central bank) to another depository institution overnight/ %	Positive
<i>Consumer Price Index (CPI)</i>	Domestic Macroeconomic	The average rate of change in prices of a fixed basket of goods and services which represents the expenditure pattern of all households/ Index	Positive / Negative
<i>Unemployment rate (UNE)</i>	Domestic Macroeconomic	Total labour force that is unemployed but actively seeking employment and willing to work/%	Positive
<i>Global financial stress index (GFSI)</i>	Global financial shock	The degree of financial stress in the markets and is constructed from 18 weekly data series: seven interest rate series, six yield spreads and five other indicators/ Index	Positive

3.2 *Techniques of Analysis - ARDL Approach*

The ARDL model estimates dynamic relationship between dependent and explanatory variables, and this relationship can be analysed by cointegration test. The traditional cointegration methods, such as residual based Eagle Granger (1987) and the maximum likelihood based on Johansen (1991, 1995) suffer from problems of endogeneity and require all the variables to be of same order of integration, $I(1)$. The ARDL bound testing approach to cointegration (Pesaran & Pesaran, 1997; Pesaran et al., 2001) has become popular in recent years as this approach offers advantages that don't require same integrated order in all the variables under study, free from autocorrelation problem and robust in small sample size. Unlike the Johansen approach, the restrictions on the number of lags can be applied to each variable separately in an ARDL method (Pesaran & Shin, 1998 & Pesaran et al., 2001).

The ARDL method integrates the short-run impact of the given variables with a long-run equilibrium using an error correction term without dropping long-run information (Pesaran & Shin, 1999). To this end, this study considers an ARDL (p, q_1, \dots, q_k) model

$$Y_t = \beta_0 + \sum_{i=1}^p \beta_i Y_{t-i} + \sum_{j=1}^k \sum_{i=0}^{q_j} \alpha_{j,i} X_{j,t-i} + \varepsilon_t, \quad (1)$$

where Y_t is the dependent variable, p is the number of lags of the dependent variable Y_t , q is the number of lags of the k explanatory variable $X_1, X_2 \dots X_k$, β_0, β_i and $\alpha_{j,i}$ are the constant term, coefficients associated with lags of Y_t and coefficients associated with the lags of k explanatory variable $X_{j,t}$ for $j = 1, 2, \dots, k$ respectively, and ε_t is a random disturbance term. To assess whether there is a long run relationship between the variables, ARDL Bound Cointegration Test is employed. The long run relationship indicates the state of the system remains stable over a period and has no tendency of changing drastically. Consider the conditional error correction form of Equation (1), which is expressed as:

$$\Delta Y_t = \beta_0^* + \rho Y_{t-1} + \sum_{j=1}^k \pi_j X_{j,t-1} + \sum_{i=1}^{p-1} \gamma_i \Delta Y_{t-i} + \sum_{j=1}^k \sum_{i=0}^{q_j-1} \theta_{j,i} \Delta X_{j,t-i} + \varepsilon_t, \quad (2)$$

where Δ denotes the first difference operator and ε_t is the white noise residuals, the test for ARDL bound to cointegration is hypothesised as $H_0: \rho = 0$ and $H_0: \pi_1 = \pi_2 = \pi_3 = \dots = \pi_k = 0$ (No cointegration) against existence

of long run cointegration. Two sets of critical values are computed by Pesaran et al (2001) for a given significance level. The null hypothesis is rejected if the calculated F-statistic exceeds the upper bound critical value. If the F-statistic falls into the bounds then the test becomes inconclusive. The null hypothesis is not rejected if the calculated F-statistic is below the lower bound critical value. If the case inclusive, a possible remedial action is to examine the error correction term based on Banerjee et al. (1998) and Kremers et al. (1992).

If cointegration does exist, the speed of convergence to equilibrium can be determined by rewriting equation (2), and therefore the cointegrating regression form of an ARDL model is expressed as:

$$\Delta Y_t = \sum_{i=1}^{p-1} \gamma_i \Delta Y_{t-i} + \sum_{j=1}^k \sum_{i=0}^{q_j-1} \theta_{j,i} \Delta X_{j,t-i} + \lambda ECT_{t-1} + \varepsilon_t \quad (3)$$

$$\text{where } ECT_t = Y_t - \frac{\beta_0^*}{\rho} - \sum_{j=1}^k \frac{\pi_j}{\rho} X_{j,t}.$$

The coefficient λ reveals the speed of Y return to equilibrium after a shock in X . The significant negative sign of error correction term ECT , shows that the model moves towards the stable position in the long run.

In this paper, all the variables are expressed in logarithm scale as these coefficients are interpretable as elasticity, except for the variables that appear in both positive and negative values, i.e. global financial stress index. Following equation (2) and (3), the conditional error correction and cointegration regression form of ARDL ($p, q_1, q_2, q_3, q_4, q_5, q_6$) representation to examine the relationships between the credit card cards NPLs and the determinants are expressed as:

$$\begin{aligned}
\Delta LNCNPL_t &= \beta_0^* + \rho LNCNPL_{t-1} + \pi_1 GFSI_{t-1} + \pi_2 LNCPI_{t-1} + \\
&\pi_3 LNOIL_{t-1} + \pi_4 LNOPR_{t-1} + \pi_5 LNOUTPUT_{t-1} + \pi_6 LNUNE_{t-1} + \\
&\sum_{i=1}^{p-1} \gamma_i \Delta LNCNPL_{t-i} + \sum_{i=0}^{q_1-1} \theta_{1,i} \Delta GFSI_{t-i} + \sum_{i=0}^{q_2-1} \theta_{2,i} \Delta LNCPI_{t-i} + \\
&\sum_{i=0}^{q_3-1} \theta_{3,i} \Delta LNOIL_{t-i} + \sum_{i=0}^{q_4-1} \theta_{4,i} \Delta LNOPR_{t-i} + \sum_{i=0}^{q_5-1} \theta_{5,i} \Delta LNOUTPUT_{t-i} + \\
&\sum_{i=0}^{q_6-1} \theta_{6,i} \Delta LNUNE_{t-i} + \varepsilon_t
\end{aligned}$$

(4)

and,

$$\begin{aligned}
\Delta LNCNPL_t &= \sum_{i=1}^{p-1} \gamma_i \Delta LNCNPL_{t-i} + \sum_{i=0}^{q_1-1} \theta_{1,i} \Delta GFSI_{t-i} + \\
&\sum_{i=0}^{q_2-1} \theta_{2,i} \Delta LNCPI_{t-i} + \sum_{i=0}^{q_3-1} \theta_{3,i} \Delta LNOIL_{t-i} + \sum_{i=0}^{q_4-1} \theta_{4,i} \Delta LNOPR_{t-i} + \\
&\sum_{i=0}^{q_5-1} \theta_{5,i} \Delta LNOUTPUT_{t-i} + \sum_{i=0}^{q_6-1} \theta_{6,i} \Delta LNUNE_{t-i} + \lambda ECT_t + \varepsilon_t
\end{aligned}$$

(5)

where

$$\begin{aligned}
ECT_t &= LNCNPL_t - \left(\frac{\pi_1}{\rho} GFSI_t + \frac{\pi_2}{\rho} LNCPI_t + \frac{\pi_3}{\rho} LNOIL_t + \frac{\pi_4}{\rho} LNOPR_t + \right. \\
&\left. \frac{\pi_5}{\rho} LNOUTPUT_t + \frac{\pi_6}{\rho} LNUNE_t + \frac{\beta_0^*}{\rho} \right)
\end{aligned}$$

4.0 Empirical Findings

4.1 Unit root and stationarity test

The unit root and stationarity test are conducted to ensure no series are I(2). The Augmented Dickey Fuller (ADF) test was done for unit root with constant and trend for each series. For comparative purposes, Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test was done for trend

stationary for each series. Results of unit root and stationarity tests are shown in Table 2.

Table 2: Unit root and stationarity tests

	Level:		First difference:				
	ADF	KPSS	ADF	KPSS			
Null Hypothesis:	Has a unit root	Is Stationary	Has a unit root	Is Stationary			
	t-Stat	LM-Stat	t-Stat	LM-Stat			
<i>GFSI</i>	-2.8161	0.1117	-8.5853	***	0.0633		
<i>LNCPI</i>	-4.2231	**	0.0763	-7.3133	***	0.0300	
<i>LNOIL</i>	-2.9395	0.1962	**	-7.8922	***	0.0314	
<i>LNOPR</i>	-1.9482	0.1698	**	-8.5602	***	0.0634	
			**				
<i>LNOUTPUT</i>	-1.665	0.3028	*	-3.900	**	0.1298	
<i>LNUNE</i>	-3.1948	*	0.1625	**	-7.9452	***	0.0307
<i>LNCCNPL</i>	-2.5303	0.1999	**	-11.619	***	0.0263	

Note: Asterisks ***, **, * indicated statistically significant at 1%, 5% and 10%. Critical value based on MacKinnon (1996) for ADF test. Critical value based on Kwiatkowski-Phillips-Schmidt-Shin (1992) for KPSS test.

All the series are stationary after taking first differencing, i.e., I(1) except the consumer price index is stationary at the level, i.e. I(0). The KPSS test gives similar results where all the series are stationary at the first difference except inflation rate and global financial stress index are stationary at the level and does not need differencing. The series are found to be mixtures of I(0) and I(1), and the maximum order of integration is 1.

4.2 ARDL bound to cointegration test

The optimal lag order of each variable in the ARDL model is selected based on the information criteria. While SIC tends to choose lowest lag structure, this study uses AIC which focuses on the best order of lags without under fitting the model. The ARDL bound to cointegration test are hypothesised as $H_0: \rho = 0$ and $H_0: \pi_1 = \pi_2 = \pi_3 = \pi_4 = \pi_5 = \pi_6 = 0$ (no long-run relationship between the levels of variables) against existence of long run cointegration based on the conditional error correction model. The

results of bound test are shown in Table 3. The F-statistic is above the upper bound, and therefore, there is sufficient evidence to reject null hypothesis at 5% significance level and conclude that a long run relationship exists between the credit cards NPLs, crude oil price, overnight policy rate, real production output, unemployment rate, consumer price index and global financial stress index.

Table 3: ARDL bound test for cointegration

Null Hypothesis: No long run relationship exists		Critical Bound	
Significance level	F-stat = 3.8207**	I(0)	I(1)
10%		2.12	3.23
5%		2.45	3.61
1%		3.15	4.43

*Note: Asterisks ***, **, * indicated statistically significant at 1%, 5% and 10%.*

4.3 *Long run relationships*

In the long run, *ceteris paribus*, for 1% increase in the crude oil price and real production output, the credit card NPLs level decrease by 0.433% and 0.669%, respectively. A 1% increase in consumer price index leads to negative changes in credit cards NPLs by 0.919%. Positive coefficients of overnight policy rate and global financial stress index indicate 1% increase in overnight policy rate resulting in an increase in credit cards NPLs by 0.586% whereas 1 unit increase in global financial stress index increases credit card NPLs by 4.17%, all else being equal. The impact of global financial stress index, crude oil price, real output, consumer price index and overnight policy rate are statistically significant in determining the credit card NPLs. There is no significant evidence of long run impact of unemployment rate on credit card NPLs. A negative and significant coefficient of error correction term further confirms the variables converge in the long run after a shock in the indicators. Approximately 19.70% of disequilibria in the credit card NPLs from the previous month are corrected in the current month.

Table 4: ARDL: Long run coefficients and cointegrating relationships
Selected Model: ARDL (1,6,0,0,0,0)

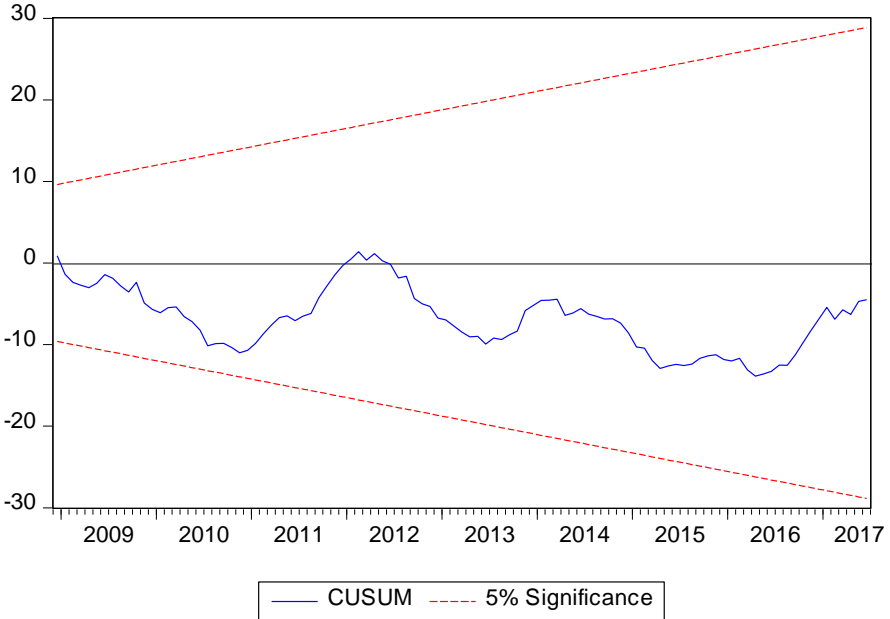
Long run coefficients			
<i>Constant</i>	15.2300	(0.0000)	***
<i>GFSI</i>	0.0417	(0.0132)	**
<i>LNCPI</i>	-0.9194	(0.0291)	**
<i>LNOIL</i>	-0.4330	(0.0001)	***
<i>LNOPR</i>	0.5862	(0.0023)	***
<i>LNOUTPUT</i>	-0.6694	(0.0404)	**
<i>LNUNE</i>	0.1728	(0.4983)	
Cointegrating relationships			
D(GFSI)	0.0142	(0.1448)	
D(GFSI(-1))	-0.0454	(0.0000)	***
D(GFSI(-2))	0.0060	(0.6033)	
D(GFSI(-3))	-0.0396	(0.0008)	***
D(GFSI(-4))	0.0041	(0.7032)	
D(GFSI(-5))	-0.0260	(0.0122)	**
D(LNCPI)	-0.1811	(0.0931)	*
D(LNOIL)	-0.0853	(0.0000)	***
D(LNOPR)	0.1155	(0.0044)	***
D(LNOUTPUT)	-0.1319	(0.0436)	**
D(LNUNE)	0.0340	(0.5480)	
ECT(-1)	-0.1970	(0.0000)	***

Note: Asterisks ***, **, * indicated statistically significant at 1%, 5% and 10%. *p* values are in the parentheses.

The cumulative sum of recursive residuals (CUSUM) test proposed by Brown et al, (1975) is applied to the residuals of the estimated error correction models to test parameter stability. The residuals are updated and

recursively plotted against the 5% critical bound for breakpoints. Figure 2 indicates the residuals are within the critical bound, hence, there are evidences of stability of coefficients and absence of structural break in the estimated model.

Figure 2: CUSUM test



5.0 Discussion and Conclusion

Credit card is an unsecured lending. Credit card debt is not beneficial as the annual percentage rate charged on the credit card outstanding balance is relatively high. The study investigates the determinants of Malaysian credit card nonperforming loans (NPLs) in the period between January 2006 and June 2017, using Autoregressive Distributed Lags (ARDL). The ARDL bound test reveals cointegration exists between credit card NPLs and the chosen variables. The CUSUM test detects no instability of estimated parameters.

The association between real production output and Malaysian credit card NPLs is negative, suggesting that positive economic condition increases macroeconomic development, individuals’ income and earnings, and hence, increases credit card holders’ ability to pay their bills. Therefore, high level of real output tends to reduce bad loans which is

consistent with the findings of Festic et al. (2011), Kalirai and Scheicher (2002) and Zeman and Jurea (2008).

Malaysia is highly dependent on trade with its total export and import double of national gross domestic product (GDP), and therefore, it is apparent that low demand from its trading partner will be felt throughout the economy (James et al., 2008). It is not surprising to observe the crude oil price (global commodity price shock) is negatively affecting the Malaysian NPLs. These findings are similar to that of International Monetary Fund's study (2015), Idris and Nayan (2016), Kinda, Mlachila, and Ouedraogo (2016). Decline in oil price benefits oil importer through lower inflation, but a weak price of Malaysia's export commodity reduces disposable income among households. Low oil prices also have adverse effect on the country's economic activity. These interruptions constrain the borrower in meeting his or her debt repayment obligation.

Overnight policy rates, on their own have marginal impact on credit card NPLs. However, the consequence will be unbearable if the card holder has other loan(s) which means there is greater tendency for him or her to default (Argawal & Liu, 2003). The changes in OPR affect borrowing cost for banks which will eventually lead to a chain effect. The analysis shows increases in OPR worsen NPLs and this relationship is significant which is supported by other studies (Khemraj & Pacha, 2009; Dash & Kabra, 2010).

Consistent with the findings of Skarica (2013) and Klein (2013), it is plausible to justify a negative coefficient on consumer price index found in this study. The level of inflation and real output (economic growth) are positively correlated throughout the sample period, showing high inflation improves debt repayment obligation and thereby reducing the rate of credit card NPLs.

This is supported by Espinoza and Prasad (2013) and Klein (2013), whereby global financial stress index is found to be a significant determinant of credit card NPLs whereby adverse global financial market conditions led to accumulation of NPLs. As expected, to some extent, global illiquidity tends to have a negative impact on emerging economies like Malaysia.

While the rate of unemployment have been extensively used in determining the probability of default (Argawal & Liu, 2003; Belloti & Crook, 2009; Castro, 2013; Messai & Jouni, 2013; Beck, Jakubik, & Polaiu, 2015), the impact of unemployment rate is found to be less relevant once other indicators are considered. This finding is supported by empirical evidence that the country has posted negligible unemployment rate throughout the sample period.

As an emerging economy, Malaysian credit card holders are affected by global headwinds and the condition of domestic economy which is influenced by the country's monetary policy. Commodity price slump

adversely undermines economic performance and together with financial market uncertainties in major advanced economies, volatile shifts in global liquidity could pressure the emerging economies. Commodity price shock, particularly oil, leads to significant losses in export activity for commodity exporters such as Malaysia. The financial accelerator mechanism (Bernanke, Gertler, & Gilchrist, 1998) amplifies the adverse global shock spill over to domestic market via effect from interrelation between real economy and the credit market. To accommodate the domestic economy, monetary policy considers a number of factors including global stance, changes in commodity demand and price as well as monetary policies in major advanced economies. A monetary policy induced by changes in interest rate not only affects domestic financial condition, but also has implications on credit and economic activities and inflation (T'ng, 2013), leading to a direct effect on household spending and debt repayment obligations.

Credit risk associated with credit card is high, particularly when there are changes in the economic environment. In any economic condition, addressing nonperforming loans (NPLs) is undoubtedly challenging as the recovery of NPLs will impact on cost efficiency of the banks in the event of disposal of NPLs (Karim, Chan, & Hassan, 2010). The consequence of consumer default is likely to decelerate consumption and thereby leading to a decrease in growth in aggregate demand. The significant influence of macroeconomic determinants suggests the authorities must closely monitor such risks. In addition, authorities could price the credit card default risk by coming up with appropriate instrument with regards to the quantitative impact of the key determinants.

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