Jurnal Ekonomi dan Studi Pembangunan
Volume 8, Nomor 2, Oktober 2007: 130-141

NON-BANK FINANCIAL INTERMEDIARIES (NBFIS) AND ECONOMIC GROWTH IN MALAYSIA: AN APPLICATION OF THE ARDL BOUNDS TESTING APPROACH TO COINTEGRATION

Mohd. Aminul Islam [1]
Dato' Jamil Bin Hj. Osman [1]

[1] International Islamic University Malaysia
P.O. Box 10, 50728 Kuala Lumpur Tel: (+603) 6196 4000 Fax: (+603) 6196 4053
E-mail: aminul_2@yahoo.com, drj@iiu.edu.my

Abstract

This paper empirically examines the impact of Non-bank financial intermediaries (NBFIs) on economic growth in Malaysia using the time series data for the period 1976-2004. We employ a recently developed autoregressive distributed lag (ARDL) bounds testing approach to cointegration suggested by Pesaran et al (2001) which is more suitable for estimation in small sample size studies and also capable of testing the existence of long run relationship irrespective of whether the underlying variables are integrated of order I(0), I(1) or mutually integrated. We found evidence of a stable long run cointegrating relationship between per capita real GDP and economic growth in Malaysia. The regression result suggests that the development of NBFIs has positive and significant long run impact on per capita real GDP in Malaysia.

Keywords: *non-bank financial intermediaries; economic growth*

***JEL** Classification: C3, C22, C51, G2*

INTRODUCTION

The importance of the development of financial system in economic growth, particularly the role of banks and stock market has long been discussed both in the theoretical and empirical studies (see for a detailed review of the literature, Levine 1997 & 2003; Blum *et. al*. 2002). These studies generally agree that a sound and well-developed financial system has a beneficial effect on a country's economic growth[1]. However, as compared to the banking sector and stock market development (which have been mostly used as a proxy for financial development), a very few[2] studies are available addressing the role and functions of the Non-bank Financial Intermediaries (Henceforth NBFIs) in the overall economic development. These studies are mostly conducted in the

[1] Some of the mostly cited empirical works that established the evidence of finance-growth relationship are: King and Levine (1993); Al-Yousif (2002); Wachtel and Rousseau (2000); Neusser and Kugler (1998); Ansari (2002); Beck *et al* (2000); Beck and Levine (2002, 2004), Fase *et al* (2003); Christopoulos *et al* (2004); Arestis and Demetriade (1997); Luintel & Khan (1999); Gregorio and Guidotti (1995); Arestis *et al* (2001); Levine and Zervos (1998) etc.

[2] In recent some studies are found trying to shed some light on the growing importance of NBFIs in the development of financial intermediation and in the economic growth. However, they mostly focused only on the study of pension fund or the contractual savings in the context of developed countries. See for example, Schmidt *et al* (1999); Bossone (2001); Santomero (2001); Murphy *et al* (2004); Vittas (1997); Impavido *et al* (2000, 2003); Davis (2004); Harichandra *et al* (2004) etc.

Table 1. Financial Development and the GDP, 1976-2004

	Shares of Financial Resources to GDP (%)							% Change in ratio 1976/2004
	1976	1980	1985	1990	1995	2000	2004	
FS:	118.8	136.6	214.9	275.7	335.7	362.2	392.8	230.6
BS	84.6	99.5	152.6	192.9	231.8	241.8	265.9	214.3
NBFIs	34.2	37.1	62.3	82.8	103.9	120.4	126.9	271.1
MC	44.6	80.8	75.2	113.7	254.2	129.5	161.3	261.4
VT	3.6	10.5	8.0	25.5	80.4	71.1	48.2	1238.9
GDP in billions (RM)	***28.1***	***53.3***	***77.5***	***115.8***	***222.5***	***343.2***	***447.5***	**1492.5**

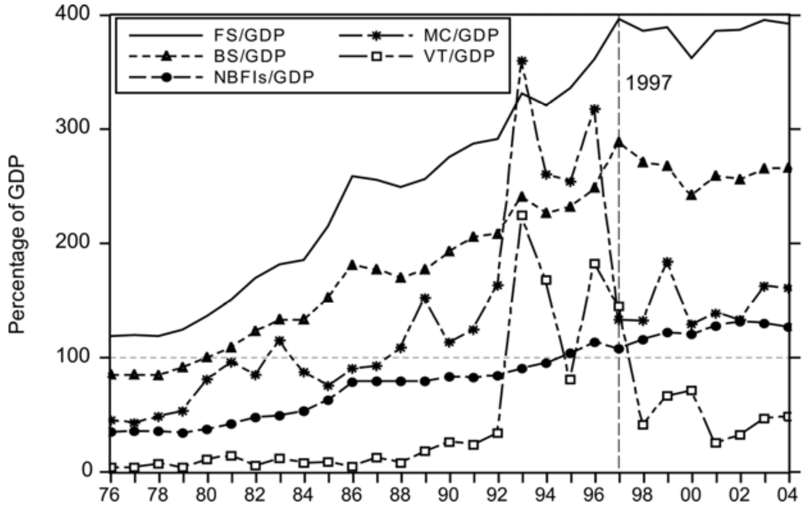
context of developed economies and concentrated disproportionately on the contractual savings (pension and insurance funds) or only on the pension funds. This is despite the fact that in many rapidly growing economies the NBFIs in various forms have also increasingly become an important component of the financial sector.

Malaysia is one of the rapidly growing economies where the financial landscape has been observed reshaping faster in concomitant with economic progress over the past three decades. Along with banking sector and stock market development, the NBFIs as a group have also been gaining significant expansion over time. The NBFIs have achieved a considerable level of development in the financial system and have rapidly expanded in relation to the size of the Malaysian economy. The NBFIs are playing important role as an alternative source of long term financing particularly through mobilizing the resources from the surplus units and channelling them to the productive investment activities in the economy. In short, the financial system[3] of Malaysia today is relatively more matured, sophisticated, broader and better structured which is (on its all fronts) playing crucial role in accelerating the healthy growth of Malaysian economy. *Table 1* provides some statistical data which will provide a quick overview of the financial system development in Malaysia over the study period.

Data in table 1 shows that in 1976, the ratio of the financial sector's total resources was 118.8 percent of GDP and by 2004 this ratio increased to 392.8 percent of GDP. Within the financial sector, banking sectors' resources accounted for 84.6 percent of GDP in 1976 which increased to 265.9 percent as at the end of 2004. The corresponding shares of the NBFIs resources were 34.2 percent and 126.9 percent respectively. Similarly, the capital markets[4], which represented a relatively small sub-sector of the Malaysian financial system particularly in the early stages of economic development in the early 1970s, also experienced significant expansion over time. In

[3] Structurally, the financial system of Malaysia is comprised of two namely: financial institutions and financial markets. The financial institutions are further subdivided into two-Banking institutions and Non-banking financial institutions. Financial markets on the other hand comprises of capital markets, bond markets, money & foreign exchange markets, derivative markets and offshore markets.

[4] Capital markets comprise of equity market and bond market. The equity market provides the avenue for corporations to mobilize funds by issuing stocks and shares, while the bond market provides the avenue for the private and public sectors to raise funds by issuing private debt securities and government securities respectively.



Keys: FS=Financial Sector; BS= Banking Sector; NBFIs =Non-Bank Financial Institutions; MC=Market Capitalization; VT = Value of Traded Shares.
Sources: Bank Negara Malaysia (BNM) *Annual Reports*, 1976 - 2004. Data for MC, *Investors Diges*t, KLSE, various issues and also BNM *Annual Reports*, 2000-2004

Figure 1. Share of Financial Sectors' Total Assets, Banking Institutions Assets and the NBFIs assets as a percentage of GDP, 1976-2004.

the capital market, however, the equity market is by far the more active component in Malaysia.

The Malaysian stock market (Now known as Kuala Lumpur Stock Exchange or KLSE) was established in 1973 with the aim of developing it into a well-structured and sophisticated financial system, and it indeed has undergone rapid development and transformation process over the years. Since its inception the KLSE has experienced rapid expansion and today, it is the largest in the Association of Southeast Asian Nations (ASEAN) region and the fifth largest in Asia in terms of market size (BNM, 1994: 390). Market capitalization[5], which amounted to RM 12.54 billion or 44.6 percent of GDP at the end of 1976, expanded steadily to reach RM 722.04 billion or 161.3 percent of GDP at the end of 2004. One important point to be noticed here is that although the ratio of NBFIs resources as a percentage of GDP is relatively smaller than the banks and the market capitalization, in terms of percentage change in ratio, the NBFIs record the highest change over the period 1976-2004 which is 271.1. This indicates that the NBFIs as a group are growing faster than the bank and the stock market capitalization in relation to the size of the economy.

In contrast with the increasing presence of NBFIs in the financial sector development and its growing participation in the Malaysian economy, to the best of our knowledge at this point no attention has been paid to its quantitative analysis especially with respect to its impact on economic growth in Malaysia. Even though, there are some empirical works available on finance-growth nexus in Malaysia (e.g., Ansari 2002; Hassanuddin, 1999; Luintel and Khan, 1999; Odedokun, 1996; Rousseau and Vuthipadadorn, 2005 etc.), the scope of these

[5] KLSE market capitalization data is available starting from 1976. Data for 1976, Investor *Digest*, KLSE, 1976 and data for 2004, BNM-*AR 2004*, p. 204

works are limited to the banks and stock market development. This study is thus a new to the dimension of finance-growth nexus aiming to integrate the NBFIs into the mainstream finance-growth literature and examine their potential effect on economic growth. In addition, this study also will help to identify the relative importance of the financial sector development in affecting economic growth particularly in Malaysia.

RESEARCH METHOD

Model Specification

We specify the generic regression equation in the following form:

$Y_t = f\ (PVC_t, FA_t, STOCK_{t,,m})$ …..(1)

where Y_t equals real per capita GDP, FA_t refers to the measure of NBFIs development indicator. *PVC* refers to the private credit extended to private sector by the banks. $STOCK_{t,m}$ (m = 1, 2) refers to the indicators (Market Capitalization, *MC* and Value of Traded Shares, *VT* respectively) of the stock market development. The subscript *t* represents the time period. All the independent variables in Eq.(1) are expressed as a ratio of GDP. Expressing the relation in linear form using the variables in natural log, we arrive at the following estimating equation:

$$LnY_t = \alpha_0 + \alpha_1 LnPVC_t + \alpha_2 LnFA_t + \alpha_3 LnSTOCK_{t,m} + u_t \quad (2)$$

Where:

Ln indicates natural log, *α's* are the parameters to be estimated and u_t is an error term.

LnY = Log [Per capita real GDP] [Adjusted by CPI, 2000=100 to obtain real values]

LnFA = Log [Total assets of NBFIs/GDP]

LnPVC = Log [Private credit extended by banks /GDP]

LnMC = Log [Market capitalization/GDP]

LnVT = Log [Value of traded shares/GDP]

We expect that the indicator of NBFIs development has positive impact on per capita real GDP. We also expect stock market development variables to be positive. The sign of the private credit variable can be positive or negative. The time series data with annual observation cover the period 1976-2004. The data are obtained from the *Annual Reports* of the Central Bank of Malaysia (BNM), published sources of the individual NBFIs, *International Financial Statistics* (IFS) and *Investor Digests*, KLSE various issues. The variables are transformed into logarithmic form in order to minimize the scale effect.

Estimation Techniques

ARDL Model Specification and Bounds Testing Procedure

There are several estimation techniques (e.g., Engle-Granger, 1987; Johansen, 1988, 1991 and Johansen-Juselius, 1990) available for investigating the long run cointegrating relationship among time series variables. However, due to some statistical limitations with the other two conventional approaches including unsuitability in dealing with smaller sample size, we prefer to employ ARDL bounds testing approach to cointegration developed by Pesaran *et al* (2001). The major advantages of the ARDL bounds testing approach are that it is suitable for small sample size and can be applied irrespective of whether the underlying variables are purely $I(0)$, $I(1)$, or mutually integrated[6]. The bounds testing procedure is the Ordinary Least Square (OLS) based autoregressive distributed lag (ARDL) approach to cointegration represented by the unrestricted error correction model (UECM). To begin with, we test for the null of no cointegration against the existence of a long run relationship. The error correction representation for equation (2) in the form of an unrestricted error correction model (UECM) is as follows:

$$\Delta LnY_t = \alpha_0 + \sum_{i=1}^{k}\alpha_{1i}\Delta LnY_{t-i} + \sum_{i=0}^{k}\alpha_{2i}\Delta LnPVC_{t-i} + \sum_{i=0}^{k}\alpha_{3i}\Delta LnFA_{t-i} + \sum_{i=0}^{k}\alpha_{4i}\Delta LnSTOCK_{t-i,m} + \alpha_5 LnY_{t-1} + \alpha_6 LnPVC_{t-1} + \alpha_7 LnFA_{t-1} + \alpha_8 LnSTOCK_{t-1,m} + \varepsilon_{1t} \quad \text{.....(3)}$$

Here Δ indicates first difference operator; k is the lag length. $\alpha_5 .... \alpha_8$ refers to long-run coefficients and α_0 is the drift. Other variables are defined as before. The first part of equations (3) with $\alpha_{1i} .... \alpha_{4i}$ represents the short run dynamics of the model, whereas the second part with α_i ($i=5....8$) represents the long run relationship. The null hypothesis of no cointegration among the variables in equation (3) is (H_0: $\alpha_5 = \alpha_6 = \alpha_7 = \alpha_8 = 0$) against the alternative hypothesis (H_1: $\alpha_5 \neq \alpha_6 \neq \alpha_7 \neq \alpha_8 \neq 0$). The hypotheses are tested based on the Wald or *F*-statistic. The *F*-test used in this procedure has a non-standard distribution. The calculated *F*-statistics are compared with two sets of critical values[7]: upper bound critical values and the lower bound critical values.

Accordingly, if the computed *F*-statistic falls below the lower bound critical value, the null hypothesis of 'no cointegration' can not be rejected but if the test statistic exceeds the upper bound critical value, the null hypothesis of 'no cointegration' is rejected implying that the underlying variables are cointegrated. In other word, there exists long run equilibrium relationship. However, if the computed *F*-statistic falls between these two value bounds the decision is inconclusive and thus to make any conclusive inference knowledge of the order of the integration of the underlying variables is required (Pesaran *et al*. 2001: 290). Akaike Information Criterion (AIC) is used to select the optimal lag length (k). Once the test confirms the existence of cointegration, we can move to the second stage to obtain the long run and the short run dynamics of the error correction estimates for the selected ARDL models. In the presence of long run relationship the associated ARDL error correction model of Eq.(3) can be constructed as follows:

$$\Delta LnY_t = \alpha_0 + \sum_{i=1}^{k}\alpha_{1}\Delta LnY_{t-i} + \sum_{i=0}^{k}\alpha_{2}\Delta LnPVC_{t-i} + \sum_{i=0}^{k}\alpha_{3}\Delta LnFA_{t-i} + \sum_{i=0}^{k}\alpha_{4}\Delta LnSTOCK_{t-i,m} + \psi ECT_{t-1} + \nu_t \quad \text{.....(4)}$$

Where Δ is the first difference operator, α_i's are the short-run dynamic coefficients of the

[6] Although ARDL bounds testing approach does not require unit root test, still it is required in order to ensure that the variables are not integrated of order more than $I(1)$ because the presence of $I(2)$ variables invalidate the use of computed *F*-statistic as the bounds test is based on the assumption that the underlying variables must be either $I(0)$ or $I(1)$ or mutually integrated. We conducted the unit root tests and found that all the underlying variables are mix of $I(1)$ and $I(0)$. The results are not reported here in order to save space but are available from the author upon request.

[7] Critical values differ based on sample size. In the original bounds testing procedure, Pesaran and Pesaran (1997) and Pesaran *et al* (2001) generated critical values based on 500 and 1000 sample observations respectively. Since our sample size is relatively small with only 29 annual observations, we employ critical values tabulated by Narayan (2005) are based on sample size of 30.

Table 2. *F*-statistics for Testing the Existence of Long Run Cointegrating Relationships Based on Equation (3)

Dependent variable	Order of lag (AIC)	*F*-statistics	*Lower Bound Value, I(0)*	*Upper Bound Value, I(1)*	*Critical Value Bounds*
F_y (Y/PVC, FA, MC)	1	7.4905*	5.333	7.063	1%
F_y (Y/PVC, FA, VT)	2	4.3032***	3.710	5.018	5%
			3.008	4.150	10%

Notes: The Critical Value Bounds are based on the number of regressors = 3 and N = 30. Critical values are cited from P.K. Narayan (2005) which is close to the sample size of 29 used in this study (**case III**: unrestricted intercept and no trend). In this regard, it is to be noted here that the original bounds *F*-statistic critical values reported in Pesaran *et al* (1997 & 2001) are based on 500 and 1000 observations respectively. * and *** refer to significance at 1 percent and 10 percent levels respectively.

model and ψ is the coefficient of the error correction term[8] that measures the speed of adjustment.

FINDINGS AND DISCUSSION

The cointegration results based on AIC lag selection criterion are presented in *Table 2.* We have set the maximum lag length to 2 and chosen the optimal lag as selected by the AIC. According to the computed *F*-statistics, for the first case (when MC is used as a stock market indicator) at a lag order of 1 and for the second case (when VT is used as a stock market indicator) at a lag order of 2 we reject the null hypothesis of 'no cointegration'. In other words, we find evidence of long run cointegrations in both cases at a lag order of 1 and 2 respectively.

The long run and short run coefficient estimates for the selected ARDL models along with *ECTs* are reported in *Table 3*.

First we look at the results in the column of *Panel A*. The long run coefficient estimates are all statistically significant. More importantly as expected, the long run coefficient of NBFIs denoted as *FA* is positive and statistically significant at 10 percent level implying that a 1 percent increase in the ratio of *FA* to GDP leads to over 1.3 percent increase in per capita real GDP. The long run coefficient of *MC* is also positive and statistically significant at 5 percent level as expected. The long run results thus imply that both NBFIs and the stock market development (in the form of *MC*) have beneficial impact on long run per capita real GDP in Malaysia. However, the coefficient of *PVC* variable appears to be significantly negative which may indicate the inefficiency of investment. This is in line with previous studies (e.g., Gregorio & Guidotti, 1995: 443). The results of the short run dynamic coefficients are also consistent with the long run coefficient estimates except the sign of *FA* which is negative in this case.

The coefficient of the error correction term (ECT_{t-1}) is -0.0856 and it is statistically significant at 5 percent level. Importantly, the *ECT* carries the expected negative sign. The speed of adjustment to the long run equilibrium after a shock is relatively slow. In other words, approximately 10 percent of the disequilibria are corrected in the current year. Over all, the regression results suggest that the underlying ARDL model fits the data reasonably well as the adjusted *R*-squared appears considerably

8 ECT is derived from the long run cointegrating relationship

Table 3. Long Run and Short Run Coefficient Estimates for the Selected ARDL Models Based on AIC

Panel A: Estimated coefficients using the ARDL (1,0,1,1) selected based on AIC			Panel B: Estimated coefficients using the ARDL (1,0,1,0) selected based on AIC		
Long run coefficients			**Long run coefficients**		
Dependent variable: *LnY*$_t$			**Dependent variable: *LnY*$_t$**		
Regressors	**Coefficients**	**T-ratio**	**Regressors**	**Coefficients**	**T-ratio**
$LnPVC_t$	-2.1816	1.721***	$LnPVC_t$	-1.3002	1.6936^
$LnFA_t$	1.3141	1.752***	$LnFA_t$	1.0400	1.8827***
$LnMC_t$	1.0313	2.079**	$LnVT_t$	0.2487	2.5630**
Constant	10.068	25.846*	Constant	10.3301	25.9216*
Short run coefficients with *ECT*			**Short run coefficients with *ECT***		
Dependent variable: *ΔLnY*$_t$			**Dependent variable: *ΔLnY*$_t$**		
Regressors	**Coefficients**	**T-ratio**	**Regressors**	**Coefficients**	**T-ratio**
$\Delta LnPVC_t$	-0.5929	2.8198*	$\Delta LnPVC_t$	-0.1541	2.3043**
$\Delta LnFA_t$	-0.1868	4.4097*	$\Delta LnFA_t$	-0.5153	3.6934*
$\Delta LnMC_t$	0.0459	2.1928**	$\Delta LnVT_t$	0.0294	3.6459*
Constant	0.8621	2.2720**	Constant	1.2243	2.7128**
$ECT_{(t-1)}$	-0.0856	2.1031**	$ECT_{(t-1)}$	-0.1185	2.4696**
R-Squared		0.83664	*R*-Squared		0.7873
R-Squared Adjusted		0.78763	*R*-Squared Adjusted		0.7367
F-statistic		25.6063 [0.000]	*F*-statistic		19.4374 [0.000]
DW-statistic		2.3891	*DW*-statistic		2.1217
Diagnostic test statistics:			**Diagnostic test statistics:**		
Serial Correlation CHSQ (1)		= 1.0165 [0.313]	Serial Correlation CHSQ (1)		= 0.2750 [0.600]
Functional Form CHSQ (1)		= 0.6887 [0.407]	Functional Form CHSQ (1)		= 1.1203 [0.290]
Normality CHSQ (2)		= 1.2424 [0.537]	Normality CHSQ (2)		= 0.0909 [0.956]
Heteroscedasticity CHSQ (1)		= 1.0838 [0.298]	Heteroscedasticity CHSQ (1)		= 4.2334 [0.040]

Notes: *, ** and *** denote significance level at 1 percent, 5 percent and 10 percent levels respectively. ^refers to significance level at 10.3 percent.

high (0.79), the *F*-statistic which measures the joint significance of all the regressors in the model is highly significant and the model also passes through a battery of diagnostic tests such as serial correlation, functional form, normality and heteroscedasticity.

Now looking at the results in the column of *Panel B* where we used value of traded shares (VT) as an alternative indicator of stock market development instead of MC, we observe that the results are more or less consistent with the results presented in the column of *Panel A*. In particular, here the coefficients of NBFIs and the stock market development indicator (VT) are also positive and statistically significant at 10 percent and 5 percent levels respectively. The coefficient of the error correction term has the correct negative sign and is significant at 5 percent level confirming the existence of a stable long run cointegrating relationship between variables. The results thus reinforce the findings of *Panel A* that both NBFIs and the stock market development (MC or VT) are important factors in enhancing per capita real GDP in the long run in Malaysia. The relatively high value of adjusted *R*-squared, the highly significant *F*-statistic and the diagnostic tests all

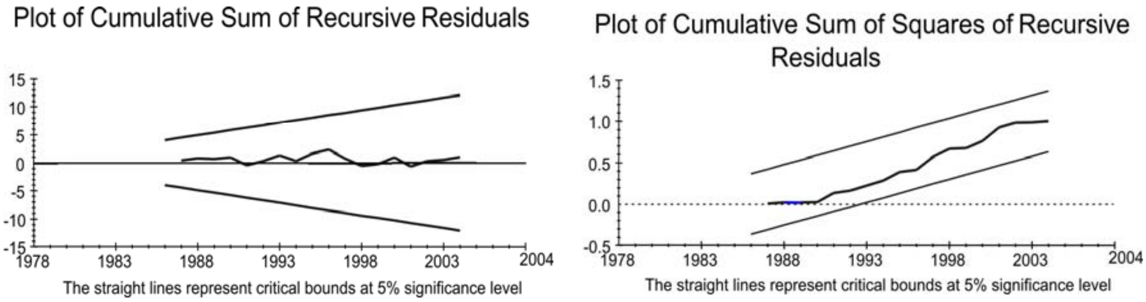


Figure 2. CUSUM & CUSUMSQ Plots for Stability Tests (for model with *MC*)

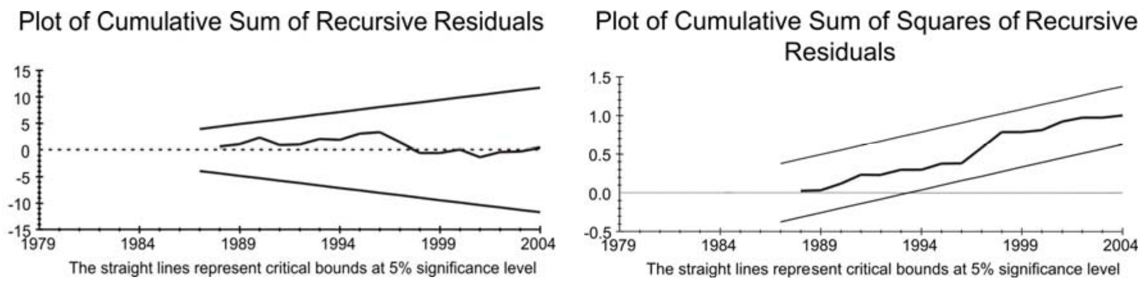


Figure 3. CUSUM & CUSUMSQ Plots for Stability Tests (for model with *VT*)

suggests that overall the goodness of fit of the model is satisfactory. Overall, from the estimation results we arrive at the key conclusions that-

1. the per capita real GDP in Malaysia is cointegrated with all the selected financial variables.
2. both NBFIs and the stock market development indicators are positive and significant indicating that they act as driving forces behind per capita real GDP in Malaysia in the long run. However, private credit variable (PVC) seems to be statistically significant at 10 percent and 10.3 percent levels respectively but with negative sign suggesting that the role of PVC as a financial factor in influencing long run output is weak when entered with other financial factors (NBFIs and STOCK).

Parameter Stability Tests

We examine the stability of the long run coefficients together with the short run dynamics for the AIC based error correction models by applying the CUSUM and CUSUMSQ stability tests as suggested by Pesaran and Pesaran (1997). The tests are presented by means of graphs as shown in *Figure 2* and *Figure 3*.

It can be seen from *Figure 2* and *Figure 3* that the plots of CUSUM and CUSUMSQ statistics stay well within the critical bounds of 5 percent significance level implying the absence of any significant structural instability in the parameters for both models.

CONCLUSION

In this paper, we examined the long-run relationship between per capita real GDP and the financial development (comprises of NBFIs, banks and stock market development) in Malaysia using the ARDL bounds testing approach to cointegration over the period 1976-2004. The test revealed that there is a stable long run relationship between per capita real GDP and its regressors (NBFIs, banks and stock market development indicators). The existence of a stable long run relationship is further confirmed by the negative and significant coefficients of the error correction terms (*ECT*). We also utilized the CUSUM and CUSUM of squares stability test. The test confirms no evidence of any significant structural instability of the long run coefficients of the output function. The estimation results suggest that both NBFIs and the stock market development indicators are the significant financial factors that do matter for explaining the variations in the long run per capita real GDP in Malaysia. The most striking finding is that the NBFIs have a positive and significant impact on long run per capita real GDP in Malaysia.

The empirical evidence suggests that the financial development indicators particularly the NBFIs and the stock market are in part responsible for future change in the per capita real GDP in Malaysia in which the stock market is viewed as a leading sector followed by the NBFIs. In other words, the results indicate that both the NBFIs and the stock market are the important financial sectors through which the financial resources are effectively channelled from savers to the users in the economy. As such it is important that besides taking steps to develop a vibrant stock market (such as through the liberalized investment and openness policies), the authorities also should thoroughly examine the mechanisms through which the NBFIs most effectively deliver financial services to promote long run economic growth. This can help the concerned authorities to formulate prudent policies for its further development and hence achieving a long run sustainable economic growth in Malaysia. The development of NBFIs can be an important locomotive for promoting economic growth particularly through providing long term financing to the productive investment activities where the financing activities of the conventional banking system are mostly limited. Furthermore, the development of NBFIs can also promote the development of small and medium-sized industries which have limited opportunities to meet their financial needs from entering the stock market and also from the commercial banking system. By doing so, the NBFIs can create employment opportunities and hence can play important role in alleviating poverty through raising income of the people.

In fact, the NBFIs as a group in Malaysia is relatively well-developed and they are playing growing role in the Malaysian economy which is obvious from the size of their total resources as a percentage of GDP (*Table 1*) and perhaps their potential role in influencing economic performance is substantiated by the findings of this empirical work (*Table 3*). The empirical findings with respect to Malaysian case can also be applicable for other countries of similar interest. As such while considering the financial development (particularly banks and stock market) as an important vehicle for fostering economic growth, the policymakers can also promote the NBFIs as an integrated part of the overall financial system. Together they can exert a greater long run and sustainable impact on the economic performance of the country.

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