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The Relevance of Financial Development for Economic Growth: A Bounds Test Approach

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ABSTRAK

Tujuan kajian ini ialah untuk menentukan sama ada perkembangan kewangan adalah relevan untuk pertumbuhan ekonomi negara Malaysia bagi tempoh masa 1955 hingga 1997. Menggunakan "bounds test" yang dicadangkan oleh Pesaran *et al.* (1996), keputusan kajian daripada spesifikasi "linear" dan "log-linear" mencadangkan bahawa data tidak menyokong kewujudan hubungan jangka panjang di antara perkembangan kewangan dan pertumbuhan ekonomi bagi tempoh masa kajian.

ABSTRACT

The purpose of the study is to determine whether financial development is relevant for economic growth in Malaysia for the period 1955 to 1997. Using a bounds test proposed by Pesaran *et al.* (1996), our results suggest that using both linear and log-linear specifications, the data do not support the existence of long-run relationships between financial development and economic growth during the period under study.

INTRODUCTION

It has long been recognized that financial markets play a central role in economic development. Cameron-McKinnon-Shaw proposition has provided a recipe for developing countries to achieve fast economic growth by liberalizing the financial sector to interact with market forces. McKinnon (1973) argues that pervasive government intervention and involvement in the financial system through the regulatory and supervisory network, particularly in controlling interest rates and the allocation of credit, tends to distort financial markets. Recent study by Fry (1998) supported Cameron-McKinnon-Shaw contention where Fry found out that less financial distortion has contributed to the fast economic growth in the Asian region.

Currently in recent literature development, there are four strands surrounding the debate on financial development and economic growth. The first strand argues that the liberalization of the financial market can lead to further development in the financial sector and consequently support the economic growth. The conducive financial environment leads to the creation and the promotion of modern and sophisticated financial structure and system so that it can meet the demand for financial services by the real sector can be matched. The proponents of the Cameron-McKinnon-Shaw have denoted this relationship as the supply leading or financial-led hypothesis.

However, the second strand disagrees on the role of financial sector as engine for economic growth. For example, Patrick (1966) and Ireland (1994) argue that instead financial sector the development of the financial markets is a result of economic growth.

The third strand however, argues that there is a possibility that economic growth and financial development grow hand in hand over time, the so-called bi-directional relationships. Finally, the fourth possible relationship between financial market and economic growth is that financial development is irrelevant for economic growth. For example, Lucas (1988) has pointed out that financial sector play a minor role in the progress of economic growth. Lucas contention is supported through an empirical study conducted by Dornbusch and Reynoso (1989). Dornbusch and Reynoso conclude that the evidence of financial factors playing an important role in economic development is an episodic and vast exaggeration.

The purpose of this study is two-fold. The first is to determine the nature of the relationship between financial development and economic growth in Malaysia using post-independence annual data from 1955-1997. For the last forty years, financial liberalization has been extensive and one of the prominent features of it is the liberalization of interest rates. Malaysia's Central Bank introduced a new interest rate scheme for commercial banks in October 1978. According to which commercial banks were freed to set interest rates on deposits and lending rates. However, since November 1983, all interest rates on loans and advances have been tied to the base lending rates of the two largest commercial banks. In fact the deposit rates of the finance companies, as well, became linked to the deposit rates of the two leading domestic banks (namely, Malayan Banking Berhad and Bank Bumiputra Malaysia Berhad) as of October 1985. In February 1987, all deposits rates at financial institutions were fully liberalized, although it was only in February 1991 that interest rates on loans became freed from the administrative control of the Central Bank. Apart from this, financial deregulation has promoted the development of modern and sophisticated money, foreign exchange and capital and futures market in Malaysia. The availability of various types of financial instruments will of course help in accelerating the growth of the economy.

Second, in this study we employ a recent technique proposed by Pesaran *et al.* (1996) to test for cointegration among I(1) or I(0) or fractional integrated variables.

METHODOLOGY

Review of Related Literature

Goldsmith (1969), McKinnon (1973), Shaw (1973), Fry (1988) and more recently King and Levine (1993) are among others who have provided evidence that financial development is a prerequisite for economic growth. Nevertheless, other researchers are skeptical with respect to the financial-led growth hypothesis. Dornbusch and Reynoso (1989) have questioned the conclusions of previous influential studies and have argued that the evidence in support of the financial-led growth paradigm is "episodic" and a "vast exaggeration". We believe that there are at least three reasons why the financial-led growth hypothesis is rejected in more recent studies. First, the conclusions reached by previous influential studies are subject to what Granger and Newbold (1977) dubbed as "spurious regression results". Traditionally, it has became general practice to regress one integrated series against another integrated series. However, Granger and Newbold have warned against using integrated series as it will invalidate the statistical tests on which hypotheses are commonly tested, and frequently leads to the acceptance of a spurious regression. Recently, Engle and Granger (1987) have introduced the cointegration methodology to avoid spurious regression problems. The cointegration approach provides a way in which the long-run information of the integrated series in level is conserved into equations that comprise stationary components (called the error-correction model) that give valid statistical inferences.

Secondly, as noted by Fry (1996 p. 1), "whatever positive effects of financial liberalisation were detected in the 1970s appeared to have become smaller over time". Several factors could contribute to the diminishing effect of financial liberalisation on economic growth. For example, it may be that other forms of financial repression exist in the economy, or that there are financial distortions in the form of high real interest rates and black market exchange rates.

Third, there may also be a "crowding-out effect" from other macroeconomic policies (The World Bank 1989; Fry 1996).

Since the work by Engle and Granger (1987), the method of cointegration has been a popular approach used in testing economic hypotheses; among others are the financial-led hypothesis, export-led hypothesis, law of one price, purchasing power parity, capital mobility, Wagner's law and so on. However, testing for the financial-led hypothesis using the cointegration approach is of recent application. Demetriades and Hussein (1996), Luintel and Khan (1999), Darrat (1999), Habibullah (1999), Lyons and Murinde (1994), Murinde and Eng (1994) and Thornton (1994, 1996) are among the few studies that have tested the financial-led hypothesis on several Asian countries.

Until now, however, there are only four studies that have incorporated Malaysia in their analysis. For example, using annual data for the period 1955 to 1990, Thornton (1994) found out that both ratios of broad money to nominal GDP and bank deposits to nominal GDP as

proxies for financial deepening, and real GDP as measure of real output are I(0). With two measures of financial development, Thornton arrived at two different inferences about the relationship between economic growth and financial deepening. Using ratio of broad money to nominal GDP, the causality runs from growth to financial deepening, but using bank deposits to nominal GDP, the causality is bi-directional. Using bank deposits to nominal GDP for the period 1956 to 1994, Luintel and Khan (1999) found that the financial depth variable and level of output (real GDP per capita) in Malaysia are I(1) process. This makes the cointegration analysis possible. Using a multivariate autoregression framework, Luintel and Khan found a two-way causal relationship between financial development and economic growth. On the other hand, using quarterly data for the period 1981:1 to 1994:4, Habibullah (1999) found that two measures of financial development – traditional broad money M2 to nominal GNP and divisia broad money M2 to nominal GNP, and economic growth proxy by real GNP are stationary in levels. Granger causality test results suggest that economic growth precedes financial deepening in Malaysia during the period under study.

Method of Estimation

Our task is to determine the causal direction between the two variables in question. Does financial development leads economic growth, or economic growth lead financial development, or two-way relationship exists between the two variables or financial development is irrelevant for economic growth?

In recent years, it has been the standard practice that before proceeding to estimation, the time series properties of the variables involved in the analysis has to be tested for their order of integration. After determining that the series are of the same order of integration, cointegration analysis is made possible. However, it has been pointed that the various integration test has low power and different approach of testing for integration can lead to different results (Bahmani-Oskooee 1998). This will impair the testing for cointegration when some of the variables are stationary and some are non-stationary in their levels. However, more recently, Pesaran *et al.* (1996) and Pesaran and Pesaran (1997) have proposed a robust testing technique of testing for cointegration. The technique known as the Autoregressive Distributed Lag (ARDL) approach, has the advantage of testing for the existence of a long-run relationship irrespective of whether the underlying regressors are I(1) or I(0) or fractionally integrated process or mutually cointegrated. Using this approach, the pre-testing for the order of integration is not needed.

The unrestricted error-correction version of the ARDL model regression of y on x and time trend t, is as follows:

$$\Delta y_t = \alpha_0 + \alpha_1 t + \phi y_{t-1} + \delta x_{t-1} + \sum_{i=1}^{p-1} \varphi_i \Delta y_{t-i} + \sum_{i=0}^{q-1} \gamma_i \Delta x_{t-i} + \varepsilon_t \qquad (1.0)$$

The ARDL procedures involve two steps. First, the null of no cointegration defined by H_0: $\phi=\delta=0$ is tested against the alternative of H_1: $\phi\neq\delta\neq0$ by means of F-statistics. However, the asymptotic distribution of the F-statistic is non-standard irrespective of whether the variables are I(1) or I(0). Pesaran and Pesaran (1997) have tabulated two sets of appropriate critical value bounds – the upper and the lower bounds. One set assumes all variables are I(1) and another assumes that they are all I(0). This provides a band covering possible classifications of the variables into I(1) and I(0) or even fractionally integrated. If the computed *F*-statistics falls outside the critical value bounds, a conclusive decision may be drawn without having to know the order of integration or cointegration rank of the underlying variables. If the *F*-statistics falls inside those bounds, inference would be inconclusive and one would need to know the order of the integration of the underlying variables to proceed further. With respect to cointegration between variables, if the computed *F*-statistics lies above the upper level of the band, the null hypothesis of non-cointegration is rejected, indicating cointegration. If the computed *F*-statistics lies below the lower level of the band, the null of non-cointegration cannot be rejected, thus supporting lack of cointegration. To determine the effect of y on x, the following regression is then tested,

$$\Delta x_t = \beta_0 + \beta_1 t + \theta y_{t-1} + \lambda x_{t-1} + \sum_{i=1}^{p-1} \pi_i \Delta y_{t-i} + \sum_{i=0}^{q-1} \varphi_i \Delta x_{t-i} + \eta_t \qquad (2.0)$$

The *F*-statistics is then computed to determine whether the x and y is cointegrated. There are four possible outcomes that we can infer from the results from estimating equations (1.0) and (2.0). First, if non–cointegration can be rejected in equation (1.0) but not in equation (2.0), then x is said to have long-run causal for y. Second, if noncointegration can be rejected in equation (2.0) but not in equation (1.0), then y is said to have long-run causal for x. Third, if non-cointegration can be rejected in both equations (1.0) and (2.0), then y and x is said to have two-way causal effect. Finally, if non-cointegration cannot be rejected in both equations (1.0) and (2.0), then y and x is said to be independent of each other in the long-run.

Sources of Data

In this study we used annual data from the period 1955 to 1997. We defined financial development indicator (FD) as a ratio of bank deposits to nominal GDP (that is, broad money M2 excluding currency in circulation) and real output (EG) as real GDP (1990=100). Both data series were compiled from various issues of the International Financial Statistics Yearbook published by the International Monetary Fund.

The Empirical Results

In this study, in order to see the robustness of the results with respect to trend, in the analysis we estimate both equations (1.0) and (2.0) with and without linear time trend. Also, we consider the possibility of a simple non-linear long-run relationship between economic growth (EG) and financial development (FD) by examining the error-correction model in the logarithms of EG and FD. Further, since the choice of the orders of the included lagged differenced variables in the unrestricted error-correction model specification have a significant effect on the test results we estimate model in equations (1.0) and (2.2) of order p=q=1,2,...6.

In estimating equation (1.0), the F-statistics for testing the null hypothesis that the coefficient of EG_{t-1} and FD_{t-1}, ϕ_{EG} and δ_{FD}, are jointly zero, denoted by F(EG|FD) are given in Table 2.1 for the case of linear long-run relationship. The 95 percent lower and upper critical values of the *F*-statistic are given in Table F in Pesaran and Pesaran (1997). For models without linear time trends (Case II) they are (4.934, 5.764) whereas for models with linear time trends (Case III) they are (6.606, 7.423). The *F*-statistics reported in Table 1.0 for regression without and with linear time trend, did not exceed the 95 percent upper critical value bound in all cases except for p=q=1. Hence, we cannot reject the null hypothesis that there is no long-run relationship between the levels of EG and FD. On the other hand, for the log-linear models, our results suggest that the *F*-statistics calculated for the

TABLE 1.0
Test results for the existence of the long-run relationship between financial development (FD) and economic growth (EG)

	Linear model:		Log-linear model:	
p,q	No trend	With trend	No trend	With trend
A. *F*(EG|FD)				
1,1	9.15*	22.26*	1.63	1.93
2,2	1.79	5.50	1.38	1.36
3,3	1.40	5.80	1.49	0.76
4,4	0.88	3.55	1.32	0.43
5,5	0.79	3.43	1.76	1.37
6,6	0.43	3.51	1.72	0.94
B. F(FD(EG)				
1,1	3.42	2.25	5.11	8.53*
2,2	2.62	1.43	2.39	3.23
3,3	2.79	1.53	1.53	2.56
4,4	3.62	1.89	1.21	1.99
5,5	3.72	1.72	1.02	3.04
6,6	3.90	2.14	0.80	2.63

Notes: Critical values at 5 percent level are 4.934 and 5.764 for no linear trend, and 6.606 and 7.423 for linear trend in the model. Asterisk (*) denotes statistically significant at the 5% level.

logarithmic specifications give similar results, in that the null hypothesis of non-cointegration cannot be rejected (except one). Therefore, the test results in Table 1.0 taken together strongly suggest non-existence of a long-run relationship between economic growth and financial development in Malaysia for the period under study.

Having established that there is no long-run relationship between economic growth and financial development (in other words, they are independent in the long-run), we test for the existence of a short-run causal relationship using the traditional Granger (1969) causality testing procedure. Using truncation lags from 1 to 6, the results for both variables in linear and logarithmic specification for testing the short-run relationship are reported in Table 2.0. In the table, we report the results for both series stationary in levels (I(0)) and stationary in first-difference (I(1)). The results clearly indicate that in the short-run, when variables are specify linearly, irrespective whether they are I(0) in levels or I(1) in levels, causality runs from economic growth to financial development. Whereas when the variables are specified in log-linear form, financial development and economic growth are independent of each other.

CONCLUSION

In this study we have investigated the long-run and short-run relationship between financial development and economic growth in Malaysia. The annual data from 1955 to 1997 provide us with more than forty observations to test for the existence of a long-run relationship between the two variables. It is interesting to note that the second half of the data covers the deregulation era of the late 1970s until early 1990s. It is expected that the relationship between financial

TABLE 2.0
Test results of Granger causality between financial development and economic growth

	Financial development does not Granger cause economic growth:		Economic growth does not Granger cause financial development:	
Truncation lags	Levels I(0)	Levels I(1)	Levels I(0)	Levels I(1)
A. Linear model				
1,1	0.88	3.89	12.82	4.81
	[0.35]	[0.06]	[0.00]*	[0.03]*
2,2	0.63	2.82	10.65	13.81
	[0.53]	[0.07]	[0.00]*	[0.00]*
3,3	0.38	1.27	7.54	8.60
	[0.76]	[0.29]	[0.00]*	[0.00]*
4,4	0.49	0.98	5.47	7.80
	[0.73]	[0.42]	[0.00]*	[0.00]*
5,5	0.83	0.64	4.97	6.82
	[0.53]	[0.66]	[0.00]*	[0.00]*
6,6	0.92	0.50	4.32	4.87
	[0.49]	[0.79]	[0.00]*	[0.00]*
B. Log-linear model				
1,1	1.59	1.86	11.41	0.01
	[0.21]	[0.18]	[0.00]*	[0.89]
2,2	2.87	1.01	6.71	0.00
	[0.07]	[0.37]	[0.00]*	[0.99]
3,3	1.70	1.55	2.72	0.01
	[0.18]	[0.21]	[0.06]	[0.99]
4,4	1.93	1.12	2.00	1.06
	[0.12]	[0.35]	[0.11]	[0.39]
5,5	1.49	1.14	1.73	0.76
	[0.21]	[0.35]	[0.15]	[0.58]
6,6	0.98	0.77	1.00	0.54
	[0.45]	[0.59]	[0.44]	[0.77]

Notes: Asterisk (*) denotes statistically significant at the 5% level.

development and economic growth during this period would be stronger and significant.

In general, our results suggest that using both linear and log-linear specifications, the data does not support the existence of a long-run relationships between financial development and economic growth during the period under study. This implies that in the long-run, the growth of financial sector is irrelevant for the growth of the Malaysian economy. However, in the short-run, our Granger causality test results show that there is a unidirectional causality that runs from economic growth to financial development when using the linear specification. For the log-linear specification, the financial sector development and economic growth is independent in the short-run.

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