LOWY INSTITUTE
FOR INTERNATIONAL POLICY

WORKING PAPERS IN
INTERNATIONAL ECONOMICS
MAY 2005 • NO. 3.05

Financial Liberalization, Financial Sector Development and Growth: Evidence from Malaysia

James B Ang and
Warwick J McKibbin

INTERNATIONAL ECONOMY PROGRAM

The Lowy Institute for International Policy is an independent international policy think tank based in Sydney, Australia. Its mandate ranges across all the dimensions of international policy debate in Australia - economic, political and strategic – and it is not limited to a particular geographic region. Its two core tasks are to:

- produce distinctive research and fresh policy options for Australia's international policy and to contribute to the wider international debate.

- promote discussion of Australia's role in the world by providing an accessible and high quality forum for discussion of Australian international relations through debates, seminars, lectures, dialogues and conferences.

Financial Liberalization, Financial Sector Development and Growth: Evidence from Malaysia

James B. Ang [a]

The Australian National University, Canberra

and

Warwick J. McKibbin [b]

The Centre for Applied Macroeconomic Analysis
Australian National University, Canberra;
The Lowy Institute for International Policy, Sydney;
The Brookings Institution, Washington

31st May 2005

Abstract

The objective of this paper is to examine whether financial development leads to economic growth or vice versa in the small open economy of Malaysia. We argue that the results obtained from cross-sectional studies are not able to address this issue satisfactorily and highlight the importance of country specific studies. Using time series data from 1960 to 2001, we conduct cointegration and various causality tests to assess the finance-growth link by taking saving, investment, trade and real interest rate into account. Contrary to the conventional findings, our results support the view that output growth causes financial depth in the long-run.

Keywords:
Financial Development, Economic Growth, Causality, Multivariate Cointegration

JEL Classification: E44, O11, O16, O53

[a] Division of Economics, Research School of Pacific & Asian Studies, The Australian National University, ACT 0200, Australia. *E-mail*: james.ang@anu.edu.au

[b] Corresponding author. Division of Economics, Research School of Pacific & Asian Studies, The Australian National University, ACT 0200, Australia. *Tel*: 61-2-61250301, *Fax*: 61-2-61253700, *Email*: warwick.mckibbin@anu.edu.au

Acknowledgements:
The authors would like to thank Prema-Chandra Athukorala, David Vines and Adrian Pagan for their helpful comments and suggestions. The usual disclaimer applies.

1. Introduction

Economists hold different perspectives on the theoretical link between financial development and economic growth. Schumpeter (1911) contends that the services provided by financial intermediaries are essential drivers for innovation and growth. Well-developed financial systems channel financial resources to the most productive use. The alternative explanation initiated by Robinson (1952) argues that finance does not exert a causal impact on growth. Instead, financial development follows economic growth as a result of higher demand for financial services. When an economy grows, more financial institutions, financial products and services emerge in the markets in response to higher demand of financial services.

The literature in this area of study is generally more supportive of the argument put forward by Schumpeter (1911). This line of argument was later formalized by McKinnon (1973) and Shaw (1973), and popularized by their followers Fry (1988) and Pagano (1993). The McKinnon-Shaw school of thought proposes that government restrictions on the operation of the financial system such as interest rate ceiling, direct credit programs and high reserve requirements may hinder financial deepening. This may in turn affect the quality and quantity of investments and hence has a significant negative impact on economic growth. Therefore, the McKinnon-Shaw financial repression paradigm implies that a poorly functioning financial system may retard economic growth. The endogenous growth literature is in line with this argument that financial development has a positive impact on the steady state growth (see Bencivenga and Smith, 1991; Bencivenga et al., 1995, and Greenwood and Jovanovic, 1990 among others).

However, not all researchers are convinced about the importance of financial system in the growth process. Lucas (1988) argues that economists tend to over-emphasize the role

of financial factors in the process of growth. Development of the financial markets may well turn out to be an impediment to economic growth when it induces volatility and discourage risk-averse investors from investing (Singh, 1997). Besides, it is also important to note that the introduction of certain financial tools that allows individuals to hedge against risks may lead to a reduction in the precautionary saving and hence lowers economic growth (Mauro, 1995).

Empirical investigations on the link between finance and growth are mostly cross-sectional in nature. Most of these studies take the McKinnon-Shaw view for granted and yet they do not attempt to disentangle the dynamic relationship between finance and growth. On *a priori* grounds, there are different ways in which finance and growth can be related. Therefore, the theoretical underpinnings proposed above should not be taken for granted and their validity should be examined empirically. While these studies have made significant contributions to the literature and spurred much research, the issue of causality cannot be satisfactorily addressed in a simple cross-sectional framework. The findings of cross sectional studies provide a useful guide on the finance-growth relationship but the results cannot be generalized since such causal link is largely determined by the nature and operation of the financial institutions and policies pursued in each country. As Solow (2001) proposed, a group of economies may share some common features but each has its own distinctive characteristics. Explaining the evolution of the economic behavior observed over time requires an economic model that is dynamic in nature. In particular, it is important to carry out country specific studies in order to relate the findings to policy designs within specific cases.

This paper examines the roles of saving, investment, trade openness and real interest rate in determining the finance-growth nexus in the small, developing economy of Malaysia for the period 1960-2001. Malaysia is a very interesting case study for this subject for two

reasons. First, Malaysia has a rich history of financial sector reforms[1]. A series of financial restructuring programs that aimed at improving the financial system had been launched since the 1970s. Immediately after the Asian financial crisis hit the country in 1997-98, a series of macroeconomic policy responses such as capital controls and reflationary policy has taken place. This was followed by restructuring in the corporate and banking sectors. However, there is little empirical evidence providing the policy makers the necessary information about whether these financial sector reforms have any impact on the real sector. Second, the database for Malaysia is considered relatively good by developing country standards. The use of annual data covering the period 1960-2001 is sufficiently long to allow for a meaningful time series investigation. These therefore address the concerns raised about the lack of time series-based individual country study (Athukorala and Sen, 2002, p. 2).

In this paper, we attempt to address the difficult problem of measuring the depth of financial development by using principal component analysis to create a proxy that represents the overall development in the financial sector. We use four trivariate vector autoregressive (VAR) models for the estimation purpose. Each model consists of per capita real GDP, financial depth proxy and a conditioning variable (saving, investment, real interest rate or trade openness). Using the recently developed time series techniques and by properly controlling for the various macroeconomic shocks experienced by Malaysia, our results show that although financial sector reforms have enlarged the financial system, these policy changes do not appear to have led to higher long-run growth. Instead, output growth exerts a positive casual effect on financial depth in the long-run. There is no short-run causality observed across all the models examined.

[1] See Yusof et al. (1994) for a detailed description of the financial sector reforms history in Malaysia.

This paper is organized as follows. Section 2 provides an overview of the macroeconomic conditions, financial sector policy and the financial system in Malaysia. Section 3 discusses the analytical framework of how financial development and economic growth can be related. Model, data and econometric methodology are described in Section 4. The estimated results are presented and analyzed in Section 5. Finally, we discuss the policy implications of the results and conclude in the last section.

2. Economic Development and Financial System in Malaysia

2.1 A Brief History of the Malaysian Economic Development

Malaysia achieved independence in 1957. During the past few decades, the Malaysian government has implemented a number of development plans, including the New Economic Policy, the National Development Policy and more recently the Third Outline Perspective Plan. With the appropriate policies adopted and the effective implementation of these development plans, Malaysia has successfully shifted the structure of its economy from agriculture and mining to manufacturing. Various liberalization measures were introduced along the way to raise international competitiveness and productivity. Huge savings and export growth, coupled with political stability, ethnic harmony and proper liberalization in the financial system and trade regime, raised the status of Malaysia to the middle-income level in the 1980s. Manufacturing exports and foreign direct investments continued to stimulate growth in Malaysia during the 1990s where real per capita income grew at about 8% per year prior to the crisis in 1997-98. Unemployment rate, prices and the exchange rate were well-managed and remained stable. However, financial system fragility, real exchange rate appreciation and inadequate international

reserves to match the massive increase in the stock of mobile capital made Malaysia vulnerable to the Asian financial crisis in 1997-98 (Athukorala, 2001, pp. 44-56). Malaysia rebounded from the crisis in 1999-2000 within a rather short period of time. This rebound coincided with the adoption of a series of policies, including pegging the exchange rate to the U.S. dollar, selective capital controls, and an expansionary fiscal policy. It is an open debate which of these policies contributed to the rebound.

2.2 Financial Sector Policy

It is widely recognized that financial liberalization is an integral part of financial sector development. As such, policies on trade liberalization, interest rate deregulation, capital account opening may have important implications on financial development and hence economic growth. Financial liberalization may induce financial fragility or deepen the financial system but its long term benefits on the economy are ambiguous, from both empirical and theoretical perspectives. Malaysia followed a gradual approach in its financial sector reforms started in 1970's by carefully and completely liberalizing interest rates. The market-determined interest rate mechanism was abolished in 1985 to mitigate the world economic recession impacts on Malaysia; but it was later reintroduced in 1991 (Williamson and Mahar, 1998). The liberalization policies adopted by the Malaysian government seem to have worked well at early stage of development in which financial deepening is clearly observed. However, it is probable that these policies left Malaysia in a more vulnerable position when it was hit by the Asian financial crisis in 1997-98.

In the aftermath of the recent Asian financial crisis, there are signs that the Malaysian authorities are making efforts to improve banking management. Malaysia has adopted an absorption rather than closure strategy in its banking restructuring program which aims to merge the domestic banks and finance companies into a small number of

groups. This provides a platform towards a stronger, more efficient and internationally competitive banking industry. With the rapid growth of Islamic funds and increased interests in Islamic financial products, there is a strong case to build an international Islamic financial centre to attract more funds, especially from the Middle East, to enlarge the financial system. The Islamic financial system has gradually evolved to form an important component of the Malaysian financial system.

2.3 Bank-based or Market-based?

There has been considerable debate in the literature on the relative merits of bank-dominated financial systems (German-Japanese model) and capital market-dominated financial systems (Anglo-Saxon model) in promoting growth (see Allen and Gale, 2000). Bank-based or market-based systems may have different impacts on economic growth. A bank-based financial system tends to promote long term economic growth as banks tend to offer longer term loans to the entrepreneurs[2]. In contrast, a market-based financial system is more likely to have short-term effects as firms are primarily concerned with their immediate performance. Given their diverse roles, it is possible for the financial intermediaries and financial markets to have a mutually reinforcing role in the overall development of the financial system.

One of the key features of the Malaysian financial system is the presence of a large number of small and medium sized firms. In most private firms, families still retain a significant control of the management which is a phenomenon not very common in an advanced financial system (Claessens et al., 1999, p.165). Another feature is the limited

[2] However, this is not always the case in reality. As Morck and Steier (2005) argue, more developed financial systems seem closely tied to better corporate governance and more efficient allocation of resources. But these correlations are rudimentary, and many counterexamples have been observed in the histories of many countries. See also Fohlin (2004), Morck and Nakamura (1999) and Morck et al. (2000).

development of the financial markets over the last 30 years. A majority of the companies in Malaysia are usually not listed and hence the more plausible source of finance is from banks rather than financial markets. The market concentration ratio is rather high for Malaysia as compared to other more advanced financial markets as market capitalization is highly concentrated in the hands of the ten largest firms. On these grounds, the Malaysian financial system can be described as a bank-based system rather than a market-based system. Thus, the use of bank-based financial proxies is more appropriate to study the issue at hand.

3. Analytical Framework

Well-functioning financial systems are able to mobilize household savings, allocate resources efficiently, diversify risks, induce liquidity, reduce information and transaction costs and provide an alternative to raising funds through individual savings and retained earnings. Clearly, these functions suggest that financial development may have a positive impact on growth. The most influential works that underpin this hypothesis are perhaps McKinnon (1973) and Shaw (1973) which suggest that better functioning financial systems lead to more robust economic growth. McKinnon (1973) considers an outside money model in which all firms are confined to self-finance. Hence, physical capital has a lumpy nature where firms must accumulate sufficient savings in the form of monetary assets to finance the investment projects. In this sense, money and capital are viewed as complementary assets where money serves as the channel for capital formation ('complementarity hypothesis'). The 'debt-intermediation' view proposed by Shaw (1973) is based on an inside money model. Shaw (1973) argues that high interest rates are essential in attracting

more saving. With more supply of credit, financial intermediaries promote investment and raise output growth through borrowing and lending.

More empirical evidence began to appear in the 1990s, in particular, with the prominent work of King and Levine (1993). Their empirical specifications, especially the measures of financial development, have been widely used with some modifications by many recent studies. King and Levine (1993) find that higher levels of financial development are associated with faster economic growth and conclude that finance seems to lead growth. Neusser and Kugler (1998) and Choe and Moosa (1999) reach the same conclusion.

However, an expansion of financial systems may also be induced by economic growth. That is to say economic growth may create demand for more financial services and hence the financial system will grow in response to economic expansion. As economic activities grow, there will be more demand for both physical and liquid capital. Hence, growth in the real sector induces the financial sector to expand, and thereby increasing competition and efficiency in the financial intermediaries and markets (Berthelemy and Varoudakis, 1996). Importantly, the cost of financial services involves a significant fixed component so that the average costs will fall if the volume of transactions increases. Therefore, wealthier economies have a greater demand for financial services and are more able to afford a costly financial system. Since transaction volume is positively associated with the level of income, financial institutions will emerge once some critical level of income is reached. Empirical support of this hypothesis can be found in Atje and Jovanovic (1993) and Demetriades and Hussein (1996).

Ultimately, it is important to perform causality testing with care because both financial development and economic growth can be driven by some common variables such as saving, investment, trade, interest rate, etc. Rajan and Zingales (1998) contends that

savings might affect the current level of financial development and future economic growth. Higher propensity to save leads to an expansion of the financial system in an economy through the accumulation of more savings. These funds, if allocated efficiently, will foster higher economic growth. Courakis (1984) argues that financial deepening through additional deposits can only be realized by changing interest rates. Low interest rates discourage savings while high interest rates promote capital accumulation. As Fry (1997) argues, higher interest rates discourage entrepreneurs from investing in low return projects and thus increase the productivity of physical capital. Taking interest rates as a variable in the function of financial depth is also common in the endogenous growth literature. The positive relationship between trade and economic growth is well documented in the literature. But there is a new literature showing that trade openness, finance and growth are related. In particular, Beck (2002) demonstrates that financial development results in higher level of exports and trade balance of manufactured goods which in turns imply higher economic development. Similarly, Do and Levchenko (2004) predict that trade is positively associated with financial system expansion in countries with higher level of economic development. Hence, it is clear that saving, investment, trade openness and interest rate are important mechanisms in promoting both financial development and economic growth.

4. Model, Data and Methodology

4.1 Model and Data

Based on the theoretical arguments presented above, we can describe the financial depth relationship as follows:

$$F = f(G, Z)$$

where *F* refers to the financial development indicator and *G* is logarithmic per capita real GDP. To avoid the issues of specification bias, we include a conditioning variable, *Z*, in the model. Following the theoretical considerations set out in the preceding section, the candidates for this conditioning variable include logarithmic ratio of gross domestic savings to nominal GDP (*S*), logarithmic ratio of gross investment to nominal GDP (*I*), real interest rate (*R*), and logarithmic ratio of exports and imports to nominal GDP (*T*).

The selection of key variables to represent the level of financial services produced in an economy and how to measure the extent and efficiency of financial intermediation are the major problems in an empirical study of this nature. Construction of financial development indicators is an extremely difficult task due to the diversity of financial services catered for in the financial systems. Furthermore, there is a diverse array of agents and institutions involved in the financial intermediation activities. The extent of financial deepening is best measured by the intermediaries' ability to reduce information and transaction costs, mobilize savings, manage risks and facilitate transactions. The idea is very simple but there is no valid and reliable data available. Despite all efforts made by researchers to refine and improve the existing measures, the financial proxies used are still far from satisfactory.

Traditionally, easily available monetary aggregates such as M2 or M3 as a ratio of nominal GDP are widely used in measuring financial deepening. However, these are not very good proxies for financial development since they reflect the extent of transaction services provided by financial system rather than the ability of the financial system to channel funds from depositors to investment opportunities. The availability of foreign funds in the financial system also renders this an inadequate measure of financial development. As an alternative measure, bank credit to private sector is often argued to be a more superior measure of financial development. Since the private sector is able to utilize

funds in a more efficient and productive manner as compared to the public sector, the exclusion of credit to public sector better reflects the extent of efficient resource allocation. Developed by King and Levine (1993), another commonly used variable is the ratio of commercial bank assets divided by commercial bank plus central bank assets which measures the relative importance of a specific type of financial institution i.e. the commercial banks in the financial system. The basic idea underlying this measure is that commercial banks are more likely to identify profitable investment opportunities and therefore make more efficient use of funds than central banks.

In most cases, these variables are highly correlated and yet there is no uniform argument as to which proxies are most appropriate for measuring financial development. This justifies the need to construct an index as a single measure that represents the overall development in the financial sector by taking the relevant financial proxies into account. We use logarithm of liquid liabilities (or M3) to nominal GDP (*M*), logarithm of commercial bank assets to commercial bank assets plus central bank assets (*A*), and logarithm of domestic credit to private sectors divided by nominal GDP (*P*) as the proxies for financial depth[3]. Using these three variables, we develop a new index using principal component analysis that sufficiently deals with the problems of multicollinearity and over-parameterization as an overall indicator of the level of financial development.

[Insert Figure 1 about here]

Annual data covering the period 1960-2001 (except for real interest rate which has only 35 observations) are used in the study. All data are obtained from the World Bank's

[3] Definitions of the variables used are provided in Appendix I.

World Development Indicators (2003) and the IMF's *International Financial Statistics* (2004). All variables are quoted in local currency. The data are converted into natural logarithms (except for real interest rate) so that they can be interpreted in growth terms after taking the first difference. It is evident from Figure 1 that the level of financial depth has deepened over the time with the largest increase observed for domestic lending to nominal GDP (*P*) and the smallest for relative assets of commercial banks (*A*). We include five dummy variables in the estimation to account for the oil crises in 1973 and 1979, the global economic recession in 1985, the Asian financial crisis in 1997-98, and the world trade recession in 2001.

[Insert Table 1 about here]

The correlation matrix reported in Table 1 shows that output (*G*) and the three financial proxies (*M*, *A*, *P*) are highly correlated. Although correlation does not imply causation, the high correlation structure observed between the variables is likely to be an outcome of causality. It is also clear that these three financial proxies are highly correlated. Thus, we use principal component analysis (PCA) to reduce the three financial proxies into one principal component. PCA has traditionally been used to reduce a large set of correlated variables into a smaller set of uncorrelated variables, known as principal components (see Stock and Watson, 20002a, b). This technique allows different measures of financial development to be expressed in terms of a single index. Theoretically, this new proxy for financial development (denoted as *F*) is able to capture most of the information from the original dataset which consists of three financial development measures.

[Insert Table 2 about here]

Table 2 summarizes the results obtained from principal component analysis. The eigenvalues indicate that the first principal component explains about 95 per cent of the standardized variance, the second principal component explains another 4 per cent and the last principal component accounts for only 1 per cent of the variation. Clearly, the first principal component, which explains the variations of the dependent variable better than any other linear combination of explanatory variables, is the best measure of financial development in this case. Hence, only information related to the first principal component are reported at the bottom panel of Table 2. The factor scores suggest that the individual contributions of *M*, *A* and *P* to the standardized variance of the first principal component are 34.5 per cent, 33.6 per cent and 34.3 per cent respectively. We use these as the basis of weighting to construct a financial depth index, denoted as *F*.[4]

4.2 Econometric Methodology

We construct four trivariate VAR models with different control variables i.e. *S*, *I*, *T* and *R* for our estimation purpose. Only three endogenous variables are used in each model in order to conserve degrees of freedom given the small data sample. A vector autoregressive (VAR) approach serves our estimation purpose well for several reasons: 1) it is possible to distinguish between the short-run and long-run causality if the variables are cointegrated, 2) it is common for macroeconomic variable to be affected by its own past value and hence the finance-growth nexus should be viewed not only in a dynamic manner but also as an autoregressive process, and 3) it avoids the endogeneity problems by treating

[4] Due to shorter data series available for the real interest rate (*R*), a separate principal component analysis was performed, using only 35 observations, to generate a different financial development index (*F*) for the VAR model using real interest rate (*R*) as the control variable. The factor scores were found to be 35.7 per cent, 33.7 per cent and 34.9 per cent for *M*, *A* and *P* respectively.

all variables to be endogenous. The exact formulation of the VAR model depends on the time series properties of the data.

The testing procedure involves three steps. We begin by testing the existence of unit roots by using Augmented Dickey-Fuller (ADF) test. The second step is to test for cointegration using the Johansen approach for each of the VARs constructed in levels. Our causality tests are preceded by cointegration testing since the presence of cointegrated relationships have implications for the way in which causality testing is carried out. If cointegration is detected, the third step is to test for causality by employing the appropriate types of causality tests available in the recent literature.

The presence of cointegrated relationships is consistent with the economic theory which predicts that finance and output have a long-run equilibrium relationship. According to Engle and Granger (1987), cointegrated variables must have an error correction representation in which an error correction term (ECT) must be incorporated into the model. Accordingly, a vector error correction model (VECM) is formulated to reintroduce the information lost in the differencing process, thereby allowing for long-run equilibrium as well as short-run dynamics. The VECM is given by

$$\Delta y_t = A_0 + \Pi y_{t-1} + A_1 \Delta y_{t-1} + A_2 \Delta y_{t-2} + \cdots + A_{p-1} \Delta y_{t-p+1} + \varepsilon_t \qquad (1)$$

where Δ is a difference operator, y_t is a column-n vector of endogenous variables, A_1,…, A_{p-1} are (nxn) matrices of coefficients, and ε_t is a vector of normally and independently distributed error terms. By construction, Π has rank r and can be decomposed as $\Pi = \alpha\beta'$. The elements of α are known as the speed of adjustment parameters, it is a (n x r) matrix where a larger α suggests a faster convergence towards the long-run equilibrium when there are short-run deviations from its equilibrium. β' is a (n x r)' matrix of cointegrating

vectors, that is the long-run coefficients in the VECM. Equation (1) can be re-written as follows:

$$\Delta y_t = A_0 + \alpha(\beta' y_{t-1}) + A_1 \Delta y_{t-1} + A_2 \Delta y_{t-2} + \cdots + A_{p-1} \Delta y_{t-p+1} + \varepsilon_t \qquad (2)$$

For example, when $r = 1$ and $n = 3$, α and β take the form:

$$\alpha = \begin{pmatrix} \alpha_{11} \\ \alpha_{21} \\ \alpha_{31} \end{pmatrix} \text{ and } \beta' = \begin{pmatrix} \beta_{11} & \beta_{21} & \beta_{31} \end{pmatrix}$$

For the 3-variable case with one cointegrated relationship, the VECM can be expressed as follows:

$$\Delta F_t = \mu_1 + \alpha_{11} ECT_{t-1} + \sum_{j=1}^{p-1} \phi_{1j} \Delta F_{t-j} + \sum_{j=1}^{p-1} \theta_{1j} \Delta G_{t-j} + \sum_{j=1}^{p-1} \psi_{1j} \Delta Z_{t-j} + \varepsilon_{1t} \qquad (3.1)$$

$$\Delta G_t = \mu_2 + \alpha_{21} ECT_{t-1} + \sum_{j=1}^{p-1} \phi_{2j} \Delta F_{t-j} + \sum_{j=1}^{p-1} \theta_{2j} \Delta G_{t-j} + \sum_{j=1}^{p-1} \psi_{2j} \Delta Z_{t-j} + \varepsilon_{2t} \qquad (3.2)$$

$$\Delta Z_t = \mu_3 + \alpha_{31} ECT_{t-1} + \sum_{j=1}^{p-1} \phi_{3j} \Delta F_{t-j} + \sum_{j=1}^{p-1} \theta_{3j} \Delta G_{t-j} + \sum_{j=1}^{p-1} \psi_{3j} \Delta Z_{t-j} + \varepsilon_{3t} \qquad (3.3)$$

where Z is one of the conditioning variables (S, I, T or R), ε_t's are Gaussian residuals and $ECT_{t-1} = F_{t-1} + (\beta_{21} / \beta_{11}) G_{t-1} + (\beta_{31} / \beta_{11}) Z_{t-1}$ is the normalized cointegrated equation. There are two sources of causation i.e. through the ECT, if $\alpha \neq 0$, or through the lagged dynamic terms. The ECT measures the long-run equilibrium relationship while the coefficients on lagged difference terms indicate the short-run dynamics. The statistical significance of the coefficients associated with ECT provides evidence of an error correction mechanism that drives the variables back to their long-run relationship.

Given the two different sources of causality, we can perform three different causality tests i.e. short-run Granger non-causality test, weak exogeneity and strong exogeneity tests. In equation (3.1), to test ΔG_t does not cause ΔF_t in the short-run, we

examine the significance of the lagged dynamic terms by testing the null $H_0 : \text{all } \theta_{1j} = 0$ using the Wald test. Non-rejection of the null implies growth does not Granger-cause finance in the short-run. The weak exogeneity test, which is a notion of long-run non-causality test, requires satisfying the null $H_0 : \alpha_{11} = 0$. It is based on a likelihood ratio test which follows a χ^2 distribution. Finally, we can also perform the strong exogeneity test which imposes stronger restrictions by testing the joint significance of both the lagged dynamic terms and ECT due to Charemza and Deadman (1992, p.267) and Engle et al. (1983). That is, the strong exogeneity test requires Granger non-causality and weak exogeneity. In particular, ΔG_t does not cause ΔF_t if the null $H_0 : \text{all } \theta_{1j} = \alpha_{11} = 0$ is not rejected. The strong exogeneity test does not distinguish between the short-run and long-run causality but it is a more restrictive test which indicates the overall causality in the system. This paper uses the concept of causality in the probabilistic rather than in the deterministic sense.

5. Empirical Findings

The ADF test results show that all variables are non-stationary in their levels but become stationary after taking the first difference. Hence, we conclude that all series are *I*(1) at the 5% level of significance[5]. Since the Johansen approach is sensitive to the lag length used, we conduct a series of nested likelihood ratio tests on first-differenced VARs to determine the optimal lag length (*p*) prior to performing cointegration tests. Given the sample size, we have considered a maximum lag length of five. The optimal lag length is found to be one for all models except for the model that uses investment (*I*) as the conditioning variable in which two lags are appropriate. We stick to this lag structure for

[5] The results are not reported here to conserve space. They are available upon request.

the rest of the estimations. Cointegration tests are performed for each VAR models at levels.

[Insert Table 3 about here]

In Table 3, both the results of trace test and maximum eigenvalue test unanimously point to the same conclusion that there is one cointegrated equation in model A and C but no cointegration is found in model B and D when investment (*I*) and real interest rate (*R*) are respectively used as the control variables, at the 5% level of significance. Since it is our interest to examine causality between financial development and economic growth both in the short-run and long-run, the remaining analysis focuses only on model A and C in which evidence of a long-run relationship is found.

[Insert Table 4 about here]

Using likelihood ratio tests, the five dummy variables used to account for various macroeconomic shocks are found to be significant for both model A and C. Table 4 presents the cointegrating vectors and speed of adjustment coefficients for each model. Lagrange Multiplier (LM) test is performed to examine for evidence of serial correlation in the residuals. As some evidence of serial correlation is found at the 10% level of significance, we also check sensitivity of the results by considering a lag order of two for each model. Multivariate normality test shows that the residuals are Gaussian for all models. By normalizing the coefficient of F_{t-1} to one, the long-run cointegrated equations reveal that all coefficients are statistically significant at the 1% level in all models. It is

evident that output and finance are positively related in the long-run. Both saving and trade openness are positively associated with output but negatively related to finance in the long-run. The results also indicate that output has stronger effects on finance when saving is used as the control variable. The loading factors, which measure the speed of adjustment back to the long-run equilibrium value, are highly significantly and correctly signed (negative). It is evident that model C adjusts faster to return the long-run equilibrium compared to model A. The results are not sensitive to the lag length used.

[Insert Table 5 about here]

Given the results of cointegration tests, we perform the ECM-based causality tests for model A and C using considering both lag order one and two. The results reported in Table 5 reveal that there is no short-run causality observed in all models, at the 5% level of significance. We find evidence of output growth causing financial development in the long-run but no feedback relationship is observed. Such evidence is further supported by the results of the strong exogeneity tests which show the overall causality for both short-run and long-run. Contrary to Luintel and Khan (1999) in which a feedback relationship between finance and growth for Malaysia is reported, our findings indicate that growth exerts a positive and uni-directional causal effect on finance in the long-run. The results are not sensitive to different control variables and lag length used.

Although financial deepening is clearly observed following a series of financial sector reforms introduced over the years, our results, however, suggest no sign of economic improvement fueled by development in the financial sector. Why has financial development not led to higher growth in Malaysia? Financial intermediation affects economic growth mainly through mobilizing savings and allocating these funds to productive investment

projects which generate good returns. Based on our findings, the financial intermediaries in Malaysia do not seem to be efficient in ameliorating informational asymmetries, reducing transaction costs and allocating resources.

Before a restriction on borrowing from abroad was put into place in 1995, many large organizations in Malaysia resorted to foreign funds instead of relying on the domestic banks to fund their business expansion projects. This reflects that the domestic banking sector has not been playing a vital role in allocating resources. This is further supported by the findings of Jomo (1998) which report that the Malaysian banks did not channel resources to the most productive use in the early 1990s. Most lending was issued for the purchase of shares and real estate property instead of for investing in the productive activities. This led to bubbles in the property sector and share market prior to the financial crisis in 1997-98.

The more risky behavior adopted by the domestic banks in their lending policy have resulted in mismanagement of assets and generated huge non-performing loans compared with the foreign banks during the crisis period of 1997-98. Interest rate spread did not gradually decline over the years. This high profit margin phenomenon suggests that efficiency in the banking sector has not been achieved. By examining the banking efficiency in the East Asian banks for the period of 1992-96, Laeven (1999) finds that the banking efficiency in Malaysia stays more or less constant at the initial level. The recent banking sector reforms further reflect that the existing financial system in Malaysia is still fragile and inefficient.

A key feature in the financial system of Malaysia is the presence of the Employees Provident Fund (EPF) which is a social security savings plan that requires both employers and employees to make monthly contributions to secure worker retirements. The EPF makes up a large proportion of the total savings in Malaysia; banks therefore have a less

significant role to play in mobilizing savings and allocating resources. Although high savings rate has contributed to the economic development in Malaysia, there is little guidance provided as to whether the funds deposited at the EPF have been allocated to the most productive sectors efficiently.

6. Policy Implications and Conclusions

Overall, our results support Robinson's (1952) argument that 'where enterprise leads finance follows' but not the hypothesis that a bank-based financial system induces long-term growth in the real sector. Economic growth exerts a positive influence on the development of the financial system. Despite the fact that financial liberalization has enlarged the financial system in Malaysia, it does not appear to be effective in promoting long term growth. Our results, however, should not be interpreted as suggesting that it is unimportant to develop the financial sector. Instead, we argue in favor of a more prudent approach to financial sector reform before liberalizing the financial sector.

Financial liberalization is unlikely to result in higher economic growth without an efficient and well-functioning financial system. To accelerate growth, the financial system must be properly shaped before undertaking any liberalization program. Thus, implementing policies that aim at improving the functioning of the financial system is crucial for Malaysia since the banking system does not appear to have allocated resources efficiently and the stock market has been subject to speculative trading activities. Financial sector expansion following the results of inflationary liquidity creation or deterioration in lending standards is not desirable and will not enhance growth. Policy makers must ensure that while encouraging the expansion of financial systems, no excessive inflation and sub-standards loans are created as negative externalities along the development process. The

private sector's effectiveness in credit evaluation, public sector surveillance, stringent accounting standards and auditing practices, as well as a sound legal framework are all essential and must be properly shaped while financial deepening is taking place.

Despite the potential dangers of financial liberalization, it does not necessarily imply that Malaysia should not consider financial liberalization at all. Instead, our results suggest that financial liberalization must be carefully planned, timed and closely monitored. It is imperative that proper regulatory structures and a healthy economic climate are already in place before liberalization is carried out. Government efforts should be directed at creating an environment which makes Malaysia an attractive destination for foreign direct investments. This includes establishing a stable macroeconomic and political environment, provision of adequate property rights, stringent accounting and audit control, and sufficiently trained work force. With all these in place, benefits from financial liberalization can be realized since a well-functioning financial system can play an important role in the process of economic development.

Appendix 1: Definition of Variables Used

Variable	Definition
M	ln (liquid liabilities or M3 / nominal GDP) - Liquid liabilities (M3) are the sum of currency and deposits in the central bank (M0), plus transferable deposits and electronic currency (M1), plus time and savings deposits, foreign currency transferable deposits, certificates of deposit, and securities repurchase agreements (M2), plus travelers checks, foreign currency time deposits, commercial paper, and shares of mutual funds or market funds held by residents.
A	ln [commercial bank assets / (commercial bank assets + central bank assets)] - commercial bank assets include reserves, claims on monetary authorities, claims on central, state and local governments, claims on non-financial public enterprise, claims on private sector, claims on other banking institutions and non-bank institutions. Central bank assets include foreign assets, claims on central government, claims on private sector, claims on deposit money banks, and claims on non-bank financial institutions.
P	ln (domestic credit to private sector / nominal GDP) - Domestic credit to private sector refers to financial resources provided to the private sector, such as through loans, purchases of non-equity securities, and trade credits and other accounts receivable, that establish a claim for repayment.
G	ln (real GDP per capita) - GDP per capita is gross domestic product divided by mid-year population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in constant local currency.
S	ln (gross domestic savings / nominal GDP) - Gross domestic savings are calculated as GDP less final consumption expenditure.
I	ln (gross fixed capital formation / nominal GDP) - Gross fixed capital formation includes land improvements (fences, ditches, drains, and so on); plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings.
T	ln (trade openness / nominal GDP) - Trade openness is the sum of exports and imports of goods and services measured as a share of gross domestic product.
R	real interest rate - Real interest rate is calculated by subtracting inflation from the fixed 3-month deposit rates. Inflation is measured by the consumer price index which reflects the annual percentage change in the cost to the average consumer of acquiring a fixed basket of goods and services that may be fixed or changed at specified intervals, such as yearly. Deposits rates are returns offered by deposit money banks or deposit-taking institutions to their customers.

Data Source: World Bank's World Development Indicators (2003) and IMF's International Financial Statistics (2004).

References

Allen, F., Gale, D., 2000. Comparing Financial Systems. The MIT Press, Cambridge.

Athukorala, P., Sen, K., 2002. Saving, Investment and Growth in India. Oxford University Press, UK.

Athukorala, P., 2001. Crisis and Recovery in Malaysia: The Role of Capital Controls. Edward Elgar, UK.

Atje, R., Jovanovic, B., 1993. Stock Markets and Developments. European Economic Review 37, 632--640.

Beck, T., 2002. Financial Development and International Trade: Is There A Link? Journal of International Economic 57, 107--131.

Bencivenga, V.R., Smith, B.D., 1991. Financial Intermediation and Endogenous Growth. Review of Economic Studies 58, 195--209.

Bencivenga, V.R., Smith, B.D., Starr, R.M., 1995. Transactions Costs, Technological Choice, and Endogenous Growth. Journal of Economic Theory 67, 153--177.

Berthelemy, J., Varoudakis, A., 1996. Economic Growth, Convergence Clubs, and the Role of Financial Development. Oxford Economic Papers 48, 300--328.

Charemza, W., Derek D., 1992. New Directions in Econometric Practice: General to Specific Modelling, Cointegration and Vector Autoregression. Edward Elgar, Cambridge.

Choe, C., Moosa, I., 1999. Financial System and Economic Growth: The Korean Experience. World Development 27, 1069--1082.

Claessens, S., Djankov, S., Lang, L., 1999. Corporate Ownership and Valuation: Evidence from East Asia, in: Harwood, A., Litan, R., Pomerleano, M., (Eds), Financial Markets and Development: The Crisis in Emerging Markets, Brookings Institution Press, Washington D.C., pp. 159--178,

Courakis, A.S., 1984. Constraints on Bank Choices and Financial Repression in Less Developed Countries. Oxford Bulletin of Economics and Statistics 46, 341--370.

Demetriades, P.O., Hussein, K.A., 1996. Does Financial Development Cause Economic Growth? Time-series Evidence from 16 Countries. Journal of Development Economics 51, 387--411.

Do, Q., and Levchenko, A.A., 2004. Trade and Financial Development. The World Bank Working Paper No. 3347.

Engle, R.F., Granger, C.W.J., 1987. Cointegration and Error Correction: Representation, Estimation, and Testing. Econometrica 55, 251--276.

Engle, R.F., Hendry, D.F., Richard, J., 1983. Exogeneity. Econometrica 51, 277--304.

Fisman R.J., Love I. 2003. Trade Credit, Financial Intermediary Development, and Industry Growth. Journal of Finance 58, 353--374.

Fohlin, C., 2004. The History of Corporate Ownership and Control in Germany. National Bureau of Economic Research Working Paper.

Fry, M.J., 1988. Money, Interest and Banking in Economic Development, John Hopkins University Press, Baltimore.

Fry, M.J., 1997. In Favour of Financial Liberalisation. The Economic Journal 107, 754--770.

Greenwood, J., Jovanovic, B., 1990. Financial Development, Growth and the Distribution of Income. Journal of Political Economy 98, 1076--1107.

Jomo, K.S., 1998. Malaysia: From Miracle to Debacle, in: Jomo, K. (Ed), Tigers in Trouble: Financial Governance, Liberalisation and Crisis in East Asia, Zed Books, London, pp. 181--198.

King, R.G., Levine, R., 1993. Finance and Growth: Schumpeter Might Be Right. Quarterly Journal of Economics 108, 717--737.

Laeven, L., 1999. Risk and Efficiency in East Asian Banks. The World Bank Policy Research Working Paper Series 2255.

Lucas, R.E., 1988. On the Mechanics of Economic Development. Journal of Monetary Economics 22, 3--42.

Luintel, K.B., Khan, M., 1999. A Quantitative Reassessment of the Finance-Growth Nexus: Evidence from A Multivariate VAR. Journal of Development Economics 60, 381--405.

Mauro, P., 1995. Stock Markets and Growth: A Brief Caveat on Precautionary Savings. Economics Letters 47, 111--116.

McKinnon, R.I., 1973. Money and Capital in Economic Development. Brookings Institution, Washington D.C.

Morck, R., David, A., Bernard Y., 2000. Inherited Wealth, Corporate Control, and Economic Growth: The Canadian Disease, in: Morck, R. (Ed), Concentrated Corporate Ownership, University of Chicago Press, Chicago, pp. 319--372.

Morck, R., Nakamura, M., 1999. Banks and Corporate Control in Japan. Journal of Finance 54, 319--340.

Morck, R., Steiler, L., 2005. The Global History of Corporate Governance – An Introduction, in: The History of Corporate Governance around the World: Family Business Groups to Professional Managers, University of Chicago Press, Chicago, pp. 1--46, forthcoming.

Neusser, K., Kugler, M., 1998. Manufacturing Growth and Financial Development: Evidence from OECD Countries. Review of Economics and Statistics 80, 638--646.

Pagano, M., 1993. Financial Markets and Growth: An Overview. European Economic Review 37, 613--622.

Rajan, R., Zingales, L., 1998. Financial Dependence and Growth. American Economic Review 88, 559--586.

Robinson, J., 1952. The Generalization of the General Theory, in: The Rate of Interest, and Other Essays, Macmillan, London, pp. 67--142.

Schumpeter, J.A., 1911. The Theory of Economic Development. Reprinted 1969, Oxford University Press, Oxford.

Shaw, E.S., 1973. Financial Deepening in Economic Development. Oxford University Press, London and New York.

Singh, A., 1997. Financial Liberalisation, Stock Markets and Economic Development. Economic Journal 107, 771--782.

Solow, R.M., 2001. Applying Growth Theory across Country. The World Bank Economic Review 15, 283--288.

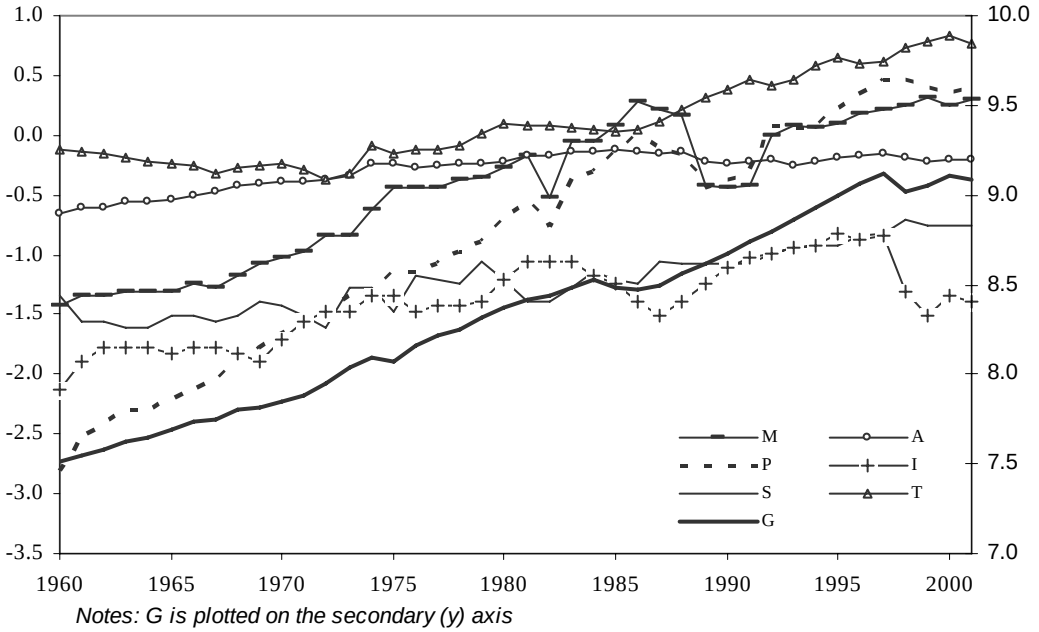
Stock, J.H., Watson, M.W., 2002a. Macroeconomic Forecasting Using Diffusion Indexes. Journal of Business and Economic Statistics 20, 147--163.

Stock, J.H. Watson, M.W., 2002b. Forecasting Using Principal Components from A Large Number of Predictors. Journal of the American Statistical Association 97, 1167--1179.

Williamson, J., Mahar, M., 1998. A Survey of Financial Liberalization. Essays in International Finance 211. Department of Economics, Princeton University, Princeton.

Yusof, Z.A., Hussin, A.A., Alowi, I., Lim, C. and Singh, S., 1994. Financial Reform in Malaysia, in: Caprio, G., Atiyas, I., Hanson, J.A. (Eds.), Financial Reform: Theory and Experience, Cambridge University Press, UK, pp. 276-320.

Figure 1: Trends of Key Variables



Notes: G is plotted on the secondary (y) axis

Table 1: Correlation Matrix

	M	*A*	*P*	*G*	*I*	*S*	*T*
M	1.000						
A	0.914	1.000					
P	0.975	0.904	1.000				
G	0.930	0.831	0.979	1.000			
I	0.768	0.819	0.823	0.825	1.000		
S	0.859	0.693	0.888	0.929	0.635	1.000	
T	0.789	0.592	0.850	0.925	0.659	0.916	1.000

Table 2: Principal Component Analysis

Principal Component	Eigenvalues	% of Variance	Cumulative %
1	2.862	0.954	95.4
2	0.113	0.038	99.2
3	0.025	0.008	100.0
Variable	Factor Loadings	Communalities	Factor Scores
M	0.583	0.340	0.345
A	0.568	0.323	0.336
P	0.581	0.338	0.343

Table 3: Johansen Cointegration Tests [1]

Model	Trace statistic (λ_{trace})			Maximum eigenvalue statistic ($\lambda_{\max}$)			Lags (p)
	$r=0$	$r\le 1$	$r\le 2$	$r=0$	$r=1$	$r=2$	
Model A: (F, G, S)	**30.40****	7.61	0.76	**22.80****	6.84	0.76	1
Model B: (F, G, I)	23.76	4.49	0.02	19.27*	4.47	0.02	2
Model C: (F, G,T)	**33.64****	8.79	0.38	**24.84****	8.41	0.38	1
Model D: (F, G, R)	28.96*	11.16	0.99	17.80	10.18	0.99	1

Notes: [1] *, ** and *** indicate 10%, 5% and 1% level of significance respectively.

Table 4: Cointegrated Equations [1]

	Lags (p)	LM test statistic [2]	Joint Jarque-Berra test statistic [3]	Cointegrated Equation	α_{11}
Model A: (F, G, S)	1	16.047*	5.110	$F_{t-1} = -29.751 + 2.961G_{t-1} - 3.716S_{t-1}$ $(7.466^{***})\ (-4.851^{***})$	-0.137***
	2	9.909	6.417	$F_{t-1} = -33.002 + 3.251G_{t-1} - 4.398S_{t-1}$ $(7.362^{***})\ (-5.007^{***})$	-0.191***
Model C: (F, G, T)	1	15.289*	3.799	$F_{t-1} = -15.202 + 1.772G_{t-1} - 1.076T_{t-1}$ $(14.508^{***})\ (-6.188^{***})$	-0.650***
	2	10.105	10.423	$F_{t-1} = -16.677 + 1.950G_{t-1} - 1.210T_{t-1}$ $(16.729^{***})\ (-7.309^{***})$	-0.684***

Notes: [1] number of observations (n) = 42; number of cointegrated vectors (r) =1; and *, ** and *** indicate 10%, 5% and 1% level of significance respectively. [2] The null (Ho: no serial correlation at lag order 1) is not rejected at the 5% level of significance. [3] The null (Ho: residuals are multivariate normal) is not rejected at the 5% level of significance.

Table 5: Causality Tests between FD and EG [1]

	Model A: (F, G, S)		Model C: (F, G, T)	
Lags (p)	1	2	1	2
$H_0 : \Delta G \not\to \Delta F$				
SR Granger non-causality test: all $\theta_{1j} = 0$	0.068	1.330	3.522*	4.283
Weak exogeneity test: $\alpha_{11} = 0$	5.110**	7.310***	13.592***	8.673***
Strong exogeneity test: all $\theta_{1j} = \alpha_{11} = 0$	5.620*	11.757***	21.617***	21.269***
$H_0 : \Delta F \not\to \Delta G$				
SR Granger non-causality test: all $\phi_{2j} = 0$	0.182	0.655	1.174	1.055
Weak exogeneity test: $\alpha_{21} = 0$	0.350	1.249	0.606	0.409
Strong exogeneity test: all $\phi_{2j} = \beta_{11} = 0$	0.506	1.004	1.491	1.205

Notes: [1] number of observations (n) = 42; number of cointegrated vectors (r) =1; *, ** and *** indicate 10%, 5% and 1% level of significance respectively; and the long-run and overall causality tests are not applicable to model B and model D since no cointegrated relationship is found in these two models.