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BANK, STOCK MARKET, AND ECONOMIC GROWTH IN MALAYSIA: AN EMPIRICAL STUDY

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Abstract

This study examines the impact of bank development and stock market development on economic growth in Malaysia using time series data. The results of the long-run cointegrating vectors show that there is a long-run relationship between economic growth and its determinants. An increase in bank development or stock market development will lead to an increase in economic growth. Moreover, there is some evidence that stock market development is found to have a more influential impact on economic growth than bank development in the long run. The results of the error correction models show bank development and stock market development to have a significant impact on economic growth in the short run. Generally, bank development and stock market development are important to promote economic growth.

***JEL Classification**:* O43; G21; G10
***Keywords**:* Bank; Stock Market; Economic Growth; Cointegration

1. Introduction

A sound financial system is important to promote economic growth. Financial system: (i) facilitates the trading, hedging, diversifying, and pooling of risk; (ii) allocates resources; (iii) monitors managers and exerts corporation control; (iv) mobilises saving; and (v) facilitates the exchange of goods and services (Levine, 1997). The increased

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availability of financial instruments and institutions reduces transaction and information costs in an economy. Thus financial development can affect the rate of economic growth by improving the use of capital. Financial development also can influence the accumulation of capital through its impact on the saving rate or changing the proportion of saving (Hondroyiannis, Lolos, and Papapetrou, 2005: 175). For the last decades, a wide theoretical debates upon the fundamental relationship between financial development and economic growth (Naceur and Ghazouani, 2007). Moreover, empirical findings on the relationship between financial development and economic growth are less conclusive. The previous literature upon the relationship between financial development and economic growth focuses on bank development. However, in many developing countries, stock markets have been playing important role in the economy as a result of financial liberalisation. Thus there has been renewed research interest in the role of the stock market development on economic growth (Hondroyiannis, Lolos, and Papapetrou, 2005: 174).[1]

Bank plays an important role in an economy through channelling funds from savers to investors. This would generate more savings, consumptions, and investments, and resulting in greater efficiency and productivity, more output, and higher rate of economic growth (Levine and Zervos, 1998). Thus a well developed banking system could contribute significantly to economic growth. Stock market development can affect economic growth through the creation of liquidity. Stock market liquidity can lead to more investment and enhance economic growth in the long run because it improves the allocation of capital and allows investors to sell stocks quickly when they need their savings. Furthermore, companies could raise their capital through issues equity. It is a cheaper way for firms to acquire funds. Moreover, a well developed stock market can enhance corporate control by mitigating the principle-agent problem through aligning the interest of managers and owners (Levine, 1996; Levine and Zervos, 1998).[2]

Stock market provides different services from those provided by bank, which can give a boost to economic growth (Caporale, Howells, and Soliman, 2004). Bank will unlikely lend to new innovative project or the new borrower because of the high risk of default of the new innovative project or new borrower. Thus bank would require a high risk premium, which would only encourage the risk borrower. The expected return of the borrower is an increasing function of the riskiness of the project.

[1]Theory provides no conclusive results upon whether bank and stock market are substitute, complement or whether bank or stock market has a greater impact on economic growth (Naceur and Ghazouani, 2007).

[2]However, there are arguments that enhanced stock market liquidity may weaken commitment of investors and their incentives to exert corporate control by overseeing managers and monitoring firm performance and potential (Levine, 1996).

This will discourage less risky investment although it could be productive. When interest rate is high, investor would favour investment with a high probability of default. Reducing opportunities to innovate will have a negative impact on economic growth in the long run (Caporale, Howells, and Soliman, 2004: 34).

The role of financial system on economic growth, particularly bank and stock market are well documented in the empirical literature. Bank development is argued to be more important in the early stage of economic development. Conversely, stock market development is argued to be more important in contributing economic growth in the long run (Law, 2004: 10).[3] The previous studies on bank development and stock market development are mainly on developed countries. In Malaysia, a few studies on the relationship between economic growth and both financial market and financial intermediary have been done previously. Moreover, empirical studies on the relationship between financial development and economic growth are dominated by cross-country studies and stock market is omitted from the analysis (Ang and McKibbin, 2007: 216; Naceur and Ghazouani, 2007). Caporale, Howells, and Soliman (2004) show that study does not include stock market development as a variable might have produced misleading results. The Asian financial crisis, 1997-1998 shows the importance of reliability and stability of financial system in an economy. This study examines the impact of bank development and stock market development on economic growth in Malaysia using time series data over the period from 1970 to 2006. A sub-sample of 1970-1996, where the year 1996 is chosen as a cut-off point is also used to exclude the contagion of the Asian financial crisis on economic growth. The crisis also raises the reliability of emerging financial system (Ang and McKibbin, 2007: 216).[4] Malaysia is a small open economy. In 1970, openness to international trade was 86.88 per cent. It increased to 112.59 per cent in 1980 and 146.89 per cent in 1990. In 2006, it was 225.24 per cent (Table 1). Malaysia has a sound financial system. The Central Bank of Malaysia has been improving and promoting a sound financial system since the independence of the country. A series of macroeconomic policy measures such as capital controls and deflationary policy was implemented immediately after the Asian financial crisis. This is followed by restructuring in the corporate and banking sectors (BNM,

[3]A well developed stock market provides a means for exercise of monetary policy through the issue and repurchase of government securities in a liquid market. Moreover, a well developed and active stock market affect the pattern of money demand and becoming stock market creates liquidity and thus spurs economic growth (McKinnon, 1989; Caporale, Howells, and Soliman, 2004: 35).

[4]This study has no aim to examine all the possible structural breaks occurred over the sample, except to exclude the impact of the Asian financial crisis, 1997-1998 on economic growth. It could be another study to examine those structural breaks on economic growth.

1999; Ang and McKibbin, 2007: 216-217). It is interesting to know the impact of financial development on economic growth in Malaysia. The success story of financial development in Malaysia could be an example to other developing country.

The rest of this article is structured as follows. Section 2 provides literature review of bank development, stock market development, and economic growth. Section 3 explains the data and methodology used in this study. Section 4 discusses the empirical results. Section 5 gives some concluding remarks.

2. Literature Review

The importance of bank development on economic growth could date back at least to the work of Bagehot (1873), who explains that banks serve as the financial intermediaries and facilitate funds channelling from the surplus units to the deficit units, and thus promoting more economic activities. This is particularly important during the early stage of economic development. Levine (1997) provides five basic functions of financial intermediaries, namely savings mobilisation, risk management, acquiring information about investment opportunities, monitoring borrowers and exerting corporate control, and facilitating the exchange of goods and services. All these five functions are absolutely relevant to the role of banks as financial intermediaries. It is obvious and could be said that financial intermediaries especially banks are important in supporting the economic growth of a country.

Nacerur and Ghazouani (2007) find no significant relationship between bank development and stock market development and economic growth using annual panel data analysis over the period from 1979 to 2003.[5] The relationship between bank development and economic growth is negative after controlling for stock market development. This lack of relationship must be linked to undeveloped financial system that discourages economic growth. The lack of contribution of stock markets in development process is mainly due to relatively new and small capital markets. Besides, the negative effect could be related to the deviation of financial resources from the real sector to stock market speculation. More efforts to be carried out to reinforce the institutional environment and improve the functions of the banking sector in the region.

Levine and Zervos (1998) find bank development and stock market development to have a significant impact on economic growth in a panel data analysis over the period from 1976 to 1993.[6] Bank development is

[5]The countries examined in the study are Bahrain, Egypt, Iran, Jordan, Kuwait, Lebanon, Morocco, Oman, Saudi Arabia, Tunisia, and Turkey.

[6]The countries examined in the study are Argentina, Australia, Austria, Bangladesh, Belgium, Brazil, Canada, Chile, Colombia, Cote d'Ivoire, Germany, Denmark, Egypt,

measured by bank credit, which is expressed by value of loan made by commercial bank and other deposit-taking bank to private sector divided by Gross Domestic Product (GDP).[7] Stock market development is measured by capitalisation, turnover, and valued traded.[8] Capitalisation is expressed by the value of listed domestic shares on domestic exchanges divided by GDP. Turnover is expressed by the value of the trades of domestic share on domestic exchange divided by the value of listed domestic shares. Value traded is expressed by the value of the trades of domestic shares on domestic shares on domestic exchanges divided by GDP. Economic growth is measured by real GDP growth, capital stock growth, productivity growth, and gross private savings.

Hondroyiannis, Lolos, and Papapetrou (2005) examine the financial development and economic growth nexus in Greece using monthly data over the period from 1980, month 1 to 1999, month 12. The study uses the Johansen (1988) cointegration method. The measurement of bank development is the value of commercial bank credit to the private sector over GDP and the measurement of stock market development is the total market capitalisation over GDP. The results show that bank development and stock market development can affect economic growth in the long run although their effects are small. The contribution of stock market development to economic growth appears to be substantially smaller compared to bank development.

Caporale, Howells, and Soliman (2004) examine the impact of stock market development on economic growth in seven countries (Argentina, Chile, Greece, Korea, Malaysia, the Philippines, and Portugal) using quarterly data over the period from 1971, quarter I to 1998, quarter IV. Two measurements of stock market are used, namely the market capitalisation ratio, which equals the value of listed shares divided by GDP and the value traded ratio, which equals the total value of shares traded on the stock exchange divided by GDP. The study estimates a bivariate vector autoregressive (VAR) and a trivariate VAR. The results show that well functioning stock market can play an important role in promoting economic growth. Moreover, the study shows that study does not include stock market development as a variable might have produced misleading results.

Spain, Finland, France, United Kingdom, Greece, Hong Kong, Indonesia, India, Israel, Italy, Jamaica, Jordan, Japan, Korea, Luxembourg, Mexico, Malaysia, Morocco, Nigeria, the Netherlands, Norway, New Zealand, Pakistan, Singapore, Sweden, Thailand, Turkey, Taiwan, United States, Venezuela, and Zimbabwe.

[7]M2 divided by GDP does not measure whether the liabilities are those of bank, central bank or other financial intermediaries nor does this financial depth measure identify where the financial system allocates capital (Levine and Zervos, 1998: 542).

[8]Capitalisation is a measured of the size of stock market while turnover and value traded are measures of liquidity of stock market (Levine and Zervos, 1998: 540).

Law (2004) examines the impact of bank development and stock market development on economic growth in 14 developing countries using panel data over the period from 1978 to 2001.[9] The study estimates real GDP is a function of capital, labour growth, a measure of bank development, and a measure of stock market development. The measurements of bank development are expressed by liquid liabilities over GDP, private sector credit over GDP, and domestic credit over GDP.[10] The measurements of stock market development are expressed by stock market capitalisation over GDP, total share value traded over GDP, and stock market turnover ratio. The study uses the random effect estimator, the autoregressive distributed lag (ARDL) estimator, and the mean group and pool mean group estimators. On the whole, the results show that bank development and stock market development are important to promote economic growth. Moreover, bank development is found to have more influential impact on economic growth than stock market.

In another paper, Law, Azman-Saini, and Smith (2006) examine finance and economic growth in Malaysia using quarterly data over the period from 1980 to 2002. The four variables in the VAR model are financial development, real GDP per capita, capital stock per capita, and real interest rate. A few measurements for financial development is used, namely bank deposit liabilities over GDP, private sector credit over GDP, domestic credit provided by banking sector, stock market capitalisation over GDP, and total share value traded over GDP. The short-run dynamic relationships based on the vector error correction model show that all banking sector and stock market development indicators cause real GDP per capita either uni-directional or bi-directional. The causal relationships are also found in the long run as shown by the levels VAR results of the Toda and Yamamoto method. Generally, the causally independent hypothesis between finance and economic growth is rejected, supporting the supply-leading and demand following hypotheses. Financial sector evolution tends to stimulate and promote economic development.

Mansor (2007) examines finance and economic development in Malaysia in a six variables VAR model using annual data over the period from 1985 to 2003. The six variables in the VAR model are real GDP,

[9]The countries examined in the study are Brazil, Chile, Colombia, Egypt, Jamaica, Jordan, Korea, Mexico, Malaysia, the Philippines, Thailand, Uruguay, Venezuela, and South Africa.

[10]Liquid liabilities include 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 deposits and securities repurchase agreements (M2) plus travellers checks, foreign currency time deposits, commercial paper, and shares of mutual funds or market funds held by residents (Law, 2004: 29)

financial intermediary development (the ratio of total credit to the private sector to nominal GDP or the ratio of deposit liabilities of the banking sector to nominal GDP), stock market development (the ratio of market turnover value to nominal GDP), financial volatility (a 12-quarter moving-average standard deviation of stock market index), Consumer Price Index, and real interest rate (the overnight interbank interest rate). The study finds that, amongst others, the financial markets development does matter for economic development. There is no significant relationship between financial intermediary development and economic development. There is no causal link between deposit liabilities and GDP. However, there exists a bi-directional short-run causality in Granger sense between total credit ratio and GDP. The impulse response functions show a positive output influence of financial intermediary development in one case and a negative output effect in the other case. There is no strong evidence for the leading role of economic development to financial development. Financial volatility has an adverse effect on real output and stock market development. The development of the financial markets promotes economic growth and perhaps with the need of financial services encourages financial intermediary development. The recommendations in the Financial Sector Master Plan to promote transparency and to focus on developing stock and bond markets can be considered to promote the progress of the financial sector.

In another paper, Mansor (2006) examines bank loans and stock prices in a six variables VAR model, which includes bank loans (total bank loans to the private sectors), stock prices (Kuala Lumpur Exchange Composite Index), real output (real GDP), the price level (Consumer Price Index), the interest rate (the overnight interbank rate), and the exchange rate (Ringgit against the US dollar exchange rate). The study uses quarterly data over the period from 1978, quarter I to 1998, quarter II. The results show that bank loans react positively to the increase in stock prices but there seems to be no influence from bank loans to stock prices. No influence of bank loans is found on real economic activity. The increase in bank loans is because of expansion in real economic activity. The exchange rate seems to affect bank lending activities through its effects on real output and stock prices. Bank loans play no significant role in transmitting stock market shocks to the real sector. The health of the banking sector depends on the stability of stock market and real output. Policy attempts to stimulate bank loans to promote stock market activities as a way to expand real economic activities may be not useful.

Ang and McKibbin (2007) examine the relationship between financial development and economic growth in Malaysia using time series data

over the period from 1960 to 2001.[11] Dummy variables are used in the estimation to account oil price crises in 1973 and 1979, economic recessions in 1985 and 2001, and the Asian financial crisis, 1997-1998. The study uses the vector error correction model in the estimation, which the variables included in the vector error correction model are real GDP per capita, financial development index, real interest rate, and financial depression index. The results show that financial liberalisation through removing the expressionist policies has a favourable effect in stimulating financial sector development. Financial depth and economic development are positively related but contrary to the conventional findings that output growth leads to higher financial depth in the long run.

3. Data and Methodology

The data are annual. The data for GDP (RM millions), GDP deflator (2000 = 100), gross fixed capital investment (RM millions), Consumer Price Index (CPI, 2000 = 100), exports of goods and services (RM millions), imports of goods and services (RM millions), and credit to private sector (RM millions) were collected from *International Financial Statistics*, International Monetary Fund (IMF).[12] Data for stock market value (RM millions) was collected from *Quarterly Bulletin*, Bank Negara Malaysia. Data for employment (thousands) was collected from *Economic Report*, Ministry of Finance Malaysia. All the data were transformed in the natural logarithms before estimation. Figure 1 shows the plots of the natural logarithms of the data. Generally, all the data are tended to be non-stationary series. Also, there is no strong evidence of a structural break in all the data.

The estimations are carried-out using sample over the period from 1970 to 2006, which is called full-sample and sample over the period from 1970 to 1996, which is called sub-sample. The economic growth model to be estimated is an augmented production function which is specified as follows:

[11]The Malaysian financial system is dominated by a large number of small and medium sized firms. In most private firms, families still control the management. The development of the financial markets was limited over the last 30 years. A majority of the companies in Malaysia are usually not listed and thus the more plausible source of finance is from banks rather than financial markets. The market concentration ratio is rather high for Malaysia because market capitalisation is concentrated in the hands of the ten largest firms. Malaysia financial system can be described as a bank-based system rather than a market-based system (BNM, 1999; Ang and McKibbin, 2007: 219-220).

[12]Monetary aggregates, namely M2 and M3 as a ratio of GDP, respectively are widely used in measuring financial deepening. They 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 (Ang and McKibbin, 2007: 220).

$$\log Y_t = \beta_{10} + \beta_{11} \log K_t + \beta_{12} \log L_t + \beta_{13} O_t + \beta_{14} \log B_t + \beta_{15} \log S_t + u_{1,t} \quad (1)$$

where log is the natural logarithm, Y_t is real GDP, K_t is capital, L_t is labour, O_t is openness to international trade, B_t is bank development, S_t is stock market development, and $u_{1,t}$ is a disturbance term. Capital is expressed by gross fixed capital formation divided by CPI, labour is expressed by employment, openness to international trade is expressed by exports and imports of goods and services divided by GDP, bank development is expressed by credit to private sector divided by GDP, and stock market development is expressed by stock market value divided by GDP. All the coefficients are expected to have a positive sign. Openness to international trade is included in the estimation to capture the influence of external sectors on economic growth as international trade contributes a big portion of Malaysian GDP (Table 1).

Table 1
Openness to International Trade of Malaysia, 1970-2006

Year	Openness to International Trade (%)
1970	86.88
1975	90.65
1980	112.59
1985	104.68
1990	146.89
1995	192.11
2000	228.88
2006	225.24

Note: Openness to international trade is expressed by exports and imports of goods and services divided by GDP and multiplied by 100. Source: *International Financial Statistics*, International Monetary Fund.

The Dickey and Fuller (1979) (DF) and Phillips and Perron (1988) (PP) unit root test statistics are used to examine the stationary of the data. Moreover, the Zivot and Andrews (1992) (ZA) unit root test statistics are used. The ZA unit root test statistics can examine one structural break in a series. The structural break could be in intercept, trend or both. The Johansen's cointegration method is used to test the number of cointegrating vectors. The Johansen's cointegration method can be used to compute two likelihood ratio tests for testing the number of cointegrating vectors in the system, namely the maximum eigenvalue (λ_{Max}) and trace (λ_{Trace}) statistics, which are respectively computed as follows:[13]

[13]Cheung and Lai (1993) show that the trace test is more robustness to both skewness and excess kurtosis in the residuals than the maximum eigenvalue test. Conversely, Enders (2004) proposes the maximum eigenvalue test is preferred than the trace test in deciding the number of cointegrating vector.

$$\lambda_{Max} = -T \ln(1 - \lambda_{r+1}) \tag{2}$$

$$\lambda_{Trace} = -T \sum_{i=r+1}^{p} \ln(1 - \lambda_i) \tag{3}$$

where ln is logarithm, T is the sample size, and λ_i is the eigenvalue. The λ_{Max} test statistic tests the null hypothesis (H_0) of r cointegrating against the alternative hypothesis (H_a) that there are (r + 1) cointegrating vectors. The λ_{Trace} test statistic tests the H_0 that has at most r cointegrating vectors in the system. That is, the number of cointegrating vectors is less than or equal to r (Johansen, 1988). The likelihood ratio test statistics can be sensitive to the choice of the lag length used in the estimation of the test statistics. The choice of the lag length used in the estimation of the test statistics is determined by the Schwarz Bayesian Criterion.[14]

Engle and Granger (1987) demonstrate that cointegration implies an error correction model. Suppose there is one cointegrating vector among variables in equation (1) and equation (1) can be re-estimated as follows:

$$\Delta \log Y_t = \beta_{20} + \sum_{i=0}^{p} \beta_{21i} \Delta \log K_{t-i} + \sum_{i=0}^{q} \beta_{22i} \Delta \log L_{t-i} + \sum_{i=0}^{r} \beta_{23i} \Delta O_{t-i} + \sum_{i=0}^{s} \beta_{24i} \Delta \log B_{t-i}$$

$$\sum_{i=0}^{u} \beta_{25i} \Delta \log S_{t-i} + \sum_{i=1}^{w} \beta_{26i} \Delta \log Y_{t-i} + \beta_{27} EC_{t-1} + u_{2,t} \tag{4}$$

where EC_{t-1} is an error correction term generated from the normalised cointegrating vector and $u_{2,t}$ is a disturbance term. The coefficient β_{27} measures the response of the regressand in each period to departure from equilibrium condition. Equation (4) gives both the short-run dynamics and long-run relationship of variables in equation (1) (Arize, 1997).

[14]The Schwarz Bayesian Criterion is a criterion for model selection among a class of parametric models. It is possible to increase the likelihood in the estimation by adding additional parameters. However, it may result in over-fitting. The Schwarz Bayesian Criterion resolves this problem by giving a penalty term for the number of parameters in the model. The penalty for additional parameters is stronger than that of the Akaike Information Criterion. The sample properties of the Schwarz Bayesian Criterion are well-researched in the literature (Mills and Prasad, 1992; Granger and Jeon, 2004; Raffalovich *et al.*, 2008). Raffalovich *et al.* (2008) show the evidence in favour of the Schwarz Bayesian Criterion over other model selection criteria.

4. Empirical Results and Discussions

The results of the DF and PP unit root test statistics are reported in Table 2a.[15] The lag length used to compute the DF unit root test statistics is based on the Schwarz Bayesian Criterion.[16] The lag length used to compute the PP unit root test statistics is based on Newey-West automatic bandwidth selection with the maximum lag length is set to three.[17] For full-sample, the results of the DF and PP unit root test statistics show that all variables are non-stationary in level but becoming stationary after taking the first difference or they are all said to be integrated of order one, except bank development (No Trend), which the DF unit root test statistic shows no evidence of a unit root whilst the PP unit root test statistic shows that it is integrated of order one. For sub-sample, the results of the DF and PP unit root test statistics show that all variables said to be integrated of order one, except capital (Trend). For capital (Trend), the DF unit root test statistic shows that it is a stationary series while the PP unit root test statistic shows no evidence of a unit root. Nevertheless, these series could be considered as a borderline case. Thus all series are said to be a unit root process in this study. The results of the ZA unit root test statistics (Crash and Break) are reported in Table 2b. Generally, the results show about the same conclusions as the DF and PP unit root test statistics, that is, the null hypothesis of a unit root is not rejected in level but it is rejected when the series are in the first difference.

The Johansen's cointegration method is used to examine the number of cointegrating vectors. The results of the Johansen's cointegration method are reported in Table 3. The results of the λ_{Max} and λ_{Trace} test statistics are computed with unrestricted intercepts and no trends.[18] For full-sample, the results of the λ_{Max} and λ_{Trace} test statistics show that the null hypothesis (H_o), that is, H_o: $r = 0$ is rejected at the 5 per cent level while the rest are not rejected at the 5 per cent level. This indicates that real GDP, capital, labour, openness to international trade, bank development, and stock market development are cointegrated. For sub-sample, the results of the λ_{Max} test statistic show that all the null hypotheses are not rejected at the 5 per cent level. However, the results of the λ_{Trace} test statistic show that H_o: $r = 0$ and $r <= 1$ are rejected at the 5 per cent level while the rest are not rejected at the 5 per cent level. Thus this study concludes that real GDP, capital, labour, openness to

[15]See Enders (2004) for a unit root testing procedure.
[16]The use of the Akaike Information Criterion to choose the lag length for the DF unit root test statistics, which are not reported, produces about the same conclusion as the lag length is chosen based on the Schwarz Bayesian Criterion.
[17]A practical guide for the maximum lag length used with annual data is three years (Enders, 2004).
[18]This procedure is used as it produces the best estimation in terms of the expected signs of the coefficients.

international trade, bank development, and stock market development are cointegrated.[19]

Table 2a
The Results of the Dickey and Fuller (1979) (DF) and Phillips and Perron (1988) (PP) Unit Root Test Statistics

	DF - No Trend	PP - No trend	DF - Trend	PP - Trend
Full-Sample				
$\log Y_t$	-1.7509(1)	-1.6896(2)	-1.7358 (0)	-1.9702(3)
$\Delta \log Y_t$	-4.8152***(0)	-4.8180***(1)	-4.9736***(0)	-4.9809***(1)
$\log K_t$	-2.4659(1)	-1.9324(1)	-2.5667(1)	-1.7244(1)
$\Delta \log K_t$	-4.1443***(0)	-4.5483***(1)	-4.5141***(0)	-4.6904***(1)
$\log L_t$	-0.7633(0)	-0.7801(1)	-2.5591(0)	-2.5736(1)
$\Delta \log L_t$	-5.7358***(0)	-6.0708***(1)	-5.7115***(0)	-6.0434***(1)
O_t	0.1144(0)	0.6319(1)	-2.3775(0)	-2.1339(1)
ΔO_t	-5.2890***(0)	-5.6485***(1)	-5.2933***(0)	-5.8633***(1)
$\log B_t$	-2.4446(0)	-2.1818(1)	-0.8319(0)	-0.5454(1)
$\Delta \log B_t$	-2.1165(2)	-6.1383***(1)	-6.0377***(0)	-6.4150***(1)
$\log S_t$	-1.8907(0)	-1.6439(1)	-2.5209(0)	-2.6753(1)
$\Delta \log S_t$	-7.6673***(0)	-8.0740***(1)	-7.5674***(0)	-7.9459***(1)
Sub-Sample				
$\log Y_t$	0.2100(0)	-1.1400(0)	0.1215(2)	-1.5468(2)
$\Delta \log Y_t$	-3.5097**(0)	-3.4693**(0)	-3.5069**(1)	-3.4098**(2)
$\log K_t$	-1.6205(1)	-1.2349(2)	-3.6681**(1)	-2.2971(2)
$\Delta \log K_t$	-3.0858***(0)	-3.2153*(1)	-3.0922 (0)	-3.2182(1)
$\log L_t$	-0.1538 (0)	-0.1465(2)	-2.0051(0)	-2.0051(0)
$\Delta \log L_t$	-4.0490***(0)	-3.9590***(2)	-3.8738***(0)	-3.7722**(2)
O_t	1.0652(2)	0.8045(3)	-1.7803(0)	-1.7262(3)
ΔO_t	-4.3041***(1)	-3.8378***(3)	-4.7944***(1)	-3.8315**(3)
$\log B_t$	-1.0523(0)	-1.0740(2)	-2.1960(0)	-2.2221(3)
$\Delta \log B_t$	-5.4543***(0)	-5.5381***(2)	-5.0033***(1)	-5.4611***(3)
$\log S_t$	-0.1643(1)	-0.5393(3)	1.5839(1)	-2.0461(2)
$\Delta \log S_t$	-6.9231***(0)	-7.1952***(3)	-5.9617***(1)	-8.2324***(3)

Notes: No Trend denotes the DF or PP t-statistic is estimated based on the model including an intercept. Trend denotes the DF or PP t-statistic is estimated based on the model including an intercept and a time trend. Values in parentheses are the lag length used in the estimation of the DF or PP unit root test statistic. The critical values can be obtained from MacKinnon (1996). *** (**) denotes significance at the 1% (5%) level.

[19]Johansen (2002) shows that if the number of parameters per observation, *kn/T*, where *k is* the number of lag in the VAR, *n* is the number of endogenous variables, and *T* is the sample size, is less than 0.20, the likelihood ratio tests will give robust results. The number of parameters per observation for full-sample is 0.14 and for sub-sample is 0.19. The number of parameters per observation are below the threshold of reliable estimate and could indicate the absent of small-sample bias.

Table 2b
The Results of the Zivot and Andrews (1992) (ZA) Unit Root Test Statistics

	ZA - Crash	ZA - Break
Full-Sample		
$\log Y_t$	-5.9991***(0)	-6.0208***(1)
$\Delta \log Y_t$	-4.9897**(1)	-4.8943(0)
$\log K_t$	-5.0430**(1)	-4.9461(1)
$\Delta \log K_t$	-5.2953**(0)	-5.2490**(1)
$\log L_t$	-4.7934(0)	-4.7387(0)
$\Delta \log L_t$	-6.4036***(0)	-6.9554***(1)
O_t	-3.5278(0)	-3.1087(0)
ΔO_t	-6.1438***(0)	-6.3633***(0)
$\log B_t$	-2.1829(0)	-2.7664(0)
$\Delta \log B_t$	-6.7468***(0)	-7.1603***(0)
$\log S_t$	-4.0757(0)	-5.2381**(0)
$\Delta \log S_t$	-8.3154***(1)	-8.2707***(1)
Sub-Sample		
$\log Y_t$	-3.7391(1)	-5.6480**(1)
$\Delta \log Y_t$	-5.1450**(0)	-5.4661**(0)
$\log K_t$	-5.4974***(1)	-5.1380**(1)
$\Delta \log K_t$	-5.0340**(0)	-4.7675(0)
$\log L_t$	-4.0642(0)	-4.0321(0)
$\Delta \log L_t$	-4.9669**(0)	-4.9372(0)
O_t	-3.5830(0)	-3.9823(0)
ΔO_t	-5.3710***(0)	-5.0842**(0)
$\log B_t$	-4.6848(0)	-4.5057(0)
$\Delta \log B_t$	-6.4472***(0)	-6.6416***(0)
$\log S_t$	-4.6561(0)	-4.6028(0)
$\Delta \log S_t$	-6.1353***(1)	-7.4520***(1)

Notes: Crash denotes the ZA unit root test statistic for testing an abrupt change in level but no change in the trend rate. Break denotes the ZA unit root test statistic for testing changes in level and trend. Values in parentheses are the lag length used in the estimation of the ZA unit root test statistics. The critical values can be obtained from Zivot and Andrews (1992). *** (**) denotes significance at the 1% (5%) level.

The results of the normalised cointegrating vector are reported in Table 4. The results of the likelihood ratio test, which tests an explanatory variables is zero are mostly rejected. Thus all explanatory variables are important to be included in the model. For full-sample, the results of the likelihood ratio test statistic show that labour and stock market development are rejected at the 1 per cent level. For sub-sample, the results of the likelihood ratio test statistic show that labour, openness to international trade, and stock market development are rejected at the 1 or 5 per cent level. The results of the likelihood ratio test statistic for bank development are all not rejected. Thus there is some evidence that stock market development is more important than bank development in the long run. For full-sample and the sub-sample, all explanatory variables are found to have the expected signs. An increase in capital,

labour, openness to international trade, bank development or stock market development will lead to an increase in real GDP. All coefficients are found to be less than one.

Table 3
The Results of the Johansen (1988) Likelihood Ratio Test Statistics

			λ_{Max} Test Statistic			
H_o:	$r = 0$	$r \leq 1$	$r \leq 2$	$r \leq 3$	$r \leq 4$	$r \leq 5$
H_a:	$r = 1$	$r = 2$	$r = 3$	$r = 4$	$r = 5$	$r = 6$
Full-Sample	45.06**	24.87	21.74	10.79	4.78	0.41
Sub-Sample	44.17**	29.45	25.21	9.83	7.79	4.77
c.v.	39.83	33.64	27.42	21.12	14.88	8.07
			λ_{Trace} Test Statistic			
H_o:	$r = 0$	$r \leq 1$	$r \leq 2$	$r \leq 3$	$r \leq 4$	$r \leq 5$
H_a:	$r \geq 1$	$r \geq 2$	$r \geq 3$	$r \geq 4$	$r \geq 5$	$r = 6$
Full-Sample	107.65**	62.59	37.72	15.97	5.19	0.41
Sub-Sample	121.22**	77.06**	47.60	22.39	12.56	4.77
c.v.	95.87	70.49	48.88	31.54	17.86	8.07

Notes: The VAR = 1 is used in all the estimations. c.v. denotes the 95% critical value. ** denotes significance at the 5% level.

Table 4
The Results of the Normalised Cointegrating Vector

Full-Sample	$\log Y_t = 0.0026 \log K_t + 1.6449 \log L_t + 0.0433\ O_t + 0.0466 \log B_t + 0.0611 \log S_t$				
	(0.0044)	(17.5078)***	(0.3240)	(1.2309)	(17.6725)***
Sub-Sample	$\log Y_t = 0.1390 \log K_t + 1.3244 \log L_t + 0.3158\ O_t + 0.0759 \log B_t + 0.0277 \log S_t$				
	(0.1354)	(14.3038)***	(6.0573)**	(1.1530)	(4.1997)**

Notes: The VAR = 1 is used in all the estimations. Values in the parentheses are the likelihood ratio test statistic to test an explanatory variable is zero. *** (**) denotes significance at the 1% (5%) level.

Cointegration implies an error correction representation.[20] This study uses the general-to-specific modelling strategy to find the representation.[21] Initially, three lags of each first difference variable are used, and then the dimensions of the parameter space are reduced to a

[20]Series that are integrated of the same order may cointegrate together. The cointegrated series may drift apart from each other in the short-run but the distance between them tends to be constant or in a stationary process in the long-run. More formally, a vector of series, y_t is said to be cointegrated if each of the series is integrated of the same order, an existing non-zero cointegrating vector, α' such that the linear combination of these series, $\alpha' y_t$ are stationary or is said to be integrated of zero and denoted by I(0) (Engle and Granger, 1987).

[21]The general-to-specific modelling strategy begins with a general statistical model that captures the essential characteristics of the underlying dataset. Then the general statistical model is reduced in complexity by eliminating statistically insignificant variables, checking the validity of the reductions at every stage to ensure congruence of the final model (Hendry, 1993; Campos, Ericsson, and Hendry, 2005). Monte Carlo studies show that the general-to-specific modelling strategy has excellent characteristics for model selection (Hoover and Perez, 1999, 2004).

final parsimonious specification by sequentially imposing statistically insignificant variables and also take into consideration the goodness of fit of the estimated model, that is, adjusted R^2. The results of the error correction models are reported in Table 5. For full-sample and sub-sample, the results show all the models to have a high adjusted R^2. Nonetheless, the estimated model for full-sample is found to have a higher adjusted R^2 than the estimated model for sub-sample. For full-sample, the adjusted R^2 is 0.8888. For sub-sample, the adjusted R^2 is 0.7357. For full-sample, the model fulfils the conditions of no-autocorrelation (except that LM(3) is found to be significant at the 10 per cent level), and normality and homoscedasticity of disturbance terms, except no-functional form. However, the autoregressive conditional heteroskedasticity (ARCH) tests are all statistically insignificant. For sub-sample, the model fulfils the conditions of no-autocorrelation, and normality and homoscedasticity of disturbance terms, except no-functional form. Nonetheless, the ARCH tests are all statistically insignificant. The one period lagged of error correction terms are all found to have the expected negative sign and statistically significant. Thus the finding supports the validity of an equilibrium relationship in the models. Figure 2 shows the plots of cumulative sum of recursive errors (CUSUM) and cumulative sum of squares of recursive errors (CUSUMSQ) statistics. From the plots, there is no evidence of the error correction models instability. The test of adequacy of predictions (Chow's second test) shows no evidence of a structural break for the full-sample. Generally, capital, labour, openness to international trade, bank development, and stock market development are important to real GDP in the short run.

The results of the Johansen's cointegration method show that there is some evidence stock market development to have a more influential impact on economic growth than bank development in the long run. Moreover, the results of the error correction models show that generally, bank development and stock market development are important to economic growth in the short run. The finding that bank development and stock market development are important to promote economic growth is consistent with the findings in the literature. Ang and McKibbin (2007) show that financial liberalisation has a favourable effect in stimulating financial sector development. Financial depth and economic development are positively related and output growth leads to higher financial depth in the long run. Bagehot (1873), Levine (1997), Levine and Zervos (1998), and Caporale, Howells, and Soliman (2004), amongst others, show that financial intermediaries especially bank and stock market are important to promote economic growth of a country. Mansor (2007) finds that, amongst others, the financial markets development does matter for economic development. There is no significant relationship between financial intermediary development and economic development. In another paper, Mansor (2006) finds,

amongst others, no influence of bank loans on real economic activity. Moreover, contraction in real economic activity tends to lead to deterioration of bank lending activities. Law, Azman-Saini, and Smith (2006) show that financial sector evolution tends to stimulate and promote economic development. The causally independent hypothesis between finance and economic growth is rejected supporting the supply-leading and demand following hypotheses. Financial sector evolution is important for economic development. Conversely, Law (2004) shows that bank development is found to have more influential impact on economic growth than stock market. Hondroyiannis, Lolos, and Papapetrou (2005) show that the contribution of stock market development to economic growth appears to be substantially smaller compared to bank development. One of the important roles of stock market is to re-channel funds from financial intermediaries to productive and innovative investment (Caporale, Howells, and Soliman, 2004: 47). Thus policies that support both bank development and stock market development are important than of either bank or stock market.

Banking sector and stock market in Malaysia shall be further improved and strengthened. The Asian financial crisis, 1997-1998 shows the importance of reliability and stability of financial system in an economy. The crisis also raises the reliability of emerging financial system. After the crisis, efforts have been taken to strengthen and consolidate the financial system in Malaysia (Ang and McKibbin, 2007: 216). The consolidation of domestic banking institutions can contribute to the development of strong domestic banking groups, providing a wider range of competitive, innovative, and customised financial products and services. The implementation of the 10-year Financial Sector Master Plan (FSMP) and Capital Market Master Plan (CMP) shall strengthen the resilience and competitiveness of the banking system and the capital market (Malaysia, 2006: 171).

The FSMP and the CMP shall provide the framework for the gradual liberalisation of the banking sector to meet increasing competition in a more globalised operating environment (Malaysia, 2006: 171). Corporate governance in banking sector shall be further enhanced. This includes the revision and issuance of guidelines to prescribe broad principles, minimum standards, and specific requirements for corporate governance, particularly with respect to improved financial disclosure, accounting standards, and internal control. These are also enabled benchmarking with international best practices. For the capital market, listing requirements were revamped, whistle blowing provisions were introduced, and the range of sanctions for breach of requirements was expanded (Malaysia, 2006: 173).

Table 5
The Results of the Error Correction Models

	Full-Sample	Sub-Sample
Constant	-3.2890 (-4.2248)***	-2.0761 (-2.6902)**
$\Delta \log K_t$	0.1748 (6.0759)***	-
$\Delta \log K_{t-1}$	-0.0709 (-3.0550)***	-
$\Delta \log K_{t-2}$	-	0.0728 (1.8324)*
$\Delta \log K_{t-3}$	0.0662 (3.8346)***	-
$\Delta \log L_t$	0.8730 (4.4375)***	0.9587 (5.5171)***
$\Delta \log L_{t-1}$	-0.5574 (-3.4747)***	-
$\Delta \log L_{t-2}$	-0.3225 (-2.1981)**	-0.4674 (-2.2665)**
$\Delta \log L_{t-3}$	-0.3200 (-2.0295)*	-
ΔO_t	-	0.1948 (3.5950)***
ΔO_{t-1}	0.0266 (0.7973)	-
$\Delta \log B_t$	-	0.0587 (1.6413)
$\Delta \log B_{t-2}$	-0.0690 (-2.7611)**	-0.0975 (-3.1028)***
$\Delta \log B_{t-3}$	0.0464 (1.7409)	-
$\Delta \log S_t$	0.0082 (1.6292)	-
$\Delta \log S_{t-1}$	-	0.0143 (2.1952)**
$\Delta \log S_{t-2}$	-0.0099 (-2.0407)*	-
$\Delta \log S_{t-3}$	-0.0139 (-2.2672)**	-
$\Delta \log Y_{t-2}$	0.4994 (4.4754)***	-0.2539 (-1.5109)
EC_{t-1}	-0.4751 (-4.2793)***	-0.4560 (-2.7639)**

Table 5 (Continued)

Diagnostic tests:		
Adj. R^2	0.8888	0.7357
LM(1)	0.6501	0.0019
LM(2)	2.5651	0.5716
LM(3)	7.1119*	1.8683
Reset	7.2621**	3.3064*
ARCH(1)	0.1455	2.0809
ARCH(2)	0.2977	2.7978
ARCH(3)	1.6455	3.3448
Chow	0.6782	-
Normal	0.5430	1.0550
Hetero	0.7794	0.0183

Notes: Notes: EC_{t-1} is the one period lagged of error correction term from the normalised cointegrating vector. Adj. R^2 is the adjusted R^2. LM is the Lagrange multiplier test of disturbance term serial correlation. Reset is the test of functional form. ARCH is the Lagrange multiplier test for autoregressive conditional heteroskedasticity (ARCH) in disturbance term. Chow is the test of adequacy of predictions (Chow's second test). Normal is the test of the normality of disturbance term. Hetero is the test of heteroscedasticity. Values in parentheses under the coefficients are the t-statistic whilst values in the parentheses in the diagnostic tests are the lag lengths used in the computing the test statistics. *** (**,*) denotes significance at the 1% (5%, 10%) level.

The regulatory and supervisory framework shall be strengthened to ensure continued stability. In the banking sector, risk management practices shall be further enhanced and prudential regulations shall be reviewed to ensure they remained effective while promoting competition and innovation. Supervisory activities shall be strengthened and a sound regulatory framework is important particularly with respect to capital adequacy and liquidity risk management (Malaysia, 2006: 173; BNM, 2008: 59). Bank development and stock market development are important to economic growth. The success story of financial development in Malaysia could be an example to other developing country.

5. Concluding Remarks

This study examines the impact of bank development and stock market development on economic growth in Malaysia. For full-sample and sub-sample, the results of the DF, PP, and ZA unit root test statistics show that generally real GDP and its determinants are found to be integrated of order one. Moreover, the results of the Johansen's cointegration method show that real GDP and its determinants are cointegrated. An increase in capital, labour, openness to international trade, bank development or stock market development will lead to an increase in real GDP. Moreover, these variables are generally found to be important in influencing real GDP in the short run. There is some evidence that stock market development is found to have a stronger impact on real

GDP than bank development in the long run. Banking sector and stock market in Malaysia shall be further improved and strengthened. The FSMP and the CMP shall provide the framework for the strength of banking sector and stock market. The regulatory and supervisory framework shall be strengthened to ensure continued stability. Policy makers shall continue to promote more information availability and more transparency in the banking and stock market industries. The availability of more quality information and more transparency in the banking and stock market industries will channel the funds in the economy more productively. The success story of financial development in Malaysia could be an example to other developing country. On the whole, bank development and stock market development are important to economic growth.

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Figure 1
The Plots of the Natural Logarithms of Real GDP (log Y_t), Capital (log K_t), Labour (log L_t), Bank Development (log B_t), and Stock Market Development (log S_t) and Openness to International Trade (O_t), 1970-2006

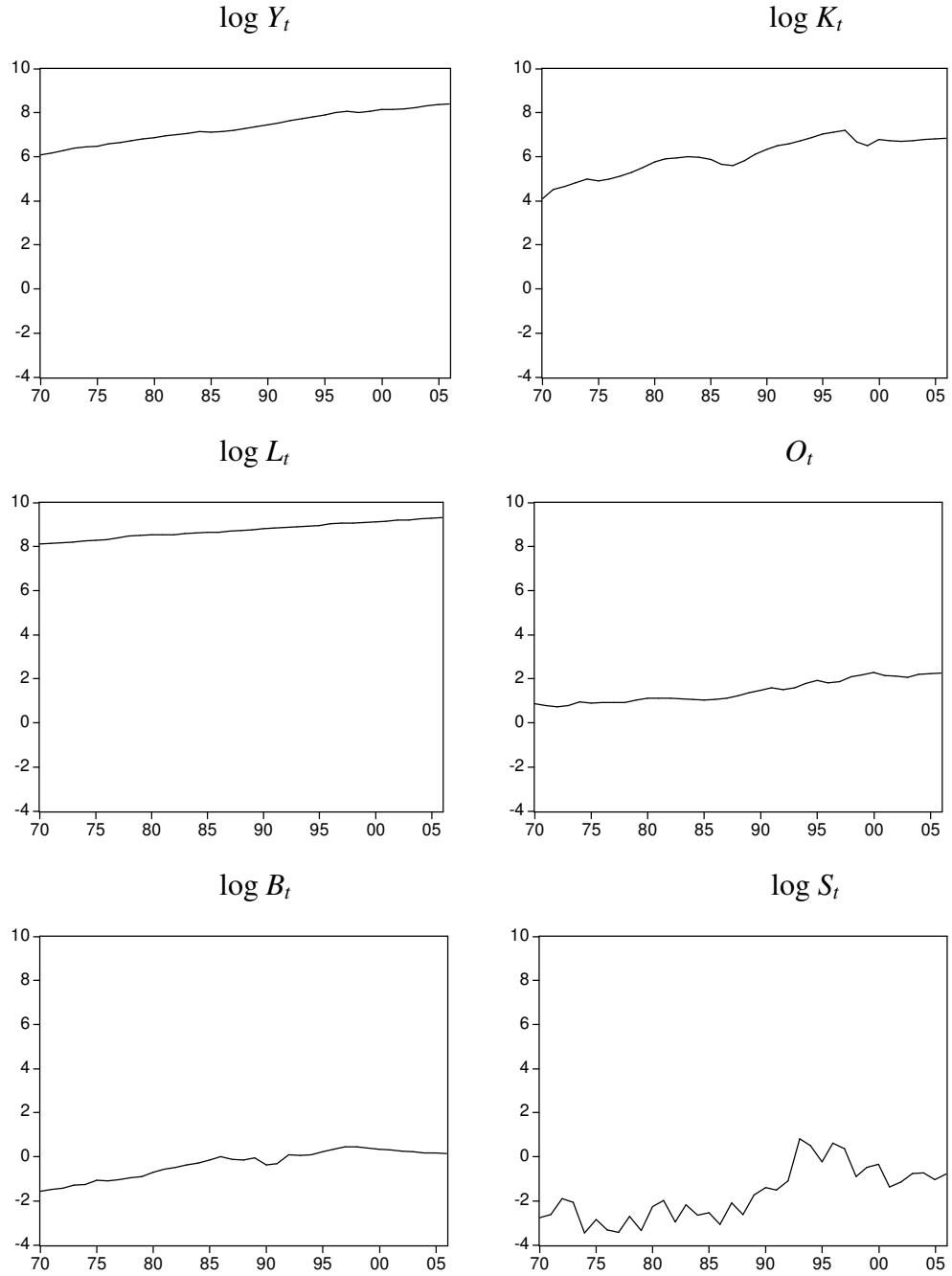
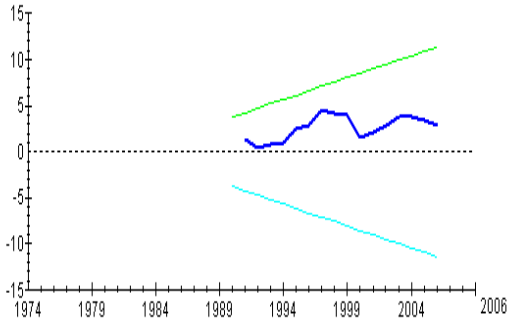
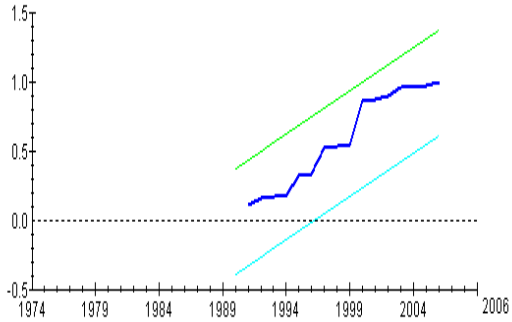


Figure 2
The Plots of Cumulative Sum of Recursive Residuals (CUSUM) and Cumulative Sum of Squares of Recursive Residuals (CUSUMSQ)

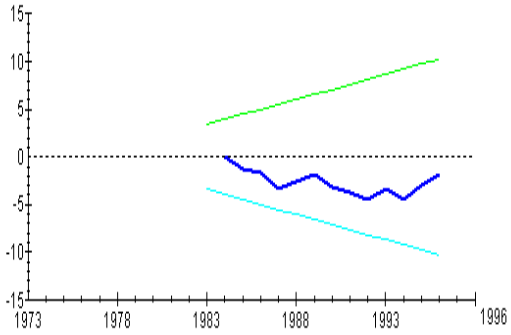
CUSUM CUSUMSQ

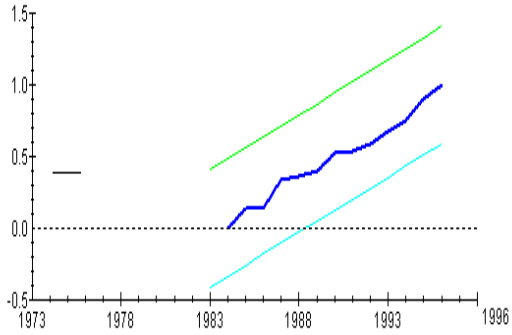
Full-Sample





Sub-Sample





Note: The straight lines represent critical bounds at the 5% significance level.