DOES FINANCIAL DEVELOPMENT CAUSE ECONOMIC GROWTH IN THE ASEAN-4 COUNTRIES♣

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Abstract
This paper empirically examines the short- and long-run finance-growth nexus
during the post-1997 financial crisis in the ASEAN-4 countries (i.e., Indonesia,
Malaysia, Thailand and the Philippines) by employing battery of times series
techniques such as autoregressive distributed lag (ARDL) model, vector error
correction model (VECM), variance decompositions (VDCs) and impulse-
response functions (IRFs). Based on the ARDL models, the study documents a
long-run equilibrium between economic growth, finance depth, share of
investment and inflation. The study also finds that the common sources of
economic progress/regress among the countries are price stability and financial
development. Granger causality tests based on the VECM further reveals that
there are: (i) no causality between finance-growth in Indonesia; the finding in
favour of "the independent hypothesis" of Lucas (1988); (ii) a unidirectional
causality running from finance to growth in Malaysia, thus supporting "the
finance-growth led hypothesis" or "the supply-leading view"; (iii) a
bidirectional causality between finance-growth in Thailand, the finding accords
with "the feedback hypothesis" or "bidirectional causality view"; and (iv) a
unidirectional causality stemming from growth to finance in the Philippines,
the finding echoes with "the growth-led finance hypothesis" or "the demand-
following view" of Robinson (1952). Based on the VDCs and IRFs, the study
discovers that the variations in the economic growth rely very much on its own
innovations. If policy makers want to promote growth in the ASEAN-4
countries, priority should be given for long run policies, i.e., the enhancement
of existing financial institutions both in the banking sector and stock market.

Keywords: Financial development; Growth, ARDL; Multivariate causality;
Impulse-response functions; ASEAN-4.

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1. Introduction

Ten years aftermath of the financial turmoil hit the Asian countries, the economies of ASEAN (Association of Southeast Nations) now have been virtually recovered. Based on IMF Report (2006), the growth rate of the countries varied from 3.8 to 8.2 percent in 2006. Of ten ASEAN members, the growth rates of five ASEAN countries [i.e., Vietnam (8.2%), Singapore (7.9%), Laos (7.3%), Myanmar (7.0%) and Malaysia (5.9%)] are above the regional average growth rate which is 5.8 percent, whilst the growth rate of the rest five ASEAN members [i.e., Indonesia (5.6%), the Philippines (5.3%), Thailand (5%), Cambodia (5%) and Brunei Darussalam (3.8%)] are below the regional average growth rate. Comparing to other larger emerging economies such as India and China, the growth rates of ASEAN are however slightly higher (Mussa, 2006). Why does the economic growth of these countries grow at different rates? Although this fundamental question has been raised by researchers in the area of economic development for the case of developed economies since early 1930s, but it is still relevant in today's context of the ASEAN economies. The empirical growth literature has come up with numerous plausible explanations of cross-country differences in growth, including the degree of macroeconomic stability, international trade, resource endowments, legal system effectiveness, religious diversity and educational attainment. The list of likely factors continues to expand, apparently without limit (Khan and Senhadji, 2000).

Of those possible factors contributing to economic growth, the role of financial sector has begun to receive attention more recently. Initially, the recognition of a significant relationship between financial development and economic growth dates back as least to the *Theory of Economic Development* by Schumpeter (1912). However, the question of whether financial development preceded economic growth or *vice versa* has been debated in the historical literature on economic growth and finance. The pioneering studies on this area such as Goldsmith (1969), Schumpeter (1932) and more recently of McKinnon (1973) and Shaw (1973) documented positive relationship between financial development and economic growth. Robinson (1952) found that financial development follows economic growth. Lucas (1988) argued that financial development and economic growth are independent and not causally related. Finally, Demetrides and Hussein (1996) and Greenwood and Smith (1997) postulated that the two variables are mutually causal, that is they have a bidirectional causality.

Despite voluminous studies on finance-growth nexus in the advanced economies, the similar studies on the ASEAN economies is inadequate considering the vast-growing economic activities in the region. Among the studies on finance-growth nexus focused on the Asian economies have been conducted by Al-Yousif (2002), Choong et al. (2003), Vaithilingam et al. (2005) and Habibullah and Eng (2006). Taking 30 developing countries

(including ASEAN-4 countries)[1] as the case study, Al-Yousif (2002) documented that financial development positively affects economic growth based on the panel data and time series analyses. For Malaysian case, Choong et al. (2003) and Vaithilingam et al. (2005) examined the finance-growth nexus from the perspectives of the stock market and banking sector, respectively. By adopting similar approach, ARDL technique the former study found that the stock market tends to stimulate growth during the period 1978-2000, while the positive effect of the banking sector on growth is found by the latter study during the period 1976-1999. Finally, by employing GMM technique on their panel data of 13 Asian developing countries for the period 1990-1998, Habibullah and Eng (2006) found the existence of the supply leading growth hypothesis. Their finding generally implies that financial intermediation promotes economic growth; thereby the policy of liberalization and financial reforms adopted by these Asian countries has improved economic growth.

Reviewing earlier studies conducted either in the emerging or advanced economies on finance-growth nexus, economists hold different views on the existence and direction of causality between financial development and economic growth. Earlier empirical studies on this issue documented mixed and inconclusive findings. This could be partly due to a number of reasons. Examining the finance-growth nexus by adopting different methods, sets of data, and samples of the study may lead to the inconsistent findings. This study is, therefore, aimed at empirically re-examining the short- and long-run relationships between financial development and economic growth in the ASEAN-4 economies, i.e., Indonesia, Malaysia, Thailand and the Philippines during the post-1997 Asian financial turmoil by adopting the latest technique autoregressive distributed lag (ARDL) bound testing approach to test for cointegration. It also attempts to investigate the finance-growth nexus using multivariate causality tests within a vector error correction model (VECM). Finally, the paper also seeks to explore the relative strength of the variables in affecting economic growth using the variance decompositions (VDCs) and the impulse-response functions (IRFs) based on the structural vector autoregression (VAR) framework. Although the two-first objectives of this study have been examined by Al-Yousif (2002), Choong et al. (2003), Vaithilingam et al. (2005) and Habibullah and Eng (2006) on few ASEAN economies using different approaches, but the last objective of the study is beyond their scope of studies.[2]

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[1] The ASEAN-4 countries that are examined by Al-Yousif (2002) included Malaysia, Thailand, the Philippines and Singapore. Although Indonesia is known as one of the founding members of ASEAN, but Indonesia was not included in his study. This provides more motivation to include Indonesia in our present study.

[2] Indonesia is not included in Al-Yousif's (2002) study, while the studies of Choong et al. (2003) and Vaithilingam et al. (2005) only focused on the Malaysian economy. Finally, Habibullah and Eng (2006) analysis is on the pre-1997 financial crisis based on the panel data analysis.

The rest of the paper is organized as follows. Section 2, provides a brief overview of the ASEAN. Section 3 discusses the theoretical issues on the finance-growth nexus. The empirical framework and data used in the study is in turn explained in Section 4. The empirical results and discussion of the finding are presented in Section 5. Finally, Section 6 summarizes the main findings and provides some policy implications.

2. A Brief Overview of ASEAN

The Association of Southeast Asian Nations (ASEAN) was established on 8 August 1967 in Bangkok by the five original member countries, namely Indonesia, Malaysia, the Philippines, Singapore and Thailand.[3] This association is formed with three main objectives: to promote the economic, social and cultural development of the region through cooperative programs, to safeguard political and economic stability of the region against high-powered rivalries, and to serve as a forum for the resolution of intra-regional differences. Although this group of countries is highly diverse economically and socially in terms of culture, one common characteristic that defines ASEAN as an economic region is that they are all market-based economies with a high degree of trading dependences (Wongbangpo, 2000).

ASEAN has recorded a remarkably consistent high economic growth for the last two decades before the 1997 financial crisis. ASEAN has been one of the fastest growing regional groups in the world. This remarkable success, according to Yean (1997), is based on their onward oriented growth strategy, which relied on international trade and foreign direct investment. For example, in the period 1987-1992, Wongbangpo (2000) reported that on average the growth rate of real GDP for the ASEAN founding members was 7.3%. Individually, the ASEAN's average annual real GDP growth rate during the period 1987-1995 was around 9% for Malaysia, Singapore and Thailand, while Indonesia and the Philippines achieved 6.6% and 3.3%, respectively. These performances were significantly above the 2.8% experienced by developed countries as a group, exceeded the 2.5% achieved by North America, and surpassed the 2.2% realized by the world.

Aftermath the 1997 financial turmoil, ASEAN continued to focus on consolidating the economic recovery of the region. The region registered a GDP growth of 5.5% in 2005 from only 3.6% in 1999. Accommodative monetary and fiscal policies continued to underpin growth, as structural reforms were actively pursued, such as corporate restructuring and fiscal consolidation. The year 2003-2006 saw the gradual return of foreign investments in the region, as evident in rising stock prices in most countries and expanding capital markets. Stable prices and currencies also helped

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[3] As a part of its widening processes, Brunei Darussalam was later accepted in the association on 8 January 1984, Vietnam on 28 July 1995, Laos PDR and Myanmar on 23 July 1997, and Cambodia on 30 April 1999. See www.aseansec.org

strengthen the region's financial systems. The prospects for growth in ASEAN economies are stronger in 2007 with a projected GDP growth of 6.0% to 7.0%. Growth is expected to be broad based, with domestic and external demand providing impetus for expansion.[4]

Table 1: Selected Basic ASEAN Indicators, 2005 (as of 29 December 2006)

Country	GDP Per capita at constant price		Total Trade	FDI Inflow[c]	Financial Depth[d]	Share of Investment[e]	Inflation[f]
	US$	US$ PPP [b]	US$ million	US$ million	US$ million	US$ million	%
Brunei Darussalam	25,751.3 (39.92)	24,946.0 (27.30)	7,872.4 (0.64)	288.5 (0.76)	n.a	n.a	1.22
Cambodia	404.3 (0.63)	2,254.0 (2.47)	5,916.2 (0.48)	381.2 (1.00)	n.a	n.a	5.65
Indonesia	1,278.6 (1.98)	4,446.0 (4.87)	143,360.8 (11.70)	6,107.3 (16.04)	55.02 (5.86)	4,764.51 (80.32)	10.45
Laos PDR	479.9 (0.74)	2,095.0 (2.29)	875.9 (0.07)	27.7 (0.07)	n.a	n.a	7.17
Malaysia	5,008.5 (7.76)	11,126.0 (12.18)	254,683.6 (20.79)	3,964.8 (10.41)	147.54 (15.71)	794.52 (13.39)	2.96
Myanmar [a]	199.4 (0.31)	1,539.0 (1.68)	4,756.7 (0.39)	71.8 (0.19)	n.a	n.a	9.37
Philippines	1,154.5 (1.79)	4,865.0 (5.32)	88,672.9 (7.24)	1,132.5 (2.97)	85.63 (9.12)	6.41 (0.11)	7.64
Singapore	26,880.7 (41.67)	28,428.0 (31.11)	429,966.9 (35.10)	20,080.5 (52.73)	574.77 (61.21)	350.20 (5.90)	0.47
Thailand	2,720.8 (4.22)	8,563.0 (9.37)	227,613.5 (18.58)	4,007.8 (10.52)	76.00 (8.09)	16.10 (0.27)	4.54
Vietnam	635.3 (0.98)	3,112.0 (3.41)	61,170.4 (4.99)	2,020.8 (5.31)	n.a	n.a	8.25
ASEAN	**64,513.3** (100)	**91,374.0** (100)	**1 224 889.4** (100)	**38 082.9** (100)	**938.96** (100)	**5,931.75** (100)	-

Note: [a] Myanmar GDP based on fiscal year from April to March of the following year, and derived foreign exchange rate based on IMF data.
[b] Recomputed based on the IMF estimates and actual country data.
[c] Refers to net inflow of foreign direct investments as measured in the balance of payments; also includes reinvested earnings. Source: http://www.aseansec.org/stat/Table1.pdf
[d, e, f] Calculated from the International Financial Statistic Online. www.imfstatistics.org. In the parentheses are the ratios of selected basic indicators to the total value of ASEAN

Table 1 provides the key economic indicators for ASEAN countries for the year 2005. In terms of GDP per capita, Singapore recorded as the richest country with US$ 26,880.7 annually income per head, while the lowest one was Myanmar with US$ 199.4 annually income per capita. Likewise, Singapore recorded the highest proportion of the financial depth (61.21%) to the total ASEAN finance depth, while Indonesia recorded the lowest one with only 5.86% of the total finance depth in the region. In terms of share of

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[4] Please refer to the ASEAN Secretariat Website at: www.aseansec.org, for further details.

investment, Indonesia recorded as the highest contributor about 80% to the ASEAN share of investment whilst the Philippines recorded as the lowest contributor about 0.10% to the total share of investment in the region. Finally, among the ASEAN founding members, the highest inflation takes place in Indonesia (10.45%), followed by the Philippines (7.64%), Thailand (4.54%), Malaysia (2.96%) and Singapore (0.47%).

3. Theoretical Underpinnings

The connection between the financial development and economic growth has been a subject of considerable interest in the development of economic and finance literatures in recent years. In this framework, financial development is considered to be the principal input for economic growth. It is an important element to affect the rate of economic growth by altering productivity growth and the efficiency of capital. It also affects the accumulation of capital through its impact on the saving rate by altering the proportion of saving (Pagano, 1993; and Levine, 1997). The theoretical support can be traced back to the work of Schumpeter (1912) where he argued that financial intermediaries sector alter the mobilizing of saving for the successful projects by managing risk, monitoring managers, and then facilitating transaction which are essentially improve technological innovation and economic development. In their seminal works, McKinnon (1973) and Shaw (1973) believed that the financial liberalization will increase savings, capital accumulation which finally to be invested and therefore enhance growth.

Of late, the development theory of economic growth has been widely used as literature in the study of economic development, macroeconomic and other related subjects. Some of these theories were introduced by Rostow (1960), Harrod (1939), Domar (1946), Lewis (1954) and Solow (1956). However, only few of these theories focussed explicitly on the role of financial development in promoting economic growth. On one hand, Harrod (1939) and Domar (1946) opined that to increase a growth rate, new investments representing net additions to the capital stock are necessary, thus the national saving ratio and national output ratio determine the rate of growth.[5] On the other hand, in his neoclassical theory of growth, Solow (1956) expanded the Harrod-Domar's theory of growth by adding a second factor, labour, and introducing a third independent variable, technology, to the growth equation.[6]

Later studies, both theoretical and empirical, have attempted to deepen our understanding of the different aspects of the finance-growth nexus by

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[5] The model explains the economies must save and invest a certain proportion of their GNP, the more saving and investment, the faster economies can grow. The model also has received some critics. For a more detailed explanation, see Todaro (2000).

[6] In this model, Solow (1956) used the standard aggregate production function in which $Y=Ae^{\mu t}K^{\alpha}L^{1-\alpha}$, where Y is gross domestic product, K is stock of human and physical capital, L is unskilled labour. A is a constant that reflects the base level of technology, and e^{u} reflect the constant exogenous rate at which technology grows over time t. For a more detailed explanation, see Todaro (2000).

exploring the existence of relationship, the direction of causality between the variables, and the channel of transmission between them. Although there have been many papers written on this issue focusing on the advanced economies, but no similar studies has been done on the ASEAN economies. In their surveys on the existing literature, Thakor (1996) and Levine (1997) found that there have been different streams of thought on the issue of the finance-growth nexus. Generally, there have been four different views on the existence and direction of causality between financial development and economic growth. The first one is "the finance-led growth hypothesis" or "the supply-leading view". The finance-led growth hypothesis postulates the supply-leading relationship between financial and economic developments (Patrick, 1966). According to this view, the existence of financial sector, as well-functioning financial intermediations in channelling the limited resources from surplus units to deficit units, would provide efficient allocation resources thereby leading other economic sectors in their growth process. This view has received considerable support from recent empirical studies (Greenwood and Jovanovic, 1990; Habibullah and Eng, 2006, to name a few).

The second one is "the growth-led finance hypothesis" or "the demand-following view". This view was advanced by Robinson (1952) and it states that financial development follows economic growth or where enterprise leads finance follows. Accordingly, as the real side of the economy expands, its demand for certain financial instruments and arrangements and the financial markets increases, leading to the growth of these services. Empirical support for this second view can be found, for examples, in the studies of Friedman and Schwartz (1963) and Demetrides and Hussein (1996).

The third view is "the feedback hypothesis" or "the bidirectional causality view". This view postulates that the finance and economic developments are mutually causal, that is they have bidirectional causality. In this hypothesis, it is asserted that a country with well-developed financial system could promote high economic expansion through technological changes, product and services innovation (Schumpeter, 1912). This in turn, will create high demand on the financial arrangements and services (Levine, 1997). As the banking institutions effectively response to these demand, then these changes will stimulate a higher economic achievement. Both financial and economic developments therefore are positively interdependent and their relationships could lead to bidirectional causality (Choong et al., 2003). Empirical support for this view can also be found, for examples, in the works of Greenwood and Smith (1997) and Luintel and Khan (1999).

Lastly, the fourth view is "the independent hypothesis". This view was originally put forward by Lucas (1988), who argued that financial and economic developments growth are not causally related or in the words of Lucas (1988), "*economic badly overstress the role of financial factors in economic growth*". Meanwhile, Chandavarkar (1992) noted that "*none of the pioneers of the development economics….even list finance as a factor of development*".

From the above brief exposition of different streams of thought on the relationship between financial and economic developments, it is obvious that the literature on this issue is mixed and inconclusive. Accordingly, it is appropriate and timely to empirically re-examine the financial development and economic growth relationship in the ASEAN-4 economies. Does the finance-growth nexus in the ASEAN-4 countries supports the first view (the finance-led growth hypothesis or the supply-leading view), the second view (the growth-led finance hypothesis/the demand-following view), the third view (the feedback hypothesis/the bidirectional causality view), or the last view (the independent hypothesis)? The extent to which the financial development is significant in promoting economic growth in the ASEAN economies, as compared to the other ancillary determinants such as inflation? By adopting the ARDL bound testing approach, VECM, VDCs and IRFs, this study aims at probing this issue in the ASEAN economies during the post-1997 financial crisis period.

4. Data and Empirical Framework

This study is carried out in the context of the ASEAN-4 countries during the post-1997 financial crisis period on the quarterly basis from 1998 – 2006.[7] All the data employed in this study are obtained from the International Financial Statistic (IFS) report published by the International Monetary Fund (IMF). As for the financial development measurement, the study uses financial depth (FD), following the study of Christopoulos and Tsionas (2004). The finance depth (FD) is the ratio of total bank deposits liabilities to nominal GDP. The study also includes share of investment (SI) as ancillary variable. The share of investment (SI) is the share of gross fixed capital formation to nominal GDP. Meanwhile, the economic growth (GDP) is proxied by real Gross Domestic Product (GDP). Since price stability is believed to have a great impact on the ASEAN economies, thus the inflation rate is included in the study as another ancillary variable to avoid the simultaneity bias (Gujarati, 1995). In this study, inflation (INF) is measured by the changes in Consumer Price Index (CPI).

4.1. Autoregressive Distributed Lag (ARDL) Bound Testing Approach

In this study, the short- and long-run dynamic relationships between economic growth and financial depth are estimated by using the newly proposed ARDL bound testing approach which was initially introduced by Pesaran et al. (1996). The ARDL has numerous advantages. Firstly, unlike the most widely method used for testing cointegration, the ARDL approach can be applied regardless of the stationary properties of the variables in the samples and allows for inferences on long-run estimates, which is not possible under the alternative cointegration procedures. In other words, this procedure can be

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[7] Due to unavailability of similar data for the rest of ASEAN countries (i.e., Singapore, Brunei Darussalam, Vietnam, Mnyanmar, Laos, and Cambodia) during the study period, thereby the present study focuses only on the ASEAN-4 countries. The chosen of the study period, the post-1997 financial crisis is also based on the availability of data.

applied irrespective of whether the series are $I(0)$, $I(1)$, or fractionally integrated (Pesaran and Pesaran 1997; and Bahmani-Oskooee and Ng, 2002), thus avoids problems resulting from non-stationary time series data (Laurenceson and Chai, 2003). Secondly, the ARDL model takes sufficient numbers of lags to capture the data generating process in a general-to-specific modelling framework (Laurenceson and Chai, 2003). It estimates $(p+1)^k$ number of regressions in order to obtain optimal lag-length for each variable, where p is the maximum lag to be used, k is the number of variables in the equation. Finally, the ARDL approach provides robust results for a smaller sample size of cointegration analysis. Since the sample size of our study is 36, this provides more motivation for the study to adopt this model.

The ARDL model used in this study can be written as follow:

$$GDP_t = \alpha_0 + \alpha_1 FD_t + \alpha_2 SI_t + \alpha_3 INF_t + e_t \tag{1}$$

Where GDP_t is real output at time t, FD_t is a measure of financial depth, SI_t is the share of investment, INF_t is inflation, and e_t is an error term.

The error correction version of ARDL framework pertaining to the variables in the Equations (1) can be reproduced as follows:

$$\Delta GDP_t = \delta_0 + \sum_{i=1}^{p} \varepsilon_i \Delta GP_{t-i} + \sum_{i=0}^{p} \phi_i \Delta FD_{t-i} + \sum_{i=0}^{p} \varphi_i \Delta SI_{t-i} + \sum \gamma_i \Delta INF_{t-i}$$

$$+ \lambda_1 GDP_{t-1} + \lambda_2 FD_{t-1} + \lambda_3 SI_{t-1} + \lambda_4 INF_{t-1} + u_{1t} \tag{2}$$

The terms with the summation signs in the Equation (2) represent the error correction dynamic while the second part (term with λs) correspond to the long run relationship. The null of no cointegration in the long run relationship is defined by $H_0: \lambda_1 = \lambda_2 = \lambda_3 = \lambda_4 = 0$ is tested against the alternative of $H_0: \lambda_1 \neq \lambda_2 \neq \lambda_3 \neq \lambda_4 \neq 0$, by the means of familiar F-test. However, the asymptotic distribution of this F-statistic is non-standard irrespective of whether the variables are $I(0)$ or $I(1)$. For a small sample size study ranging from 30 to 80 observations, Narayan (2004) has tabulated two sets of appropriate critical values. One set assumes all variables are $I(1)$ and another assumes that they are all $I(0)$. This provides a bound covering all possible classifications of the variables into $I(1)$ and $I(0)$ or even fractionally integrated. If the F-statistic lies exceeds upper bound level, the null hypothesis is rejected, which indicates the existence of cointegration. On the other hand, if the F-statistic falls below the bound level, the null hypothesis cannot be rejected, which supporting no cointegration exist. If, however, it falls within the band, the result is inconclusive.

Finally, in order to determine the optimal lag-length incorporated into the model and select the ARDL model to be estimated, the study employs the Akaike Information Criteria (AIC). Since our study utilizes quarterly data with

only 36 numbers of observations, the possible optimal lag-length to be considered is only 4.

4.2. Vector Error Correction Model (VECM) Framework

To examine the multivariate causality relationship among the variables, the study employs the vector error correction model (VECM) framework. The VECM regresses the changes in the both dependent and independent variables on lagged deviations. The multivariate causality test based on VECM can therefore be formulated as follows:

$$\Delta Z_t = \delta + \Gamma_i \Delta Z_{t-1} + \ldots\ldots + \Gamma_k \Delta Z_{t-k} + \Pi Z_{t-k} + \varepsilon_t \qquad (3)$$

where Z_t is an *n x 1* vector of variables and δ is an *n x 1* vector of constant, respectively. In our case, $Z_t = (GDP, FD, SI, INF)$. Γ is an *n x n* matrix (coefficients of the short run dynamics), $\Pi = \alpha\beta'$ where α is an *n x 1* column vector (the matrix of loadings) represents the speed of short run adjustment to disequilibrium and β' is an *1 x n* cointegrating row vector (the matrix of cointegrating vectors) indicates the matrix of long run coefficients such that Y_t converge in their long run equilibrium. Finally, ε_t is an *n x 1* vector of white noise error term and k is the order of autoregression.

A test statistic is calculated by taking the sum of the squared F-statistics of Γ and t-statistics of Π. The multivariate causality test is implemented by calculating the F-statistics (Wald-test) based on the null-hypothesis that the set of coefficients (Γ) on the lagged values of independent variables are not statically different from zero. If the null-hypothesis is not rejected, then it can be concluded that the independent variables do not cause the dependent variable. On the other hand, if Π is significant (that is different from zero) based on the t-statistics, then both the independent and dependent variables have a stable relationship in the long-run.

From the Equations (3), two channels of causation may be observed. The first channel is the standard Granger tests, examining the joint significance of the coefficients of the lagged independent variables. Whereas, the second channel of causation is the adjustment of the dependent variable to the lagged deviations from the long run equilibrium path, represented by the error correction term (ECT). If the ECT is found to be significant, it substantiates the presence of cointegration as established in the system earlier and at the same time; it tells us that the dependent variable adjusts towards its long run level. From these tests, we can reveal four patterns of causal interactions among pairs of the variables, i.e., (i) a unidirectional causality from a variable, say *x*, to another variable, say *y*; (ii) a unidirectional causality from *y* to *x*; (iii) bidirectional causality; and (iv) independent causality between *x* and *y*.

4.3. Variance Decompositions (VDCs) and Impulse-Response Functions (IRFs)

Apart from the above battery of time series techniques, the study also generates variance decompositions (VDCs) and impulse-response functions (IRFs) to further delve into the dynamics interaction among the variables. The VDCs enable us to examine the out-of sample causality among the variables in the VAR system. It measures the percentage of the forecast error of variable that is explained by another variable. Precisely, it indicates the relative impact that one variable has on another variable. At the same time, it provides information on how a variable of interest responds to shocks or innovations in other variables. Thus, in our context, it allows us to explore the relative importance of financial development in accounting for variations in economic growth. To interpret economic implications from VDCs findings, the Sim's (1980) innovation accounting procedure is employed. This procedure involves the decomposition of forecast error variance of each variable into components attributable to its own innovations and to shocks of other variables in the system.

On the other hand, the IRFs (also known as innovation accounting in the literature) allow us to trace temporal responses of variables to its own shocks and shocks in other variables. In our context, from the IRFs we can assess the direction, magnitude and persistent of economic growth responses to innovations in the financial development.

5. Empirical Results

Before estimating the short- and long-run relationships between financial development and economic growth for the ASEAN-4 countries, we have to decide about the lag-length on the first-differenced variables. Bahmani-Oskooee and Bohl (2000) have shown that the results of this first step are usually sensitive to the lag-length. To verify this, we incorporate lag-length equal to 1 to 4 on the first-differenced variables.

The computed F-statistics for each lag-length is reported in Table 2 along with the critical values at the bottom of the table. As reported, the test outcome of the significance levels for the ASEAN-4 countries varies with the choice of lag-length. Except for the lag-length =1, for all other lag-length, the computed F-statistics are significant at least at 95% level for Indonesia. For Malaysia, only the lag-length = 2 and 3 are found to be significant at 90% and 95% levels respectively, while the lag-length = 1 and 4 are not. With the exception of the lag-length = 4, all other lag-lengths = 1, 2 and 3 are found to be significant at least at 95% level for Thailand. Finally, for the Philippines only the lag-length = 1 and 2 are found to be significant at 95% and 99% levels, respectively. The results seem to provide evidence for existence of a long-run relationship between economic growth, financial depth, share of investment and inflation in the ASEAN-4 countries. In other words, these variables are found to have a long-run equilibrium in which the variable has a tendency to

move together in the long-run. This results should be considered preliminary and indicate that in estimating Equation (1) we must retain the lagged level of variables.

Table 2: F-statistics for Testing the Existence of a Long-run Growth Equation

Lag-Length	F-Statistics			
	Indonesia	**Malaysia**	**Thailand**	**Philippines**
1	1.0432	1.7958	3.4099**	5.2444**
2	4.5543**	2.5761*	5.7778***	5.5756***
3	8.4077***	4.1525**	7.9124***	2.3598
4	6.3412***	0.25502	1.6687	1.2700

Note: The relevant critical value bounds are taken from Narayan (2004) [Case II with a restricted intercept and no trend and number of regressors = 3 from]. They are 4.480 – 5.700 at the 99%; 3.170– 4.160 at the 95%; and 2.618 – 3.502 at the 90% significance levels respectively. *, **, and *** denotes that F-Statistics falls above the 90%, 95% and 99% upper bound, respectively.

In the second stage, we retain the lagged level of variables and estimates Equation (2) using the Akaike Information Criterion (AIC) lag-length selection criteria. Based on the F-statistic values, the maximum lag-length is set at 3 for Indonesia, Malaysia and Thailand, while for the Philippines the maximum lag-length is set at 2). The long-run ARDL model estimates selected based on the AIC criteria for the ASEAN-4 countries are reported in Table 3.

Table 3: The Long Run ARDL Model Estimates

Country	Indonesia [2,0,1,2]	Malaysia [2,1,2,1]	Thailand [2,2,0,0]	Philippines [0,0,1,0]
C	0.6103* (1.9985)	7.7892*** (5.2776)	1.6952*** (14.3626)	1.8878* (1.8878)
FD	1.1651 (0.2819)	1.7481** (2.2325)	.00839* (1.7916)	-.10354** (-2.1440)
SI	0.3141 (0.5803)	-3.9361 (-1.1143)	.61476*** (3.5825)	-30.3755 (-1.69121)
INF	-0.1706*** (-2.8754)	2.3031*** (8.4321)	.039192** (2.10802)	0.54324*** (4.0455)
	Adj-R^2 = 0.7807 D-W = 2.1493	Adj-R^2 =.95195 D-W = 2.3216	Adj-R^2 = .96250 D-W = 2.4762	Adj-R^2 = .89998 D-W = 1.8745

Note: *, ** and *** denotes significantly at 10%, 5% and 1% level of significance, respectively. Figures in the parentheses and squared parentheses are the *t*-statistics values and the selected ARDL model. D-W denotes Durbin-Watson test for autocorrelation.

Based on ARDL [2, 0, 1, 2], we find that inflation is the only variable which is significantly (negative) affecting economic growth in Indonesia. Meanwhile, financial development which is proxied by financial depth is found to be

insignificant in promoting the Indonesian economic growth. For Malaysia, the finding from ARDL [2, 1, 2, 1] indicates that except the share of investment, all other variables are found significantly in promoting economic growth. Based on ARDL [2, 2, 0, 0], the Thai economic growth is found to be to be positively affected by the financial development and price stability. Finally, the finding from ARDL [0, 0, 1, 0] for the Philippines reveals that the financial development is found to be an obstacle for the country's economic growth. In a nutshell, the common sources of economic progress/regress among ASEAN-4 countries were price stability and financial development.

Our finding of the insignificant finance-growth nexus in Indonesia is in harmony with the finding for Mexico and Ecuador, while the insignificant relation finding between investment and economic growth is similar to the finding for Honduras and Jamaica by Christopoulos and Tsionas (2004) for the period 1970-2000. Our findings of the positive finance-growth relationships for Malaysia and Thailand are compatible with many earlier studies such by Christopoulos and Tsionas (2004) for Thailand during period 1970-2000, Habibullah and Eng (2006), Choong et al. (2003) and Vaithilingam et al. (2005) for Malaysia during different periods, spanning from 1976 to 2000. Finally, the finding of negative finance-growth relationship for the Phillipines is in line with the studies by Gertler and Rose (1991) and Gregorio and Guidotti (1995). One possible explanation for this negative relationship is that it is a result of the business cycle rather than a representation of a long run relationship. It could also be partly due to the fact that financial sector is operating in a weak regulatory environment combined with the expectation that government will bail out failing banks, thereby the financial institutions were inefficient in allocating their resources. This inefficiency may in turn lead to a reduction in the rate of economic growth.

Furthermore, the relatively higher rate of inflation in Indonesia during the study period as compared to other ASEAN-4 economies has been an obstacle for the government to promote economic development.[8] Earlier empirical studies documented that for countries with low inflation rate below 10 percent annually, their economic growth will be accelerated (Bekaert et al., 2005; and Hung, 2003), while countries with high inflation about 10 – 20 percent a year could detriment the long-run economic growth (Gylfason et al., 2001; and Andrés et al., 2004). This particular finding is in line with the studies by Gylfason et al. (2001); and Andrés et al. (2004) and Christopoulos and Tsionas (2004). In their study, for example, Christopoulos and Tsionas (2004) found that during the period from 1997 to 2000, a higher rate of inflation in Peru has spoilt the economic growth of the country. Unlike in promoting growth for other ASEAN-4 economies, it is very important for the Indonesian government to maintain price stability by reducing the rate of inflation below

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[8] See, for example, the IMF report for the year 2005. The average rate of inflation for Indonesia was 10.45%, while for the rest ASEAN countries their rates of inflation were between 0.5 - 9.4%, i.e., Brunai Darussalam (1.22%), Malaysia (2.96%), Cambodia (5.56%), Laos PDR (7.17%), Myanmar (9.37%), the Phillipines (7.64%), Singapore (0.47%), Thailand (4.54%) and Vietnam (8.25%).

two digits to promote her economic growth. A significant increase in the prices of petroleum and cooking oil in the early 2005 and mid-2006 respectively has hindered the growth of the Indonesian economy and it has also become one of obstacles for the government to totally recover her economy.

Our findings on the finance-growth nexus seem to indicate that aftermath the 1997 financial crisis, the Philippines and Indonesian governments has not yet entirely succeeded in boosting financial sector in order to promote their economic growth, while the Thai and Malaysian authorities on the other hand has successfully enhanced their financial sector in speeding up the economic growth of the countries. The Indonesian and the Philippines governments, therefore, need to further enhance and restructure the banking sector and stock market. The national investment environment is also needed to be deregulated in order to attract more foreign portfolios investment into the countries. The restructuring and deregulation of financial sector, banking and stock market is one of crucial factors to be looked into so as to speed up the economic growth for these countries, Indonesia and the Philippines. Maintaining and even enhancing the current practices of banking sector and stock market should be given priority by the Malaysian and Thai policy makers in order to further promote their economic growth.

After exploring the long run association between economic growth and measures of financial development, we now proceed to multivariate Granger causality test based on VECM. At this juncture, it is important to note that the documented cointegration among the variables suggests only their long run association and, while it implies causality, does not reveal the directions of causation among them. Table 4 reports the multivariate causalities among the economic growth (GDP), financial depth (FD) and two other ancillary variables, i.e., share of investment (SI) and inflation (INF).

It is interesting to note that both error correction terms (ECTs) and short run channels of Granger causality were temporarily active for our main models (i.e., when GDP is considered as dependent variable) for all ASEAN-4 countries. The significance of ECTs at least for our main models, confirms the existence of long-run relationship among the variables as documented in earlier ARDL models, i.e., ARDL [2, 0, 1, 2] for Indonesia, ARDL [2, 1, 2, 1] for Malaysia, ARDL [2, 2, 0, 0] for Thailand and ARDL [0, 0, 1, 0] for the Philippines. Specifically, this implies that GDP, FD and INF adjust to correct for any deviations from the long-run relationship in the Indonesian economy, while any deviations from the long-run equilibrium relationships in the Malaysian, Thai and the Philippines economies are mainly caused by the changes in GDP. In other words, the GDP bears the brunt of short run adjustment to the long run equilibrium.

Table 4: Multivariate 'VECM' Causality

Dependent Variables		Independent Variables				
		ΔGDP	ΔFD	ΔSI	ΔINF	ECT$_{t-1}$
Indonesia	ΔGDP	-	1.3438 [0.2588]	2.6607* [0.0923]	2.0512 [0.1360]	-1.4307*** (-3.5972)
	ΔFD	0.5405 [0.6596]	-	2.1997 [0.1346]	1.3082 [0.2968]	-0.1975* (-2.0432)
	ΔSI	4.7974*** [0.0102]	3.6600* [0.0688]	-	1.2395 [0.3193]	0.0385 (1.2656)
	ΔINF	1.6465 [0.2075]	0.1805 [0.6751]	0.6319 [0.5410]	-	-0.5203** (-2.7004)
Malaysia	ΔGDP	-	0.8378** [0.0460]	5.0694*** [0.0081]	0.751915 [0.4832]	-0.1969** (-2.6202)
	ΔFD	0.9655 [0.4266]	-	0.5776 [0.6358]	1.5509 [0.2344]	0.1010 (1.5771)
	ΔSI	6.7934*** [0.0021]	1.7017 [0.2055]	-	1.3949 [0.2689]	0.1021 (1.2543)
	ΔINF	5.6664*** [0.0049]	1.4828 [0.2488]	0.7050 [0.5594]	-	-1.2379 (-0.9070)
Thailand	ΔGDP	-	3.3738* [0.0749]	1.7714 [0.1957]	1.0811 [0.3088]	-0.1896** (-2.2609)
	ΔFD	6.2808*** [0.0027]	-	0.0456 [0.8327]	1.6271 [0.2143]	-6.5886 (-0.6431)
	ΔSI	1.7114 [0.1913]	1.4930 [0.2417]	-	0.3608 [0.5537]	0.1865 (0.9933)
	ΔINF	0.8687 [0.4709]	1.4206 [0.2612]	0.0072 [0.4709]	-	1.3983 (0.2240)
Philippines	ΔGDP	-	1.3046 [0.2642]	8.5676*** [0.0015]	0.1601 [0.8529]	-0.7008** (-2.1981)
	ΔFD	3.4112** [0.0490]	-	0.0801 [0.9233]	0.2203 [0.8038]	3.7362 (0.1258)
	ΔSI	10.0171*** [0.0006]	0.0840 [0.9197]	-	0.3724 [0.6928]	-0.3931 (-0.8328)
	ΔINF	0.0135 [0.9866]	1.3272 [0.2833]	0.3913 [0.6803]	-	14.3241 (1.2007)

Note: ***, ** and * represent significance at the 1%, 5% and 10% levels, respectively. ECT$_{t-1}$ is derived by normalizing the cointegrating vectors on the GDP as proxy for economic growth, producing residual *r*. By imposing restriction on the coefficients of each variable and conducting Wald test, we obtain *F*-statistics for each coefficient in all equations. Figures in the parentheses and squared parentheses represent *t*-statistics and probabilities for *F*-statistics, respectively.

We also note that there are only two short-run dynamic interactions among the variables for the Indonesian, Malaysian and the Philippines equations. We find a bidirectional causation between GDP and SI. Thus, while we do not find the

long run causality between GDP and SI in these countries (see Table 4); there exist short-run interactions between them. Finally, we also find a unidirectional causation running from: (i) FD to SI for Indonesia; (ii) GDP to INF for Malaysia;[9] (iii) FD to GDP for Malaysia; and (iv) GDP to FD for the Philippines. Thus, in short run, the development of the Indonesian, Malaysian and the Philippines economies hinge crucially on the performance of the investment. Although we do not find any causation in short term from financial development and price stability to the economic growth in the Indonesian and the Philippines economies, but one short run interaction exist running from FD to GDP in the Malaysian economy. For the Thai economy, we find only one short run interaction exist between the variables, i.e., a bidirectional causality between GDP and FD.

Our finding on the non-causalities between finance-growth in Indonesia is in line with the view of "the independent hypothesis", put forward put by Lucas (1988). As to his words, "*economic badly overstress the role of financial factors in economic growth*". In addition, Chandavarkar (1992) also noted that "*none of the pioneers of the development economics....even list finance as a factor of development*", thereby finance-economic growth nexus is independent to each other. Singh (1997) also claimed that financial development may be not beneficial for growth for several reasons. First, the inherent volatility and arbitrariness of the stock market pricing process under developing countries conditions make it a poor guide to efficient investment allocation. Secondly, the interaction between the stock and currency markets in the wake of unfavourable economic shocks may exacerbate macroeconomic instability and reduce long-term growth. Thirdly, stock market development is likely to undermine the existing group-banking system in developing countries which, despite their many difficulties, have not been without merit in several countries, not least in the highly successful East Asian economies.

As for Malaysia, the finding of the short-run causality stemming from financial development to economic growth is in favour of "the finance-growth led hypothesis" or "the supply-leading view". This implies that the financial institutions can be viewed as an effective leading sector in channelling and transferring the financial resources between surplus and deficit units in the Malaysian economy. This particular result echoes the findings of Choong et al. (2003) and Habibullah and Eng (2006) on the Malaysian economy during the periods 1978-2000 and 1990-1998, respectively. Meanwhile, the finding of short-run Granger causality running from economic growth to financial development in the Philippines support the view "the growth-led finance hypothesis" or "the demand-following view" of Robinson (1952). Based on this view, the financial development in the Philippines follows economic growth or where enterprise leads finance follows. Accordingly, as the real side of the economy expands, its demand for certain financial instruments and

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[9] At this jucture, it is interestingly to note that the economic growth leads the price to rise in the Malaysian economy. This type of inflation is categorised under the demand pull inflation. The higher income leads to the higher purchasing power of the citizens thereby they will demand more for goods and services.

arrangements and the financial markets increases, leading to the growth of these services in the country.

Finally, our finding of the bidirectional causality between financial development and economic growth in the Thai economy supports "the feedback hypothesis" or "the bidirectional causality view". According to this view, the Thai financial system has been able to promote high economic expansion through technological changes, product and services innovation. This in turn, will create high demand on the financial arrangements and services. As the financial institutions effectively response to these demand, then these changes will stimulate a higher economic achievement. Both financial and economic developments therefore are positively interdependent and their relationships could lead to bidirectional causality.

Table 5: Variance Decompositions

Horizon (Quarterly)		Explained by shocks in:			
		GDP	FD	SI	INF
Indonesia	1	100.00	0.00	0.00	0.00
	2	95.39	0.10	4.18	0.33
	4	89.07	0.78	4.96	5.19
	8	87.46	1.12	5.03	6.39
	12	87.19	1.20	5.06	6.55
Malaysia	1	100.00	0.00	0.00	0.00
	2	93.15	2.33	2.46	2.06
	4	91.50	3.58	2.84	2.08
	8	85.09	11.02	2.42	1.47
	12	80.20	16.33	2.30	1.17
Thailand	1	100.00	0.00	0.00	0.00
	2	95.92	0.07	2.85	1.21
	4	92.36	0.69	5.22	1.73
	8	90.25	0.91	6.59	2.25
	12	89.06	1.06	7.55	2.33
Philippines	1	100.00	0.00	0.00	0.00
	2	91.57	5.09	0.04	3.30
	4	74.59	4.31	17.02	4.08
	8	74.25	4.32	17.80	3.63
	12	74.23	4.26	18.04	3.47

To further explore dynamic interaction between financial development and economic growth, the study proceed to test the variance decompositions (VDCs) and impulse-response functions (IRFs). The results of VDCs reported in Table 5 provide detailed information on the relative strength of the financial depth, share of investment and inflation in explaining the changes in the economic growth. From the VDCs and IRFs results, we are also able to capture the relative important of various shocks and their influences on the economic growth. The VDCs and IRFs are simulated by orthogonalizing the innovations in the vector autoregression (VAR) equations using the so-called

Cholesky decomposition suggested by Sim (1980) with the orderings of the variables: GDP, FD, SI, INF.[10] Based on VDCs results for the horizon of 1 – 12 quarters, we find that the variations in the Indonesian economic growth respond more to shocks in the price stability (inflation) account for about 0 – 6.5 percent of economic growth forecast error variance after 3 years. Meanwhile, the variations in the economic growth of this country respond to shocks in the share of investment and financial depth only account for 0 – 5 percent of economic growth forecast error variance after 12-quarter.

As for Malaysia, the variations in the economic growth respond more to shocks in the financial depth account for about 0 – 16 percent of economic growth forecast error variance. On the other hand, the variations in the economic growth in Thailand and the Philippines respond more to shocks in the share of investment account for about 0 – 8 percent and 0 – 18 percent of economic growth forecast error variance, respectively after the same period. The variations in the economic growth in the ASEAN-4 countries are, however, much depending on its own innovations. This finding seems to support our earlier finding of short-run dynamic causalities among the variables examined in the study.

To complement our analysis on the VDCs, we further generate the IRFs, as described above. As reported in Figure 1, the overall results seem to be very much consistent with our earlier findings. Economic growth seems to have immediate negative response to shocks in the price stability and share of investment, while no significant effect is found between the shocks in the financial development to the innovations in the economic growth of Indonesia and Malaysia.

On the other hand, the economic growth in Thailand and the Philippines seems to have immediate response to shocks in the financial depth and share of investment. This further implies that any policies pertaining to the price stability and investment in Indonesia and Malaysia and any policies concerning the investment and financial development should at least be noted by the governments of the ASEAN-4 countries in order to speed up their economic growth.

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[10] We also have tried to use different orderings of the variables such as GDP, FD, INF, SI; GDP, INF, SI, FD; and GDP, INF, FD, SI. We also have tried to employ the generalized impulses which do not depend on the VAR ordering, as described by Pesaran and Shin (1998). However, their results are very much similar.
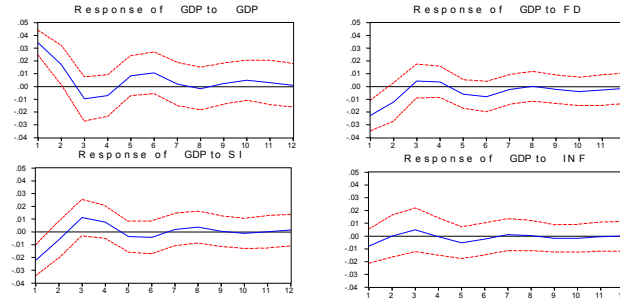
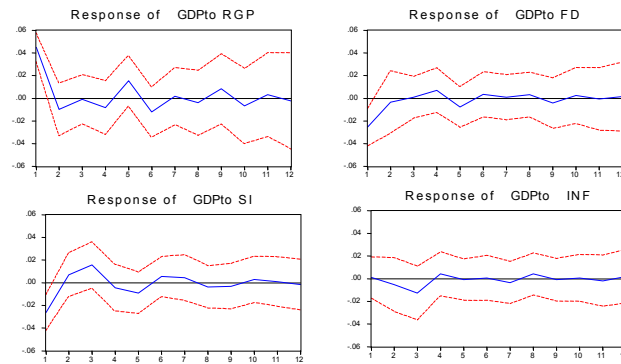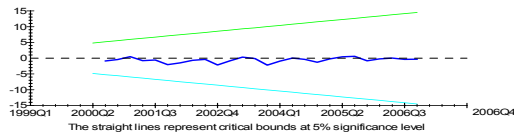# Indonesia
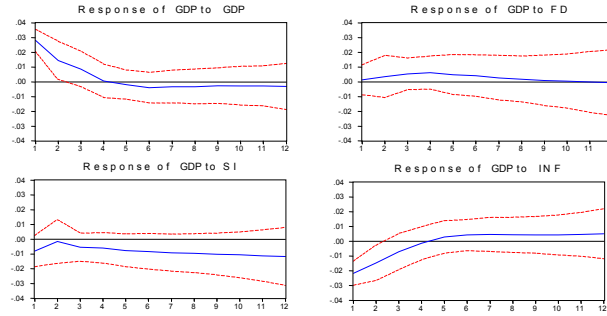
Malaysia
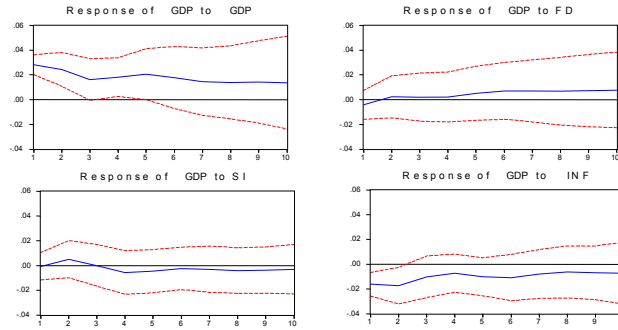
Thailand

Philippines

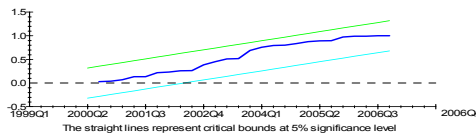**Figure 1: Generalized Impulse-Responses Functions**

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Finally, we performed the cumulative sum of recursive residuals (CUSUM) and cumulative sum of squares of recursive residuals (CUSUMSQ) stability tests for our chosen ARDL models. Figure 2 provides the plots of the CUSUM and CUSUMSQ stability tests for each ASEAN-4 countries. From the figures, we find that the plots of CUSUM and CUSUMSQ statistics remain within the critical bounds at 5% significance level. This implies that all coefficients in the error correction model are stable over the time. These selected models adopted in the study seem to be good enough and robust in estimating the short- and long-run relationships between financial development and economic growth.

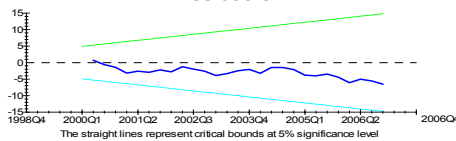**Indonesia**

Plot of Cumulative Sum of Recursive Residuals

The straight lines represent critical bounds at 5% significance level

Plot of Cumulative Sum of Squares of Recursive Residuals

The straight lines represent critical bounds at 5% significance level

Malaysia

Plot of Cumulative Sum of Recursive Residuals

The straight lines represent critical bounds at 5% significance level

Plot of Cumulative Sum of Squares of Recursive Residuals

The straight lines represent critical bounds at 5% significance level

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Thailand

Plot of Cumulative Sum of Recursive Residuals

The straight lines represent critical bounds at 5% significance level

Plot of Cumulative Sum of Squares of Recursive Residuals

The straight lines represent critical bounds at 5% significance level

Philippines

Plot of Cumulative Sum of Recursive Residuals

The straight lines represent critical bounds at 5% significance level

Plot of Cumulative Sum of Squares of Recursive Residuals

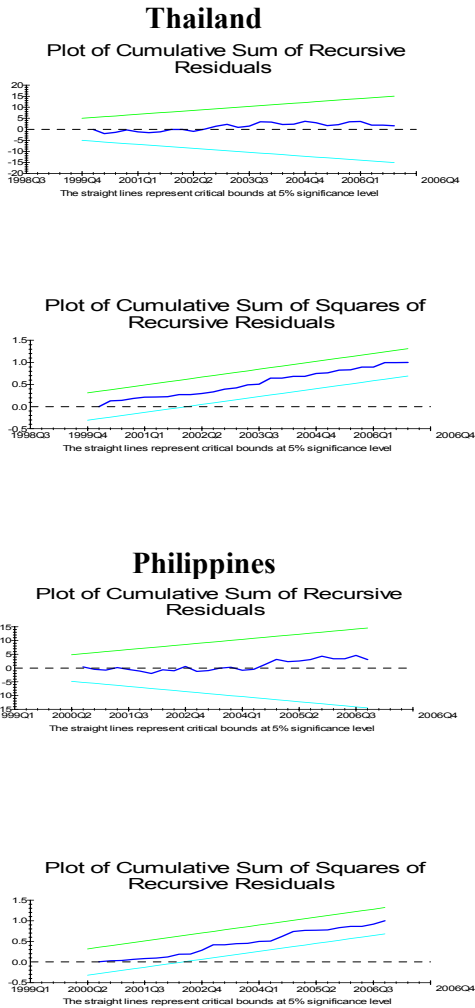The straight lines represent critical bounds at 5% significance level

Figure 2: CUSUM and CUSUMSQ Plots

6. Conclusion and Some Policy Implications

By employing a battery of statistical tests, this paper empirically explore the short- and long-run relationships between financial development and economic growth in the ASEAN-4 countries during the post-1997 financial crisis. It also attempts to empirically investigate the dynamic causality among the variables using vector error correction model (VECM) and re-examine the model in level form and generates variance decompositions (VDCs) and impulse-response functions (IRFs) to further assess their interactions such that robust conclusion can be made. Based on the specified ARDL models, the paper finds a long-run equilibrium between economic growth, finance depth, share of investment and inflation. The study also documents that the common sources of economic progress/regress among ASEAN-4 countries were price

stability and financial development. Specifically, this implies that in promoting the growth of economy in the ASEAN-4 countries, it is very important for the respected governments to preserve price stability by maintaining and reducing the rate of inflation below two digits.

In terms of the dynamic causalities among the variables, the study documents the non- causality between financial development and economic growth in the Indonesian economy. This finding is in line with the view of "the independent hypothesis", put forward put by Lucas (1988). The financial development may be not beneficial for growth in this market could be due partly to the inherent volatility and arbitrariness of the stock market pricing process under developing countries conditions make it a poor guide to efficient investment allocation and the interaction between the stock and currency markets in the wake of unfavourable economic shocks may exacerbate macroeconomic instability and reduce long-term growth. As for Malaysia, the study finds the unidirectional causality stemming from financial development to economic growth. This empirical evidence is in favour of "the finance-growth led hypothesis" or "the supply-leading view". This implies that the financial institutions can be viewed as an effective leading sector in channelling and transferring the financial resources between surplus and deficit units in the Malaysian economy. This particular result echoes the findings of Choong et al. (2003) and Habibullah and Eng (2006) on the Malaysian economy during the periods 1978-2000 and 1990-1998, respectively.

Furthermore, the study documents the unidirectional causality running from economic growth to financial development in the Philippines, as opposed to the finding for Malaysia. This finding supports "the growth-led finance hypothesis" or "the demand-following view" of Robinson (1952). Based on this view, the financial development in the Philippines follows economic growth or where enterprise leads finance follows. Accordingly, as the real side of the economy expands, its demand for certain financial instruments and arrangements and the financial markets increases, leading to the growth of these services in the country.

Finally, our finding of the bidirectional causality between financial development and economic growth in the Thai economy accords "the feedback hypothesis" or "the bidirectional causality view". This proves that the Thai financial system has been able to promote high economic expansion through technological changes, product and services innovation. This in turn, will create high demand on the financial arrangements and services. As the financial institutions effectively response to these demand, then these changes will stimulate a higher economic achievement. Both financial and economic developments therefore are positively interdependent and their relationships could lead to bidirectional causality.

Based on VDCs and IRFs tests, we find that the variations in the economic growth respond more to shocks in the inflation (for Indonesia), financial depth (for Malaysia) and investment (for Thailand and the Philippines). It only accounts for about 0 – 18 percent of economic growth forecast error variance

after 12-quarter. Economic growth seems to have immediate negative response to shocks in the price stability and share of investment, while no significant effect is found between the shocks in the financial development to the innovations in the economic growth of Indonesia and Malaysia. On the other hand, the economic growth in Thailand and the Philippines seems to have immediate response to shocks in the financial depth and share of investment. The variations in the economic growth in the ASEAN-4 countries, however, very much hinges on its own innovations. This further implies that any policies pertaining to the price stability, financial development and investment should at least be noted by the governments of the ASEAN-4 countries in order to speed up their economic growth.

However, the findings of our study also show that the result are country specific and tend to vary with the kind of financial institutions exist in the countries. This can be attributed to the fact that these countries differ in their level of financial development due to differences in policies and institutions. These findings accord with the view of the World Bank that economies policies are country specific and their success is a function of the institutions that implement them (World Bank, 1993).

The most important implication of our findings is a policy recommendation: if policy makers want to promote growth, then attention should be focused on long run policies, for example the enhancement of the existing modern financial institutions both in the banking sector and stock market. The government, therefore, needs to further enhance and restructure the banking sector and provide a conducive environment for investors to allocate the assets in the stock markets. The restructuring and deregulation of financial sector, banking and stock market is an important factor to be looked into in order to speed up the economic growth. Another implication of the absence of short run causality in the Indonesian economy, and the strong nature of long run causality between financial development and economic growth, is the one emphasized by Darrat (1999), namely that since the effect of financial development growth is realized in short run, policy makers may be deceived to believe that there is no effect at all. The long run nature of the effect, however, is a necessary implication of the fact that financial markets affect the cost of external finance to the firm and, therefore, their effect materializes through facilitating the investment process itself. Unless conditions for low-cost investment are created, long run growth impossible.

Finally, in this study we have examined the relationship between financial development and economic growth which are limited to the ASEAN-4 economies during the post-1997 financial crisis. Thus, to enhance and enrich the findings, more robust analysis is needed. Further researches that are recommended in this context are in terms of comparing the analyses between the pre- and post-1997 financial turmoil periods; perhaps this could provide a clearer picture for the policy implementation. Additionally, the enrichment of the finding could also be done by including more countries into the analysis such as by examining all ASEAN countries. A comparative study between the

ASEAN economies and developed markets would also provide additional insight into the existing empirical evidence.

References

Al-Yousif, Y. K. (2002). Financial development and economic growth: Another look at the evidence from developing countries. *Review of Financial Economics* 11: 131–150.

Andrés, J. Hernando, I., and Lo´pez-Salido J.D. (2004). The role of the financial system in the growth–inflation link: the OECD experience. *European Journal of Political Economy* 20: 941–961.

ASEAN Secretariat: www.aseansec.org

Bahmani-Oskooee, M., and Bohl, M.T. (2000). German monetary unification and the stability of the German M3 money demand function. *Economics Letters* 66: 203–208.

Bahmani-Oskooee, M., and Ng, R.C.W. (2002). Long-run demand for money in Hong Kong: an application of the ARDL model. *International Journal of Business and Economics* 1(2): 147-155.

Bekaert, G., Harvey, C.R., and Lundblad, C. (2005). Does financial liberalization spur growth? *Journal of Financial Economics* 77(30): 3–55.

Chandavarkar, A. (1992). Of finance and development: neglected and unsettled questions. *World Development* 22: 133-142.

Choong, C. K., Yusop, Z., Law, S. H., and Sen. V.L.K. (2003). Financial development and economic growth in Malaysia: the stock market perspective. *Economic Working Paper* Archive at WUSTL – Macroeconomics.

Christopoulos, D.K., and Tsionas, E.G. (2004). Financial development and economic growth: evidence from panel unit root and cointegration tests. *Journal of Development Economics* 73: 55-74.

Darrat, A.F. (1999). Are financial deepening and economic growth causally related? Another look at the evidence. *International Economic Journal* 13(3): 19-35.

Demetriades, P.O., and Hussein, A.K. (1996). Does financial development cause economic growth? Time series evidence from 16 countries. *Journal of Development Economics* 51:387-411.

Domar, E. 1946. Capital expansion, rate of growth, and employment. *Econometrica* 14(2): 137-147.

Friedman, M., and Schwartz, A.J. (1963). *A Monetary History of the United States*. Princeton, NJ: Princeton University Press.

Gertler, M., and Rose (1991). Finance, growth and public policy. *Working Paper WPS 814*. Washington, DC: The World Bank.

Goldsmith, R.W. (1969). *Financial Structure and Development*. New Haven, CT: Yale University Press.

Greenwood, J. and Smith, B. (1997). Financial markets in development, and the development of financial markets. *Journal of Economic Dynamics and Control* 21: 145-181.

Greenwood, J., and Jovanovic, B. (1990). Financial development, growth, and the distribution of income. *Journal of Political Economy* 98(5): 1076-1108.

Gregorio, J.D., and Guidotti, P.E. (1995). Financial development and economic growth. *World Development*, 23(3): 433-448.

Gylfason, T., and Herbertsson, T.T. (2001). Does inflation matter for growth? *Japan and World Economy* 13: 405-428.

Habibullah, M.Z., and Eng, Y.K. (2006). Does financial development cause economic growth? a panel data dynamic analysis for Asian developing countries. *Journal of the Asian Pacific Economy* 11 (4): 377-393.

Harrod, R. (1939). An essay in dynamic theory. *The Economic Journal* 49(193): 14-33.

Hung, F.S. (2003). Inflation, financial development, and economic growth. *International Review of Economics and Finance* 12: 45–67.

International Monetary Fund. (2006). *International Financial Statistic Online*: www.imfstatistics.org.

Khan, S.M. and Senhadji, A.S. (2000). Financial and economic growth: An overview. *IMF Working Paper*. International Monetary Fund, Washington.

Laurenceson, J and Chai, J. C. H. 2003. *Financial Reform and Economic Development in China. Cheltenham*, UK: Edward Elgar.

Levine, R. (1997). Financial development and economic growth: views and agenda. *Journal of Economic Literature* 35 (2): 688-726.

Lewis, W.A. (1954). Economic development with unlimited supplies of labour. *The Manchester School* 22: 139-191.

Lucas, R.E. (1988). On the mechanics of economic development. *Journal of Monetary Economics* 22(1):3-42.

Luintel, B.K., and Khan, M. (1999). A quantitative re-assessment of the finance-growth nexus: evidence from multivariate VAR. *Journal of Development Economics* 60: 381-405.

McKinnon, R.I. (1973). *Money and Capital in Economic Development*. Washington, DC: The Brooking Institution.

Mussa, M. (2006). "Global economic prospects 2006/2007: continued solid growth in 2006, rising risks for inflation, financial markets and growth for 2007". *Paper presented at the ninth semi-annual meeting on Global Economic Prospects*, Washington, DC, April 11.

Narayan, P.K. (2004). Reformulating critical values for the bounds F-statistics approach to cointegration: an application to the tourism demand model for Fiji. *Discussion Paper No. 02/04*, Department of Economics, Monash University. Australia.

Pagano, M. (1993). Financial markets and growth: an overview. *European Economic Review* 37: 613-622.

Patrick, H.T. (1966). Financial development and economic growth in underdeveloped countries. *Economic Development and Cultural Change* 14: 174-189.

Pesaran, M.H., and Pesaran, B. (1997). *Working with Microfit 4.0: Interactive Econometric Analysis*. Oxford, Oxford University Press.

Pesaran, M.H., Shin, Y., Smith, R. J. 1996. Testing for the existence of a long-run relationship. *DAE Working Paper No. 9622*. Department of Applied Economics, University of Cambridge.

Pesaran, M.H., and Shin, Y. (1998). Generalized impulse-response analysis in linear multivariate models. *Economic Letters* 58: 17-29.

Pesaran, M.H., Shin, Y., and Smith, R.J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of applied econometrics* 16: 289-326.

Robinson, J. (1952). "The Generalization of the General Theory," in *The Rate of Interest and Other Essays*. London: MacMillan.

Rostow, W.W. (1960). *The Stages of Economic Growth: A Non-communist Manifesto*. London: Cambridge University Press.

Schumpeter, J. A. (1912). *A Theory of Economic Development*. Cambridge, MA: Harvard University Press.

Schumpeter, J. A. (1932). "Entwicklung," State University of New York at Albany: *Special Collections and Archives, SPE XMS Lederer*, Box 1, 82.1.

Shaw, E.S. (1973). *Financial Deepening in Economic Growth*. Oxford Univ. Press, NY.

Sim, C.A. (1980). Macroeconomics and reality. *Econometrica* 48(1): 1-49.

Singh, A. (1997). Financial liberalization, stock markets and economic development. *Economic Journal* 107: 771-782.

Solow, R. (1956). A contribution to the theory of economic growth. *Quarterly Journal of Economics* 70: 65-94.

Thakor, A.V. (1996). The design of financial system: an overview. *Journal of Banking and Finance* 20:917-948.

Todaro, M.P. (2000). *Economic Development* (7th Edition). United Kingdom: Addison Wesley Longman.

Vaithilingam, S, Nair, M., and Guru, B. (2005). Private sector financing on economic growth in Malaysia: results from the bounds test. *Journal of Academy of Business and Economics*: 1- 21.

World Bank. (1993). *The Asian Miracle: Economic Growth and Public Policy*. New York: Oxford University Press.

Yean, S.C. (1997). Economic interdependence and cooperation in East Asia. *PhD Dissertation*. Department of Economics in the Graduate School, Southern Illinois University. Ann Arbor, Michigan: UMI Dissertation Services, A Bell & Howell Company.

Wongbangpo, P. (2000). Dynamic analysis on ASEAN stock markets. *PhD Dissertation*. Department of Economics, Southern Illinois University at Carbondale. Ann Arbor, Michigan: UMI Dissertation Services, A Bell & Howell Company.