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THE DYNAMIC CAUSAL BETWEEN FINANCIAL DEVELOPMENT AND ECONOMIC GROWTH: EMPIRICAL EVIDENCE FROM MALAYSIA BASED ON VECTOR ERROR CORRECTION MODELING APPROACH

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Abstract

The purpose of this paper is to study the effectiveness of financial development on Malaysian economic growth by utilising quarterly data. In view of the priority given to dynamic relationship in conducting this study, the Vector Autoregressive (VAR) method which encompasses the Johansen-Juselius Multivariate cointegration, Vector Error Correction Model (VECM), Impulse Response Function (IRF) and Variance Decomposition (VDC), are used as empirical evidence. The result reveals a short term and long term dynamic relationship between financial development and economic growth. The importance of financial sector in influencing the economic activity is proven as a clear policy implication.

JEL Classification: C1; E44
Keywords: Financial Development; Economic Growth; VECM

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1. Introduction

Solow (1956)[1] a Neo Classical economist, stated that in addition to capital and labour, investment generated through the financial sector plays a significant role in the growth process. Meanwhile, endogenous growth theory introduced in the end of 1980s by Romer (1986) and Lucas (1988) brought an array of

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[1] Depicted from discussion in Christopoulos and Tsionas (2004).

theoretical and empirical studies to observe the causal factor of economic growth. Since then, a large empirical literature concentrated more on the sources of long term growth such as investment and real capital, human capital, tax and technology (Barro, 1991); (Barro and Sala-i-Martin, 1997); (Benhabib and Spiegel, 1994); (Mankiw, Romer and Weil, 1992)[2]. The effect of financial sector development on economic growth has been a topic of interest and debate in recent years. Several financial measurement proxies have been used to examine the relationship. In theory, financial development can influence the economic growth through resource allocation. The theoretical argument for linking financial development to growth is that a well-developed financial system performs several critical functions to enhance the efficiency of intermediation by reducing information, transaction, and monitoring costs. A modern financial system promotes investment by identifying and funding good business opportunities, mobilizes savings, monitors the performance of managers, enables the trading, hedging, and diversification of risk, and facilitates the exchange of goods and services. These functions resulting in a more efficient allocation of resource, a more rapid accumulation of physical and human capital, and in faster technological progress, which in turn feed economic growth.

In actual fact, this theory has long been introduced dating back to 1911; Joseph Schumpeter stressed that national savings distribution to firms will encourage the process of economic growth and development which are channelled through the increase in productivity and technological advances. In other words, the introduction of monetarization in the financial sector will be transformed to the form credit creation which will support economic activities resulting in higher economic growth. Notwithstanding the above, the said statement is still debated, as a variety of results have been obtained from previous studies depending on the methodology, sample and estimation procedures adopted.

Since previous empirical studies provide mixed findings on the direction of causality, this study will continue the effort of earlier researchers (Choong et al. (2003) and, Ang and McKibbin (2005)) using the Malaysian time series data to re-examine the relationship between financial development and economic growth dynamically. The objectives of this study are; (1) To conduct stationary test on all time series under consideration, (2) To conduct the Johansen multivariate cointegration test, (3) To conduct Granger causality test in Vector Error Correction Model (VECM) framework; and in addition to existing studies we will (4) view the Impulse Response Function (IRF) and Variance Decomposition (VDC) in supporting the VECM findings.

2. Previous Study

There are two forms of study often performed by researchers in observing the relationship between financial development and economic growth, either by using the cross section or time series data. Researchers who used the cross

[2] The extensive studies in relation to the growth theory and the factors that cause it, the empirical results are mixed as reviewed by Face and Abma (2003).

section data applied the GMM (Generalized Method of Moments) and Instrumental Variable (IV) estimation methods in analyzing the data. The finding on the effectiveness of financial sector development on economic growth varies depending on the case or country under studied. King and Levine (1993), Levine et al. (2000), Beck et al. (2000) and Nourzad (2002) agree that there exist a positive relationship between financial indicators and economic growth after taking into consideration biases and specific effect in the sampling framework.

Those who used the time series data applied the Engle-Granger and Johansen cointegration tests to examine the relationship between financial development and economic growth. The result of the study varies based on the period and the samples used in the study, depending on the economic environment faced by the samples. Arestis and Demtriades (1997) showed a positive and significant effect between financial development and real economic growth for data of Germany while insufficient proof is obtained for the data of United States of America. Neusser and Kugler (1998) found the existence of long term relationship between financial activities and Gross Domestic Product for the manufacturing sector for 13 OECD countries. Shan et al. (2001) showed the existence of causal relationship, depending on the economic condition, for 9 OECD countries and China. They stated that financial development is not exactly the primary cause for economic growth. By using the Granger causal relationship in the error correction framework, Ghali(1999), Chang(2002), and Khalifa (2002) found that the result depends on the specific nature of the country under observation and the proxies used as the indicator of economic growth.

In Malaysian context, Choong et al. (2003) provide evidence on the finance-led growth hypothesis. Using autoregressive distributed lag (ARDL) bound tests approach and VECM framework, their testing revealed that the evolution of stock market (proxy for financial development) was the leading sector in stimulating domestic growth. Ang and McKibbin (2005) conducted cointegration and various causality tests to assess the finance-growth link by taking saving, investment, trade and real interest rate into account using annual data. Contrary to the conventional findings, their results supported the view that output growth causes financial depth in the long run.

3. Data, Model and Methodology

To study the relationship between financial development and economic growth, the following model is derived:

$$G_t = \beta_0 + \beta_1 F_t + \beta_2 XM_t + \beta_3 I_t + u_t, \qquad (1)$$

where G_t - real output growth

F_t - financial sector indicator, the ratio of the total credit in the economy to GDP

XM_t - total transactions with outside economy: ratio of total export and import to GDP

I_t - inflation rate

The selection of the key variables are based on the theoretical framework of previous studies for example, as discussed by Levine et al. (2000), Face and Abma (2003), Christopoulos and Tsionas (2004), and Choong et al. (2005). In view that the direction of causal relation is unclear, it is also specified that:

$$F_t = \alpha_0 + \alpha_1 G_t + \alpha_2 XM_t + \alpha_3 I_t + v_t \,. \tag{2}$$

With the existence of *XM* and *I*, the following equations can be considered:

$$XM_t = \gamma_0 + \gamma_1 G_t + \gamma_2 F_t + \gamma_3 I_t + e_t \,, \tag{3}$$

$$I_t = \delta_0 + \delta_1 G_t + \delta_2 F_t + \delta_3 XM_t + g_t \,, \tag{4}$$

where u_t, v_t, e_t, g_t are terms for disturbances and all the equations are long term equilibrium relation. The quarterly data of the Malaysian economy for the period of 1990:1 to 2003:2 obtained from the International Financial Statistics and Bank Negara Malaysia's Monthly Bulletin is used in the empirical analysis[3]. The SAS and E-Views packages are used to analyze the data.

Step 1: Stationary Test

A unit root test is vital in observing the stationary of a time series data. Are the variables observed have the tendency to return to the long term trend following a shock (stationary) or the variables follow a random walk (containing a unit root)? If the variables follow a random walk after a temporary or permanent shock, the regression between the variables is spurious. According to the Gauss-Markov theorem, in such cases, the series do not have a finite variance. Hence the OLS will not produce a consistent parameter estimates. This study utilised two tests on the individual stochastic structure, that are the Augmented Dickey-Fuller test (5) and the Phillip-Perron test (6), which have been frequently used for time series data.

$$\Delta X_t = \lambda_0 + \lambda_1 T + \lambda_2 X_{t-1} + \sum \lambda_i \Delta X_{t-i} + \varepsilon_t \,; \qquad i = 1, 2, 3..., k \tag{5}$$

(The equation presented above includes both a drift term and a deterministic trend; the equation with a drift term but without a deterministic trend will also be tested accordingly)

The hypothesis tested:

$H_0 : \lambda_2 = 0$ (contain a unit root, the data is not stationary)
$H_1 : \lambda_2 < 0$ (do not contain a unit root, the data is stationary)

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[3] The financial market in Malaysia has undergone financial development since late 1970s but the availability of quarterly data only begin in 1990 especially for GDP (in order to arrive at real output growth). As a result, it constraints our sample period.

$$\Delta X_t = \eta_0 + \eta_1 T + \eta_2 X_{t-1} + v_t \tag{6}$$

The hypothesis tested:

$H_0 : \eta_2 = 0$ (contain a unit root, the data is not stationary)
$H_1 : \eta_2 < 0$ (do not contain a unit root, the data is stationary)

(The equation presented above includes both a drift term and a deterministic trend; the equation with a drift term but without a deterministic trend will also be tested accordingly)

Step 2: Cointegration Test

Cointegration means that, even though the variables are not stationary individually but the linear combination between two or more variables may be stationary[4]. The cointegration theory put forward by Granger (1981) is expanded by Engle and Granger (1987) integrating the short term and long term dynamic relationship. Components in vector X_t is said to be co-integrated at d,b degree, presented by CI(d,b) if:

(i) All components of X_t is I(d)
(ii) There exist a non zero vector $\beta = (\beta_1, \beta_2, ..., \beta_n)$ so that the linear combination of $\beta X_t = \beta_1 X_{1t} + \beta_2 X_{2t} + ... + \beta_n X_{nt}$ will be co-integrated at (d – b) degree where b > 0. Vector β is the cointegration vector. In the case of b = d = 1, if X_t is I(1) and their linear combination is I(0).

Granger (1981), Granger and Weiss (1983) and Engle and Granger (1987) have presented a relationship between error corrections with cointegration concept through the Granger Theorem. Johansen (1991) and Johansen and Juselius (1990), produced the maximum likelihood approach using the VAR model to estimate the cointegration relationship between components in vector k variable X_t. Consider VAR model for x_i;

$$A(L)x_i = \varepsilon_t \tag{7}$$

The parameter can be presented in the form of Vector Autoregressive Error Correction Mechanism:

$$\Delta X_t = \sum_{i=1}^{p-1} \Pi_i \Delta X_{t-i} + \alpha\beta' X_{t-p} + \varepsilon_t \tag{8}$$

where vector $\beta = (-1, \beta_2, \beta_3, ..., \beta_n)$ which contain r cointegration vectors and speed adjustment parameter is given as $\alpha = (\alpha_1, \alpha_2, ..., \alpha_n)$ when rank β = r < k, k is the number of endogenous variables. If the number of

[4] For more details on cointegration analysis see Enders (2004).

cointegration relations is known, hypothesis testing on α and β can be performed. Lag length specification for the model can be determined by VAR equation using the AIC and SBC criteria.

Step 3: Granger Causality Test

Cointegration techniques of Granger (1986), Hendry (1986), and Engle and Granger (1987), Johansen (1988) and Johansen and Juselius (1990) have given a significant contribution to the Granger causality test. If cointegration is found from the variable series, error correction term (ECT) obtained from cointegration regression must be taken into consideration in the causality test to avoid the problem of miss-specification (Granger, 1981). When two or more variables are co-integrated, they will show the existence of long term relationship if the variables contain mutual stochastic trend, as such, there exist at least one Granger Causality either in one or bi-directional (feedback effect). Result from the cointegration relationship between variables has set aside the probability of spurious estimation. Notwithstanding the above, cointegration only shows the existence or non existence of the Granger Causality, but does not indicate the direction of causality between variables.

Vector Error Correction Model (VECM)

VECM is a restricted VAR designed for use with non stationary variables that are known to be co-integrated. VECM specification restricts the long run behaviour of the endogenous variables to converge to their co-integrating relationships while allowing for short-run adjustment dynamics. Engle and Granger (1987) showed that if the variables, say X_t and Y_t is found to be co-integrated, there will be an error representatives which is linked to the said equation, which gives the implication that changes in dependent variable is a function of the imbalance in cointegration relation (represented by the error correction term) and by other explanatory variables. Intuitively, if X_t and Y_t have the same stochastic trend, current variables in X_t (dependent variable) is in part, the result of X_t moving in line with trend value of Y_t (independent variable). Through error correction term, VECM allows the discovery of Granger Causality relation which has been abandoned by Granger (1968) and Sims (1972).

The VAR constraint model may derive a VECM model as shown below:

$$\Delta X_t = u_i + \sum_{i=1}^{n} A_i \Delta X_{t-i} + \sum_{i=1}^{n} \xi_i \Theta_{t-i} + v_t \qquad (9)$$

where X_t – in the form of n x 1 vector
A_i and ξ_i – estimated parameters
Δ – difference operator
v_t – reactional vector which explains unanticipated movements in Y_t and Θ (error correction term)

In the Granger causality test, the degree of exogeneity can be identified through the t test for the lagged error correction term (ξ_i), or F test applied to the lags of the coefficients of each variable separately of the non dependent variable (A_i). In addition to the above, VECM method allows the differentiation of the short term and long term relationship. Error term with lagged parameter (ECT $(e_{1,\, t-1})$) is an adaptive parameter where it measures the short term dispersal from long term equilibrium. In the short term, the variables may disperse from one another which will cause in-equilibrium in the system. Hence, the statistical significance of the coefficients associated with ECT provides evidence of an error correction mechanism that drives the variables back to their long-run relationship.

Step 4: Impulse Response Function (IRF) and Variance Decomposition (VDC)

F and *t* tests in VECM can be described as causality test within the sampling period. Those tests will only determine the degree of endogeneity or exogeneity of dependent variables in the estimated period. They do not provide the indicator for the dynamic nature of the system. Furthermore, they do not indicate the degree of exogeneity between variables outside of the sampling period. Variance Decomposition (VDC) can be described as the causality test outside of the estimation period, VDC decomposes variation in an endogenous variable into the component shocks to the endogenous variables in the VAR. The VDC gives information about the relative importance of each random shock to the variable in the VAR. In other words, VDC shows the percentage of forecast error variance for each variable that may be attributed to its own shocks and to fluctuations in the other variables in the system.

Information gathered from VDC can also be presented with IRF. Both are obtained from the Moving Average (MA) model which was obtained from the original VAR model. IRF measures the predictable response to a one standard deviation shock to one of the system's variables on other variables in the system. Therefore, the IRF shows how the future path of these variables changes in response to the shock. In fact, they can be viewed as dynamics multipliers giving about the size and the direction of the effect. The IRF is normalized to zero to represent the steady state of the variable reacted upon. As the VAR model used is under-identified, the Choleski clarification method is used to orthogonalize all innovation/shock. Notwithstanding the above, this method is very sensitive and dependent on the order of variables. In this study, the order identified in accordance to the importance of variable is *G*, *F*, *XM* and *I*. This approach is in line with the suggestion made by Gordon and King (1982), adopted by Masih and Masih (1996); those variables which respond most to current events such as changes in exchange rates, interest rates or inflation rates should be placed in the order. So that their values reflect contemporaneous realization of variables of a higher order. The Generalized Impulse Response Functions (GIRFs) are not being used in this study since we have identified the ordering of variables in the model based on the theoretical background.

4. Empirical Results

Step 1: Stationarity – Individual Stochastic Trend

In this study, two stationary tests on individual stochastic trend are used i.e. the Augmented Dicky-Fuller (ADF) and Phillip-Peron (PP) tests. Both tests are sensitive to the total lag used in estimation. The value of ADF *t*-statistic and PP *z*-statistic will be compared to the critical value given by MacKinnon (1991). The time series under consideration should be integrated in the same order before we can proceed to co integration analysis and causality test. Table 1 presented the results of the stationarity test at level and first difference. From the result, it is found that the null hypothesis of non stationary at level for all the time series failed to be rejected. Notwithstanding the above, all null hypotheses are rejected for every test at first difference. The results clearly indicate that all variables are stationary at I(1).

Table 1
Stationary Test at Level and First Difference

Variable	ADF(t_c)	ADF (t_t)	PP(z_c)	PP(z_t)
At Level				
F	-1.6935	-2.7063	-1.6143	-2.8540
XM	-1.4905	-1.3430	-1.5438	-1.2677
G	-13.1186	-13.7514	-10.3917	-10.5106
I	-6.1603	-6.2543	-10.1738	-10.3363
At First Difference				
F	-10.8449	-11.0246	-10.8449	-11.0246
XM	-7.4673	-7.5810	-7.4673	-7.5810

Notes: ADF without trend; t_c critical value at 5% significant level is -2.89; t_t with trend, critical value at 5% significant level is -3.45. PP follows similar value as ADF's critical value; where *G*-real output growth, *F*-financial development indicator, *XM*-total transactions with other country, *I*-inflation rate. All values are observed at lag 1 (The optimal lag length used for conducting unit root test was selected based on minimizing Akaike's criterion, where the order is the highest significant lag from either ACF or PACF).

Step 2: Cointegration Test

Cointegration technique for multiple variables by Johansen (1988) and Johansen and Juselius (1990) is used in the equation with 4 variables which have the same order of stationarity. Johansen suggests two statistic tests to determine the cointegration rank namely λ_{trace} and λ_{max}. The results of analysis are reported in Table 2. λ_{max} statistics indicate the existence of cointegration between variables. Null hypothesis of no cointegration vector hypothesis (r = 0) is rejected at 5% significance level on all lag tested (1,2,3 and 4). At least one cointegration vector exists for series of variables in the system. As such, it can be concluded that at any point of time, there is an (n - r) mutual stochastic trend in this model.

Table 2
Johansen and Juselius Cointegration test

Null Hypothesis	λ_{max}	5%
Lag Length = 1		
r = 0	93.06*	28.17
r < 1	39.35*	21.89
r < 2	8.78	15.75
r < 3	3.32	9.09
Lag Length = 2 lags		
r = 0	75.70*	28.17
r < 1	23.96*	21.89
r < 2	10.37	15.75
r < 3	3.12	9.09
Lag Length = 3 lags		
r = 0	29.57*	28.17
r < 1	17.00	21.89
r < 2	12.53	15.75
r < 3	4.88	9.09
Lag Length = 4 lags		
r = 0	28.98*	28.17
r < 1	13.06	21.89
r < 2	11.31	15.75
r < 3	4.83	9.09

Notes: Critical value taken from Osterwald and Lenum (1992). (*) shows the rejection of critical value at 5% significance level.

The presence of co-integrating relationship is consistent with the economic theory which predicts that financial development and economic growth have a long-run equilibrium relationship. According to Engle and Granger (1987), co-integrated variables must have an error correction representation in which an error correction term (ECT) must be incorporated into the model. ECT forms part of the variables which are exogenous as seen in Table 3. Masih and Masih (1996) stated that cointegration brings to an end of any need to use other usual dynamic relationship model as this model may be faced with misspecification drawback. As mentioned earlier, cointegration between variables cannot indicate the direction of Granger causality relationship. It can only be seen by using the VECM sample framework.

Step 3: VECM and Granger Causality Test

VECM specification only applies to co-integrated series. The long-run relationship exists between both fundamental variables, as the error correction term is significant. The results are presented in Table 3. The statistical significance of the coefficients associated with ECT provides evidence of an error correction mechanism that drives the variables back to their long-run relationship, which shows the econometrical exogeneity of the ECT series. There is also a short term relationship between economic growth and financial development. The moneterization effect is clearly viewed through the significance of the said variable dynamically. The feedback effect exists between both variables. If the government implements a policy to influence economic growth through changes in the financial sector, it will be an effective policy in view of the significant relationship between both variables. It is also true in reverse as economic growth will also spur the development in financial sector. The above relationship can be seen through significant of *t* testing for ECT and *F* testing for the endogenous variables involved for lags which are greater than one.

Table 3
Causality test in VECM

Dependent variable	ΔG	ΔF	ΔXM	ΔI	ECT $_{(e1,t-1)}$ *t* value
Lag Length = 1	AIC = 5.47				
ΔG		0.0376*	0.1784	0.8163	-11.3667*
ΔF	0.0354*		0.1287	0.8550	4.4232*
ΔXM	0.1471	0.9198		0.7332	3.1626*
ΔI	0.2579	0.2062	0.1206		1.0662
Lag Length = 2	AIC = 5.35				
ΔG		0.00742*	0.0037*	0.6283	-9.4542*
ΔF	0.0052*		0.2163	0.9911	4.1885*
ΔXM	0.0030*	0.7662		0.9378	3.5736*
ΔI	0.4032	0.0250*	0.0651		1.5759
Lag Length = 3	AIC = 5.04				
ΔG		0.0002*	0.0065*	0.4248	-6.9119*
ΔF	0.0001*		0.2163	0.9911	3.1885*
ΔXM	0.0021*	0.4482		0.4400	1.9624*
ΔI	0.2151	0.0268*	0.1431		3.2445*
Lag Length = 4	AIC = 5.14				
ΔG		0.0155*	0.0396*	0.1629	-3.3580*
ΔF	0.0001*		0.8196	0.3272	1.4365
ΔXM	0.0054*	0.3525		0.5361	0.8010
ΔI	0.2854	0.0682	0.2882		2.4699*

Notes: The above values are the value of *F* (*p* value). * Significant at 5% significance level.

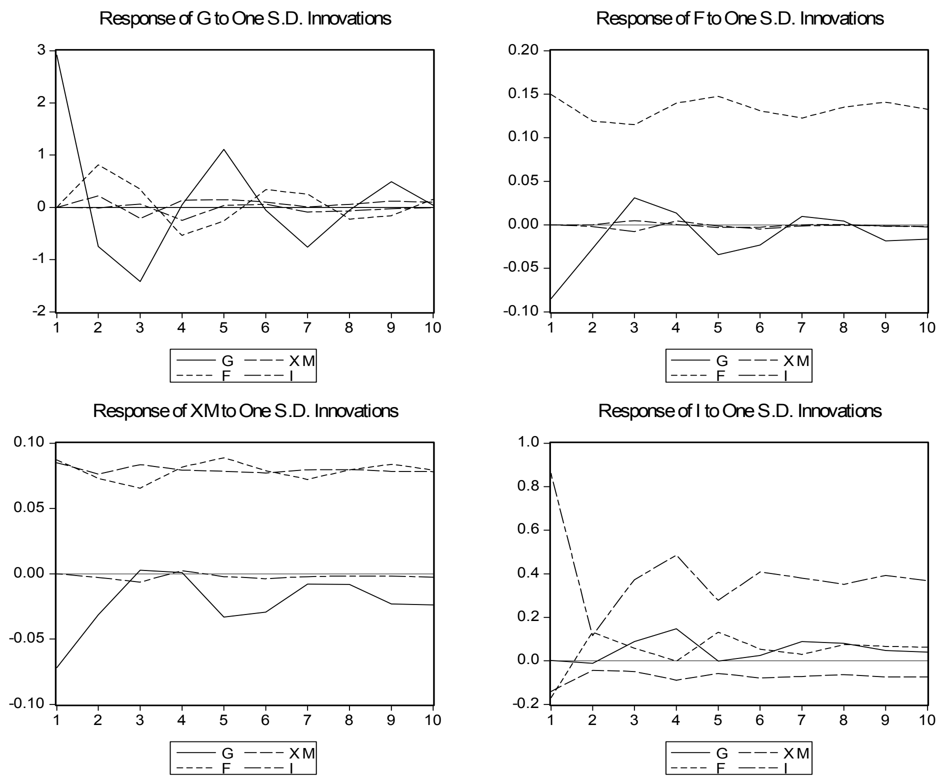
Other variable that may explain economic growth is the total foreign transactions (*XM*) which is significant for all lag period under consideration except for the first lag. This proves that the volume of export and import can be used to promote economic growth. The results obtained for all lag period examined are not significant for the inflation variable. In other words, inflation rate in Malaysia is not important in explaining economic growth. Only the effects of moneterization can influence the rate of inflation in this country. If the Akaike Criterion (AIC) is viewed, the best model is obtained with the utilisation of lag 3, but model with other lags do indicate similar causality relation[5]. It can be noted that some of the ECTs are positive and significant. The endogenous variables (*F*, *XM* and *I*) are adjusted in the long run but their values are too high to be in equilibrium. We can conclude that those variables divert from their long run equilibirium steady state unlike real output growth which will converge to the long run equilibrium. Masih and Masih (1996) using almost the same macroeconomic variables as this study produced some positive significant ECTs for the case of Malaysia. Therefore our study is not a unique case of non-convergence to the long run equilibrium in accordance to the Theory of Endogenous Growth (Romer, 1986).

Step 4: IRF and VDC

Dynamic simulations are used to calculate VDC and visualize the IRF in order to corroborate the results obtained through VECM. An analysis of the IRF is presented in Figure 1. A ten-period horizon is employed to allow the dynamics of the system to work out. Shocks to variables in particular *F* have an impact on *G*, and there is a relatively persistent effect on *G* though decreasing through out the horizon. Likewise the response of *F* to a shock in *G* can be seen significant and persistent. Shocks to variables *G* and *F* have positive small response on *I* but the impact is not persistent almost stabilize in period 6. Therefore, the IRF appears to be broadly consistent with earlier VECM results, that there is a bilateral effect between *G* and *F*.

[5] Diagnostic tests such as CUSUM and LM test on residuals have been performed. The results show that the estimated models are free from structural break as well as serial correlation.

Figure 1
Impulse Response Functions of One Standard Deviation Shocks/Innovations



The results of VDCs are reported in Table 4. A ten-period horizon is employed to convey a sense of the dynamics of the system. The Granger-causal chain implied by the analysis of VDC tends to suggest that *F* time series is relatively the leading variable, being the most exogenous of all, followed by *I* and *G*. For example, in the model even after 5 and 10-quarter horizons, about 90 to 93 percent of the forecast error is explained by its own shocks compared to the other variables. Decomposition of variance in *G*, besides being explained by its own variable, *G* can be explained by *F*. The same can be said for *F*, in addition to being explained by the variable itself, it is explained by variable *G*.

Table 4
Variance Decompositions (VDCs)

VD of *G*: Period	*S.E.*	*G*	*F*	*XM*	*I*
1	2.916507	100.0000	0.000000	0.000000	0.000000
2	3.126486	92.78442	6.725320	0.487638	0.002620
3	3.458881	92.68377	6.481362	0.796235	0.038630
4	3.512086	89.92036	8.613908	0.908871	0.556865
5	3.695134	90.21273	8.295245	0.980875	0.511150
6	3.712399	89.39675	9.026841	1.044613	0.531794
7	3.798847	89.38755	9.052390	0.997718	0.562342
8	3.807145	89.02110	9.364066	1.017940	0.596894
9	3.844435	88.95307	9.365487	1.091633	0.589807
10	3.848744	88.76606	9.499611	1.145571	0.588754
VD of *F*: Period	***S.E.***	***G***	***F***	***XM***	***I***
1	0.172057	24.25044	75.74956	0.000000	0.000000
2	0.210894	17.79923	82.19020	1.30E-05	0.010553
3	0.242165	15.14562	84.70814	0.033833	0.112410
4	0.279954	11.56173	88.30406	0.025524	0.108691
5	0.318243	10.11050	89.77418	0.029236	0.086076
6	0.344817	9.072013	90.79918	0.032855	0.095947
7	0.366078	8.115688	91.76845	0.029153	0.086708
8	0.390229	7.154528	92.74311	0.025668	0.076692
9	0.415173	6.517683	93.38850	0.024909	0.068906
10	0.436139	6.048815	93.85985	0.025365	0.065972
VD of *XM*: Period	***S.E.***	***G***	***F***	***XM***	***I***
1	0.141155	25.87959	37.94663	36.17378	0.000000
2	0.178898	19.21442	40.13374	40.62457	0.027269
3	0.208124	14.21322	39.52490	46.14261	0.119275
4	0.237165	10.94660	42.26465	46.68820	0.100551
5	0.267069	10.16977	44.34579	45.39828	0.086159
6	0.290414	9.616756	44.84878	45.44264	0.091823
7	0.309662	8.525506	44.85010	46.53847	0.085933
8	0.329575	7.589188	45.41034	46.92200	0.078470
9	0.349747	7.176694	46.06498	46.68615	0.072173
10	0.367780	6.910046	46.30836	46.71096	0.070634
VD of *I*: Period	***S.E.***	***G***	***F***	***XM***	***I***
1	0.888815	0.000390	3.603905	2.508643	93.88706
2	0.906883	0.014296	5.515025	2.644288	91.82639
3	0.987423	0.810735	4.994386	2.479628	91.71525
4	1.113877	2.378279	3.925274	2.602985	91.09346
5	1.156909	2.204766	4.919405	2.661550	90.21428
6	1.230659	1.988230	4.529727	2.776577	90.70547
7	1.293072	2.275881	4.151326	2.828421	90.74437
8	1.345761	2.455116	4.135792	2.840017	90.56907
9	1.406053	2.361225	4.011379	2.883139	90.74426
10	1.456575	2.274346	3.919655	2.938971	90.86703

Notes: Ordering: *G F XM I*

5. Conclusion and Policy Implication

The main objective of this study is to view the relationship between financial development and economic growth using Malaysian data by applying the cointegration test in the VAR framework. The Granger causality test is performed to determine the direction of the relationship between both fundamental variables through VECM. The VDC and IRF are viewed to verify the results obtained through VECM. The evidence of cointegration between the variables, suggest the existence of a long run stable relationship or a common stochastic trend between variables. This gives the implication that even though there is a momentary dispersal from the common long-run trend, the power of endogenous variables will promote the relationship back to long-run equilibrium.

The finding from cointegration test or the relation of long-run stability between variables especially economic growth and monetarization effect is vital for policy maker. The combination of Granger causality through VECM dynamic analysis, VDC and IRF provide a valuable implication on the direction of relationship (lead-lag) between variables examined. In view of the feedback effect, in the determination of policy, the government may utilize the financial sector in influencing the economic growth. If an increase of the growth rate is desired in Malaysia, the financial sector should be refined in term of efficiency in provision of resources which will spur economic activities. Inversely, economic growth itself will support the financial sector as the increase in transactions in the economy will subsequently boost domestic savings and generate more transactions. Other variables that have been chosen as explanatory variables are total foreign transactions and inflation rate, but the result obtained, especially for inflation rate, is not encouraging. The volume of foreign transactions is still important in influencing the economic growth and financial sector. In conclusion, the empirical results show that, financial development significantly causes growth in the short-run, and in the long-run. There is a bi-directional relationship between financial development and economic growth. In other words, the Malaysian case supports the supply-leading phenomena and the demand-following cases (mutual causality) in the long-run.

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