# The determinants of economic growth: the Malaysian case

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18 April 2018

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## Abstract

This paper investigates the factors that stimulate and enhance economic growth. The determinant factors studied are consumer price index, stock market index, gross domestic growth, export and housing price index. This study uses the time series techniques to analyze the relationship between economic growth and the determinant factors. The results of this study tend to indicate that there exists a long-run cointegrating relationship and multiple short-run causal relationships between economic growth and the determinant factors. Overall, findings show that all the determinant factors (combined determinant factors) cause economic growth in the short-run. However, individual tests indicate that only asset prices (stock prices) and consumer good prices cause economic growth, while this is less so for housing prices, commodity prices and real production. The study concludes that asset prices and consumer good prices play important roles as determinant factors of economic growth, whereas, commodity prices, housing prices and real production may have a role as a catalyst and complementary determinant factors to economic growth in Malaysia. This study contributes to the formulation of both the monetary and fiscal policies at least in the context of Malaysia.

**Keywords**: Determinants of economic growth, VECM, VDC, Malaysia

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# 1.0 Introduction

Assessing existing policies or developing new policy options requires indicators showing where a community stands, where it is going to and how far it is from where it wants to be. Indicators are necessary in all steps of the policy cycle: to describe the current situation/problem; to analyse the causes; to identify possible solutions and analyses, select and implement policy proposals; to monitor and evaluate the policies and to communicate the outcomes at all steps of the policy cycle. Economic performance is generally being measured through GDP (Gross Domestic Product), a variable that has also become the de facto universal metric for 'standards of living'. However, GDP does not properly account for complete financial, social welfare and environmental standards. GDP is fairly unique in that it combines simplicity, linearity and universality, as well as carries the objectivity of the 'observable market price' as its guiding principle.

The paradigm shift in the economy from static to dynamic has sparked considerable attention from economists since the early 90s. The currently accepted idea is that the economy is not static – economic structure can change (Galbraith, 1994). A change in the economy can affect the development of a country. For this reason, economic growth and the factors leading to growth have been a constant area of study. Traditional growth theory based on Solow (1956) and Denison (1962) as cited in Piazolo (1996) shows that setting the output depends on the level of capital stock, the volume of labour employed and types of technology. Factors like savings and investment rate of government consumption expenditure are also cited as minor influences for long term economic development. The current growth theory according to Piazolo 1996 focuses mainly on Technological changes, Role of the government, Trade policies and human capital development as determinants of economic growth .

Some cited variables that determine economic growth in past studies are consumption expenditure, government expenditure, investment and import export. Most literature, however, focuses more on export factor as a determinant of output growth (Chow, 1987; Thirlwall, 1994; Ahmad and Harnhirun, 1996; Balaguer ).

## 1.1 Objectives

The main objective of this study is to investigate the relationship and causal pattern of several determinant factors (price of consumer goods , export of prime commodities, stock market, housing prices, gross domestic production) towards economic growth in Malaysia. In addition, this study will also look into the possible effects of combined determinant factors towards economic growth. The study is significant as it serves a crucial and helpful role in the formulation of both the monetary and fiscal policies.

### 1.2 Theoretical framework

There are not many theories that discuss role of various factors in determining economic growth of various factors in determining economic growth. Two main strands can be distinguished: the neoclassical, based on Solow's growth model, has emphasized the importance of investment and, the more recent; theory of endogenous growth developed by Romer and Lucas has drawn attention to human capital and innovation capacity. Furthermore, important contributions on economic growth have been provided by Myrdal's cumulative causation theory. In addition there are other explanations that have highlighted the significant role non-economic factors play on economic performance. These developments gave rise to discussion that distinguishes between 'proximate' and 'fundamental' (or 'ultimate') sources of growth. The classical refers to issues such as accumulation of capital, labour and technology while the counterparty view more towards the institutions, legal and political systems, socio-cultural factors, demography and geography. The theoretical answers are still inconclusive and there is a need for an empirical answer to the issue raised..

## 2.0 Literature Review

There is a vast amount of research in the area of economic growth. Both theoretical both and empirical studies have been carried out in order to determine contributing factors to economic growth some eg Li and Liu, 2005; Sharma and Panagiotidis, 2005; Yoo, 2006; Hsiao and Hsiao, 2006; Baharumshah and Thanoon, 2006; Sinha and Sinha, 2007; Agu and Chukwu, 2008. Research has also been carried out using the Malaysian and Asian context ( Yoo, 2006; Baharumshah and; Ang, 2008; and Sook-Ching, Kogid and Furuoka, 2010). Some of the studies are summarized below

According to Chow (1987), the contribution of export growth to the development of countries can be measured using impact on the increase of the country's income, production of non-export goods, capital efficiency and its ability in handling external shocks, negative external effects, resource allocation and also total productivity factor. Export is one the most researched determinant factor for economic growth, This could be due to the fact that since early 1970s, most developing countries have practiced export promotion. Research supports export as an effective component of economic growth in developing countries. Also according to Jung and Marshall, 1985 some countries have testified to export promotion as an effective development.

There are studies that suggest that there are other factors besides export that contribute to economic growth. Ahmad and Harnhirun (1996) studied the economic success of new industrial countries Indonesia, Malaysia, Philippines, Singapore and Thailand using time data series from the year 1966 until 1988 to find out whether export is the cause of the countries' economic growth. Their study suggested that the link

between export and economic growth lies in the development policy. Interestingly, their article also found that it is economic development that causes export growth, and not the other way. Balaguer and Jorda (2001) found that although export is a definite cause of economic growth during economic liberalization in Spain, there are other indirect causes from output growth to export.

According to Awokuse (2002), the identification of empirical evidence linking export to economic growth is questionable. Their study re-tested the export-lead growth hypothesis for Canada using the Granger causality test from export to output growth using the Vector Error Correction Model (VECM) and an augmented Vector Autoregression (VAR) method developed by Toda and Yamamoto. The result of the study implied that a long-term relationship exists in the model with six variables and there is a flow of Granger cause from real export to real GDP. Sharma and Panagiotidis (2005) reinvestigated economic growth sources in India for the periods 1971 to 2001. They developed the Feder model to empirically investigate the relationship between export growth and GDP growth using data from the Reserve Bank in India. They gave particular attention to GDP growth and net GDP growth on export. However, they failed to prove the argument that export was the Granger cause to GDP based on the Engle-Granger and Johansen approach (using two measurements namely GDP with export and GDP without export).

Cortes-Jimenez and Pulina (2006) explored the effects of foreign exchange, specifically tourism on economic growth. Their study suggested international tourism is the largest foreign exchange earner for most low-income countries, as is with developed countries. Currently, many developing countries are giving pressure to economic policies to promote international tourism as a potential contributing factor to a nation's economic growth. However, efforts to gain greater understanding on the relationship between export and economic growth are still in progress. It appears that cross-section studies support the hypothesis that export is inclined to enhance economic growth, while time series studies do not. Cortes- Chen 2009 article also looked at whether export and tourism which are export-led growth hypothesis and growth-led tourism, really do encourage economic growth. The outcome of their study on Spain and Italy using the cointegration and multiple Granger causality test showed that export is the cause to economic growth in the long run for both countries, while tourism is the more influencing factor to economic growth in the long run for Spain.

Ricardo (1817) study implied that the wealth of a country that is involved in trade will increase compared to countries that do not trade (Khalafalla and Webb 2001). Due to the impact on economic growth, foreign trade development is a factor of constant discussion. The existence of foreign trade and development is closely linked to economic growth where foreign trade encourages economic growth to a country (Chen 2009). Alfaro, Chanda, Kalemli-Ozcan and Sayek (2004) attempted to identify various relationships

between Foreign Direct Investment (FDI), financial market and economic growth. They also sought to find out whether countries with better financial systems are able to exploit FDI more efficiently. Their empirical analysis used cross country data between the years 1975 to 1995. The study found that with 71 countries, FDI played an ambiguous role in contributing to economic growth. On the other hand, countries with a structurally good financial market were able to gain significant advantages from FDI. Li and Liu (2005) studied whether FDI affected economic growth based on panel data for 84 countries from the year 1970 to 1999. Single and simultaneous systems of equation techniques were used to test this relationship. Li and Liu study suggested that there is significant relationship between FDI and economic growth which was identified from the mid 1980s and after. FDI appears to indirectly interact with human capital, which leads to a strong positive effect on economic growth in developing countries. It should be noted that in countries with a technological gap, FDI gives a significant negative impact on economic growth.

Hsiao and Hsiao (2006) article employed panel data and time series from 1986 to 2004 to identify the link in Granger causality between GDP, export and FDI among China, Korea, Taiwan, Hong Kong, Singapore, Malaysia, Philippines and Thailand. (These are considered fast developing countries in South East Asia and East Asia.) The result of their research implies that FDI has a direct one-way effect on GDP and an indirect effect through export. There was also a bilateral causal relationship between export and GDP. In addition, panel data causal analysis has a stronger decision outcome compared to time series causal analysis. In another study conducted by Baharumshah and Thanoon (2006), a quantitative assessment was carried out on various types of flow models towards the growth process in East Asian countries including China. Their empirical findings based on dynamic data panel showed positive domestic savings contributed to economic growth in the long run. This study implied that FDI causes growth and its effects can be experienced in both short and long-term. Significance of this study is that FDI contributes largely to the development of East Asian economy and suggests that the countries which succeed in attracting FDI inflow can generate more investment, leading to faster overall development. Ang (2007) used annual time series data from 1960 to 2005 in his study to see the determinants of FDI for Malaysia. His study found that real GDP had a significant positive impact on FDI inflow. There was also evidence that the GDP growth rate gave a minor positive impact on FDI inflow.

A number of studies have focused on the effect of education investment , bank financing (Tang, 2003), financial deepening (Agu and Chukwu, 2008), saving (Sinha and Sinha, 2007), electricity (Yoo, 2006) and insurance (Sook-Ching et al., 2010) as additional factors on the economic growth of a nation Piazolo (1996) studied the determinants of Indonesian economic growth through time series analysis based on cointegration and error correction model from the year 1965 to 1992. He showed that the determinants of economic growth in Indonesia were human capital, investment, government consumption, imports and

inflation especially in the long term. Exports played a strong positive influence on Indonesian economic growth in the short term. Trade and financial liberalization as well as exogenous technological change also contributes positively to economic growth. Ramirez et al. (1998) suggested that high level human capital development can affect the economy through the population's increase in capacity, productivity and creativity. Investment in education will promote the development of a critical and technologically skilled human capital.

Tang (2003) in his study re-investigated the role of bank financing as an alternative factor on Malaysian economic development by using the bounds testing approach. The study covered the annual periods from 1960 to 1998. The study found that there was no long term relationship between the volume of bank lending and the real Gross Domestic Product (GDP). The study also found that bank lending is influenced by the country's economic growth in the long-run. Agu and Chukwu (2008)'s study on the causal direction between "bank based" financial deepening variables and economic growth in Nigeria between the years 1970 to 2005 using the augmented Granger causality test. The result of the cointegration test showed that financial deepening and economic growth cointegrate positively. The result of their study also suggests that the selection pattern to the financial deepening variable influenced the causal result.

Sinha and Sinha (2007) studied the relationship between per capita saving and per capita GDP in India using the Granger causality test based on the Toda and Yamamoto approach. The data used were from 1950 to 2004. The types of savings include household, corporate and public savings. The result of their studies showed that there are no causal relationships between per capita GDP with per capita household savings or per capita corporate savings coming from any direction. However, there exist a bilateral causal relationship between per capita household savings and per capita corporate savings.

Yoo (2006) study looked into the causal relationship between electricity usage and economic growth amongst four ASEAN countries namely Indonesia, Malaysia, Singapore and Thailand using time series data for the years 1971 to 2002. This study implied that there is a bilateral causal relationship between electricity use and economic growth in Malaysia and Singapore, while a one-way causal relationship exists towards economic growth through electricity usage in Indonesia and Thailand.

There are also studies on the relationship between the life insurance sector and economic growth. For instance, study done by Sook-Ching, Kogid and Furuoka in 2010 applies the Johansen co integration test, and the Granger causality test based on the Vector Error Correction Model (VECM) to examine the causal relation between the life insurance and economic growth in Malaysia using quarterly data from 1997 to the second quarter of 2008. The study suggested that there is sufficient evidence to support a long-run

relationship between the life insurance and the real GDP, and also a short-run causal relation from the real GDP to the life insurance.

## 3.0 Methodology

This study will use Time Series Technique to test the impact of growth indicators on GDP using MICROFIT to run the analysis . Using Time Series technique, this study will try to analyse factors that are cointegrated with Economic growth. The cointegration test may select any variable which move together with GDP in the long term equilibrium. The VECM will identify the causal relationship between cointegrated variables. While the VDCs and IRF try to find the most leading variable, the persistence profile may inform us about the duration required for cointegrated variables to return back to their equilibrium when the external shock occurs.

The theory is derived from past studies carried out on growth indicators. The variable included GPD from second quarter of 1999 to 2010, Housing price index (HPI) from 2nd quarter 1999 to 4th quarter 2010, Stock price index (API) 2nd quarter of 1999 to 4th quarter of 2010, Commodities index with is the weight average of the palm oil and rubber export prices from second quarter 1999 to 4th quarter of 2010, Consumer price index (CPI) from 2nd quarter on 1999 to 4th quarter on 2010. The variables to construct the model will include:

**Table 1: Showing Variables used**

| No | Variable | Symbol | Logarithm Form |
|---|---|---|---|
| 1 | Gross Domestic Product | GDP | LGDP |
| 2 | Consumer Price index | CPI | LCPI |
| 3 | Malaysian stock price index | API | LAPI |
| 4 | Housing price index | HPI | LHPI |
| 5 | Commodities price index | CDR | LCDR |

## 4.0 Data, Empirical Results and discussion

In this section eight step steps of the time series technique will be performed. All variables will are derived according to the theories relating to economic growth explained in the literature review.

### 4.1 Step 1: Non stationary test

This step is to identify the stationarity of the variables. A variable is stationary if its mean, variance and covariance is constant over time. To test for non- stationary test is carried out using Augmented Dickey-Fuller or ADF and Philips Perron or PP test. Testing the null p=0 given by the t-ratio of the coefficient of xt-1. If the t-ratio of the coefficient is not statistically significant then null is accepted this means that variable is non-stationary and is a random walk which has a long term memory. The advantage of ADF tests solves autocorrelation problem in the data. Whereas the advantage of PP test is that it not only takes care of autocorrelation but heteroscedasticity problem in the data as well. Table 2 shows summary of both ADF tests. The differenced form for each variable used is created by taking the difference of their log forms. For example, DGDP = LGDP – LGDPt-1. We then conducted the Augmented Dickey-Fuller (ADF) test on each variable (in both level and differenced form). PP test requires second difference for example D2DGDP= DGDP-DGDP(-1), variable are in both test in there level and second difference form. Table 3 shows summary of PP (Philips Perron) test.

**Table 2: Summarized ADF (Augmented Dickey-Fuller) test results**

| Variable | Test Statistic | Critical Value |
|---|---|---|
| LGDP | -2.2465 | -3.5189 |
| DGDP | -4.3701 | -2.9339 |
| LHPI | -3.2504 | -3.5189 |
| DHPI | -4.0377 | -2.9339 |
| LAPI | -3.2178 | -3.5189 |
| DAPI | -3.2133 | -2.9339 |
| LCDR | -3.3485 | -3.5189 |
| DCDR | -4.1147 | -2.9339 |
| LCPI | -1.8794 | -3.5189 |
| DCPI | -2.7923 | -2.9339 |

According to the table the variable are non-stationary in their level form (critical value > test statistic) and stationary in their difference (critical value < test statistic). Appendix 1a and 1b shows ADF and PP test

results. For variable of LGDP in level form, p-value is 14%, which means that we can reject the null of stationary. Therefore, LGDP is non-stationary in level form. On the other hand, for the difference form of LGDP, which is DGDP, we can see that the p-value is 00 meaning that is stationary

**Table 3: Summary of PP (Philips Perron) Test**

| Variable | Probability |
|---|---|
| LGDP | 0.14 |
| DGDP | 0.00 |
| LHPI | 0.00 |
| DHPI | 0.00 |
| LAPI | 0.01 |
| DAPI | 0.00 |
| LCDR | 0.00 |
| DCDR | 0.00 |
| LCPI | 0.65 |
| DCPI | 0.00 |

From both the tables difference in results are observed as PP tests suggests non stationary (P value less than 10%) in level form in some of the variables but never the less we proceed based on the initial ADF test which indicates that all variables are non-stationary in level form.

### 4.2 Step 2: Determination of the order of the VAR Model

Before proceeding with test of cointegration, order of vector auto regression (VAR) model needs to be determined that is, the number of lags to be used. Appendix 2 provides the computational analysis. The results from the Adjusted LR test shows the p-value of all orders are greater than 10%, which means that the null is accepted. To choose the appropriate lag, the highest value of AIC, which is 444.7268 at order 5 is selected and the highest value of SBC which is 405.4390 at order 0 is picked. Therefore, the best lag is at order 5 attributed to the highest AIC. However, considering only 41 observations relatively, some degree of freedom if lost if take 5 lags are selected. On the other hand, it is impossible to take lag 0 related to the highest SBC. In this case, 2 will be the choice of lags.

### 4.3 Step 3: Test for Cointegration

The cointegration test is very important as it checks whether all variables are theoretically related. If variables are cointegrated, this would mean that there is a co-movement among these variables in the long term reaching the equilibrium, although they move differently in the short term. Cointegration also means that a linear combination of our variables in their original form will leads to a stationary error term. This test is very useful because it will prove the untested hypothesis or theory. There are two ways to conduct cointegration test first one is the Engle-Granger test (residual-based test) while the second one would be Johansen test (Maximum Likelihood test). The residual-based test is only able to test the presence one cointegration. While Johansen test has an advantage over Engle-Granger testing as it tests more than one cointegration. Table 4 summaries Engle-Granger test results and table 5 provides summary multiple cointegrating vectors. table shows computational results for Johansen and Engle Granger

**Table 4: Summary of Engle Granger test.**

| Variable | T-stat | Critical value |
|---|---|---|
| **LGDP** | -1.7643 | -4.8255 |
| **LHIP** | -3.2913 | -4.8255 |
| **LAPI** | -2.3114 | -4.8255 |
| **LCDR** | -3.2951 | -4.8255 |
| **LCPI** | -1.8157 | -4.8255 |

Based on the table 4 Engle granger test results do not show any cointegrating vectors as the T-stat is lower than the critical value

**Table 5 Johansen ML Results for multiple cointegrating vectors – Housing price index, GDP, Asset price index, Commodity price index, Consumer price index**

| Ho | H1 | Statistic | 95%Crit | 90%Crit |
|---|---|---|---|---|
| Maximum Eigen value Statistic | | | | |
| r=0 | r>=1 | 61.0799 | 37.8600 | 35.0400 |
| r<=1 | r>=2 | 36.9922 | 37.7900 | 38.2398 |
| Trance Statistic | | | | |
| r=0 | r>=1 | 126.4809 | 87.1700 | 82.8800 |
| r<=1 | r>=2 | 65.4010 | 63.0000 | 68.1600 |

Based on the table the null is rejected and accept the error at 5% and 10% for r=0 at Statistic is higher at both 95% critical and 90% meaning that there is no cointegration. At r<=1 we accept the null reject the error at 5% and 10% as statistic is lower at both 95%crtical and 90% critical. This means that there is one cointegrating vector. For instance, we also reject the null for r=0 and accept at r<=1 as statistic for r=0 is high at both 95% and 90% and at r<=1 test statistic is higher at 90% and lower at 95%. This means that at

the estimated statistic there is also one cointegrating vector. table shows the result of cointegration test. In the maximal eigen value test, both critical values, we have to accept the null of r<=1. In other words, it means that we have one cointegration. Both Engle Granger and Johansen test results are contradictory never the less based on the results of Johansen we proceed to the next stage of identifying if the variables are significant or insignificant or if they variable go against theoretical acceptations.

### 4.4 Step 4: Long Run Structural Modeling (LRSM)

This step estimates theoretically meaningful cointegrating relations. Long-run relations are imposed and then tested by over-identifying restrictions according to theories and information of the economies under review. In other words, this step will test the coefficients of our variables in the cointegration equations against the theoretical expectation. This LRSM step also tests the coefficients of our variables whether they are statistically significant. The cointegration equation is derived from the coefficients. Since there is one cointegration, the exact identification will impose one restriction only. Normalization is imposed by putting long-run coefficient of LGDP equal to one where long-run coefficients of all remaining level-form variables are obtained. As in this case the level-form variables, the t-ratio is greater than two. It may imply all variables in the long-run equation are statistically significant. Therefore, 0 was not imposed to each variable. To show what this means table 6 summarizes the exact and over identifying restriction for one vector.

**Table 6: Exact and over Identifying Restrictions on the Cointegrating Vectors**

| | **Panel A** | **Panel B** |
|---|---|---|
| LGDP | 1.0000 | 1.0000 |
| | (*NONE*) | (*NONE*) |
| LHPI | 1.4895 | 1.0000 |
| | (0.39510) | (*NONE*) |
| LAPI | .35656 | .44006 |
| | (0.14617) | ( .071113) |
| LCDR | -1.8294 | -1.2693 |
| | (0.45371) | ( .045144) |
| LCPI | 1.1928 | .91440 |
| | (0.37447) | ( .40398) |
| Trend | -0.029032 | -.032125 |
| | ( .0036662) | ( .0030523) |
| Chi-Square | None | 7.1921(.007) |

According to the table 6 we reject the null as the value of chi-square less than 10%. This mean that the coefficient of LHPI is not equal to 1.The cointegrating equation is in line with the theory of economic growth indicators therefore all variables should be in this equation. The magnitude of the long run coefficients is unknown therefore the coefficients are estimated by the equation

Cointegration equation:

**1 LGDP + 1.489LHPI + 0.356LAPI – 1.82489LCDR + 1.1928LCPI = I(0)**
**(*NONE*) (0.39510) (0.356) (0.45371) (0.37447)**

The equations above do not give the information about which variable is exogenous and which variable is endogenous. There is no "equal sign" and the equations do not tell the causal relationship. Therefore, the next step which is VECM addresses this issue.

### 4.5 Step 5: Vector Error correction model (VECM)

Error-correction term (ECT) is the stationary error term, in which this error term comes from a linear combination of the non-stationary variables that makes this error term to become stationary if they are cointegrated. It means that the ECT contains long term information since it is the differences or deviations of those variables in their original level form. VECM uses the concept of Granger causality that the variable at present will be affected by another variable at past. Therefore, if the coefficient of the lagged ECT in any equation is insignificant, it means that the corresponding dependent variable of that equation is exogenous. This variable does not depend on the deviations of other variables. It also means that this variable is a leading variable and initially receives the exogenous shocks which results in deviations from equilibrium and transmits the shocks to other variables. On the other hand, if the coefficient of the lagged ECT is significant, it implies that the corresponding dependent variable of that equation is endogenous. It depends on the deviations of other variables. This dependent variable also bears the brunt of short-run adjustment to bring about the long term equilibrium among the cointegrating variables.

The appendix 5a shows the results for each variable. The null hypothesis is that the coefficient of the lagged ECT is equal to zero. For dLGDP in the VECM equation, the P-value for the coefficient of the lagged ECT is 0%, meaning that we can reject the null since it is less than 10%. The lagged ECT is statistically significant to affect dLGDP. It means that LGDP is endogenous and it depends on the deviations of other variables. For DLAPI in the VECM equation, the P-value for the coefficient of the lagged ECT is 80.9%, meaning that we cannot reject the null since it is more than 10%. The lagged ECT is statistically insignificant to affect DLAPI. It means that LAPI is exogenous in the equation and it does not depend on the deviations of other variables. The coefficient of the lagged ECT also indicates the speed of short term adjustment to bring about long term equilibrium. For DLHPI the p value of coefficient of the lagged ECT is less than 10% therefore the null is rejected this means that variable DLHIP is endogenous. For DCDR the p value of coefficient is less than 10% his means the null is rejected means that ECT is statistically significant and is affected by deviations of other variables. Meaning that variable DHPI is endogenous. P-

value of coefficient of lagged ECT for CPI is more the 10% (19.8%) therefor the null cannot be rejected. The lagged ECT is statistically insignificant to affect the DCPI meaning that this variable is exogenous in the equation and does not depend on the deviations of other variables. Table show ECM model

**Table 7: Vector Error-Correction Estimates**

| Variable | DLGDP | DLHPI | DLAPI | DLCDR | DLCPI |
|---|---|---|---|---|---|
| DLGDP | .41821 | -1.0451 | .40479 | -.80386 | .040976 |
| | (.11242) | (0.44079) | .33761 | .38838 | .026641 |
| DLHPI | 0.52669 | 1.6173 | -2.1409 | .97417 | .019443 |
| | (.30199) | (1.1841) | .90692 | 1.0433 | .071564 |
| DLAPI | .13185 | -0.12239 | -.28565 | -.14422 | .0045198 |
| | (.072029) | (0.28242) | .21632 | .24884 | .017069 |
| DLCDR | -0.74735 | -2.1360 | 2.6203 | -1.3252 | -.043303 |
| | (0.34499) | (1.3527) | 1.0361 | 1.1918 | .081754 |
| DLCPI | 2.6905 | 4.0440 | -.17387 | 3.6611 | .22319 |
| | (0.84287) | (3.3048) | 2.5313 | 2.9119 | .19974 |
| ECM(-1) | -0.87826* | -1.5008* | -.10572 | -1.1962* | -.045447 |
| | (0.14487) | (.56800) | (0.43505) | (0.50048) | (0.034330) |
| Chi-sq SC(4) | 16.6459(0.002) | 2.3800(0.666) | 2.5923[.628 | 4.9674[.291 | 2.5975(0.627) |
| Chi-sq FF (1) | 1.6647(0.197) | 0.01897(0.890) | 0.45778(.499) | 0.0076206(.930) | 0.0197(0.888) |
| Chi-sq N (2) | 0.38774(0.824) | 0.29761(0.862) | 0.61709(.735) | 0.27310(0.872) | 0.5201(0.600) |
| Chi-sq Het (1) | 0.9164(0.338) | 0.76843(0.381) | 1.1288(.288) | 0.26937(0.604) | 6.3890(0.012) |

The diagnosis of all equations of the error-correction model (testing for the presence of autocorrelation, functional form, normality and heteroscedasticity) tend to indicate that the equation is well specified. From table 7 we see that the each equation is well specified with the exception of Heteroscedasticity for CPIS. stability test of coefficient using CUSUM and CUSUM SQUARE test shown below in figure 1a and 1b

**Figure 1a: CUSUM results**

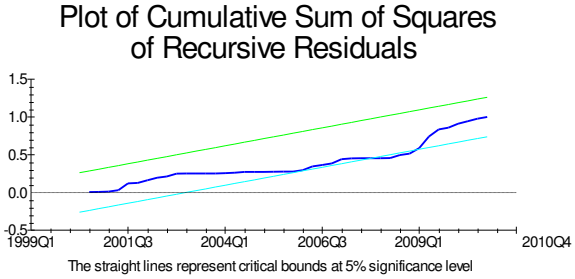



**Figure 1b: CUSUM SQUARE results**

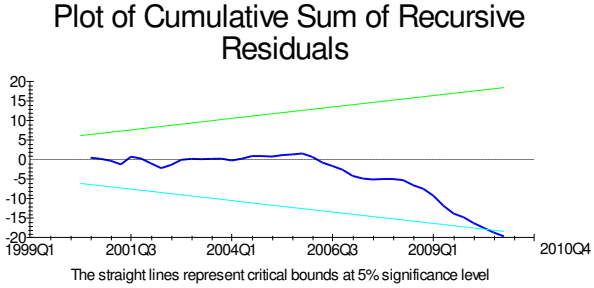



Figure 1a and 1b show minor structural shows break structure break between 2007-2008 as the sum of recursive residual goes outside the critical bounds this could be due to the global financial crisis that may have had impact on Malaysian economic growth but in the long run they remain within the critical bounds.

### 4.6 Step 6: Variance decompositions

The forecast error variance decomposition presents decomposition of the variance of the forecast error of a particular variable in the VAR at different horizons. It will break down the variance of the forecast error of each variable into proportions attributable to shocks in each variable in the system including its own. The variable which is mostly explained by its own past shocks is considered to be the most leading variable of all. In this study, we will use Orthogonalized Variance Decomposition Analysis and Generalized VDC. The orthogonalized VDCs are not unique and depend on the particular ordering in the VAR. It also assumes that when a particular variable is shocked, all other variables in the system are switched off. On the other hand, Generalized does not depend on the order while it also does not impose the restriction of switching off. The Appendix 6a shows the VDCs for each variable. The matrix of VDCs with the forecast period 50 quarters can be written as following. The table 8 is orthogonalized while the table 9 is generalized. In order to get the relative exogeneity and endogeneity, we will rely on table 9, which is in the generalized form with the reason mentioned above.

**Table 8 Orthogonalized decompositions model**

| Percentage of Forecast Variance Explained by innovations in | | | | | | |
|---|---|---|---|---|---|---|
| | | ΔLGDP | ΔLHPI | ΔLAPI | ΔLCDR | ΔLCPI |
| Quarters | Relative Variance in ΔLGDP | | | | | |
| 1 | | 99.070 | 0.78264 | 14.30E-3 | 73.53E-3 | 59.21 |
| 25 | | 51.569 | 4.0430 | 36.120 | 38.419 | 4.4262 |
| 50 | | 47.846 | 4.2517 | 39.159 | 8.937 | 4.8501 |
| | Relative Variance in ΔLHPI | | | | | |
| 1 | | 20.887 | 67.581 | 8.9445 | 0.95011 | 16.373 |
| 25 | | 37.291 | 38.875 | 23.378 | 0.18471 | 2.7063 |
| 50 | | 37.389 | 38.795 | 23.510 | 0.9836 | 2.0740 |
| | Relative Variance in ΔLAPI | | | | | |
| 1 | | 12.354 | 3.7057 | 77.115 | 61.208 | 0.70497 |
| 25 | | 17.896 | 2.5376 | 61.197 | 16.620 | 1.7502 |
| 50 | | 18.192 | 2.5092 | 60.574 | 16.960 | 1.7656 |
| | Relative Variance in ΔLCDR | | | | | |
| 1 | | 26.003 | 63.841 | 3.5408 | 3.8228 | 2.7927 |
| 25 | | 46.189 | 40.508 | 0.990 | 2.1169 | 0.19618 |
| 50 | | 46.517 | 40.500 | 10.911 | 19.554 | 0.11699 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Relative Variance in ΔLCPI | | | | | |
| 1 | | 27.026 | 3.6749 | 9.9124 | 2.0172 | 57.369 |
| 25 | | 29.278 | 4.3883 | 9.0295 | 2.1224 | 55.182 |
| 50 | | 29.241 | 4.4404 | 8.9055 | 2.1191 | 55.294 |

**Table 9: Generalized decompositions model**

| Percentage of Forecast Variance Explained by innovations in | | | | | | |
|---|---|---|---|---|---|---|
| | | ΔLGDP | ΔLHPI | ΔLAPI | ΔLCDR | ΔLCPI |
| Quarters | Relative Variance in ΔLGDP | | | | | |
| 1 | | 89.418 | 19.968 | 18.017 | 24.825 | 23.236 |
| 25 | | 26.718 | 16.899 | 5.9442 | 21.717 | 9.5588 |
| 50 | | 15.989 | 15.702 | 3.6189 | 20.198 | 6.8219 |
| | Relative Variance in ΔLHPI | | | | | |
| 1 | | 31 | 90.31 | O.25917 | 85.096 | 0.30746 |
| 25 | | 27.697 | 80.411 | 3.9215 | 68.419 | 3.6933 |
| 50 | | 27.029 | 80.135 | 4.1550 | 67.696 | 3.6041 |
| | Relative Variance in ΔLAPI | | | | | |
| 1 | | 20.597 | 012.705 | 96.920 | 084.372 | 48.361 |
| 25 | | 21.129 | 023.393 | 93.043 | 11.414 | 52.92 |
| 50 | | 21.194 | 023.854 | 92.919 | 11.535 | 40.46 |
| | Relative Variance in ΔLCDR | | | | | |
| 1 | | 36.966 | 90.179 | 3.0948 | 91.972 | 0.26991 |
| 25 | | 36.924 | 89.754 | 0.35813 | 84.186 | 2.7598 |
| 50 | | 36.477 | 89.993 | 0.19895 | 83.968 | 2.6802 |
| | Relative Variance in ΔLCPI | | | | | |
| 1 | | 13.226 | 3.1344 | 0.77878 | 3.5610 | 97.706 |
| 25 | | 7.0601 | 1.7885 | 0.17439 | 1.5077 | 96.064 |
| 50 | | 6.7257 | 1.6849 | 0.14133 | 1.3726 | 96.036 |

From the result above, it can be seen that the most leading variable is the LCPI The proportion of the variance that is explained by its own past shocks is 96%. It means that this variable has the highest percentage of own-path dependence compared to that of other variables. The more the variable depends on

its own, the stronger the variable is. By observing the percentage of own-path dependence in the matrix above, the rank of the leading variable from the stronger to the weaker leader is shown in table 10 below

**Table 10: Ranking of the Exogenous and Endogenous variables**

| Rank | Exogenous Variables | Endogenous Variables |
|---|---|---|
| 1 | LCPI | LGDP |
| 2 | LAPI | LHPI |
| 3 | | LCDR |

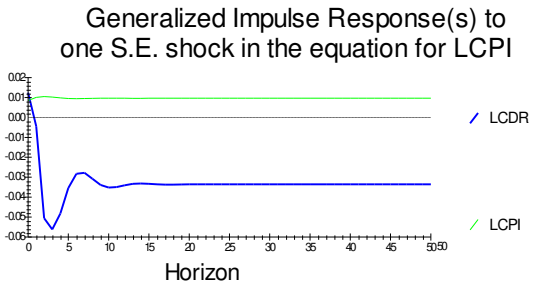
From the table 10 the most is variable is LCPI as it depends on itself the most the most endogenous is LGDP it depends on itself the least and depends on other more.

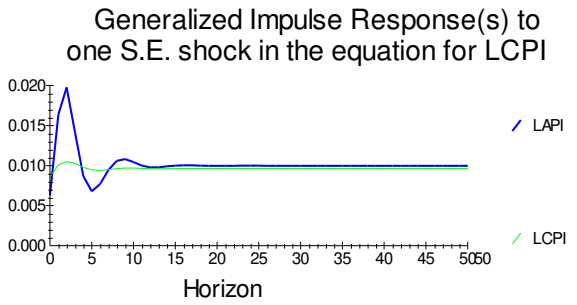
### 4.7 Step 7: Impulse Response Functions (IRFs)

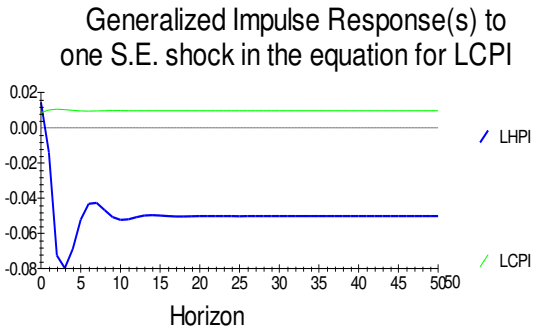
The information which is presented in the VDCs also can be equivalently represented by Impulse Response Functions (IRFs). IRFs will present the graphical expositions of the shocks of a variable on all other variables. In other words, IRFs map the dynamic response path of all variables owing to a shock to a particular variable. The IRFs trace out the effects of a variable-specific shock on the long-run relations. The IRFs are normalized in which the zero will represent the steady-state value of the response variable. The Appendix 7 shows the graphs. We shock each variable and see the response of other variables in the graph. We will also present IRF both in orthogonalized and generalized. However, we will rely on generalized IRF with the advantage of no-order and no-switching off restrictions.

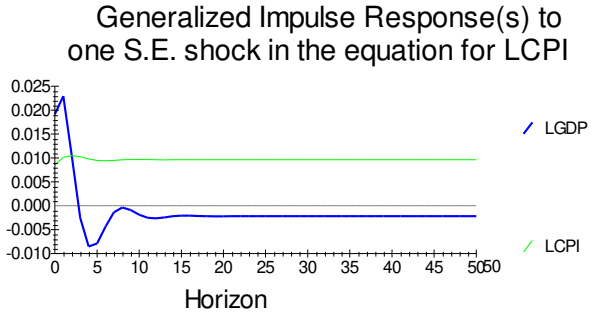
Figure 2: graphically shows Generalized the impact on other variables when LCPI is shocked.

**Figure 2: Generalized Impulse Response**



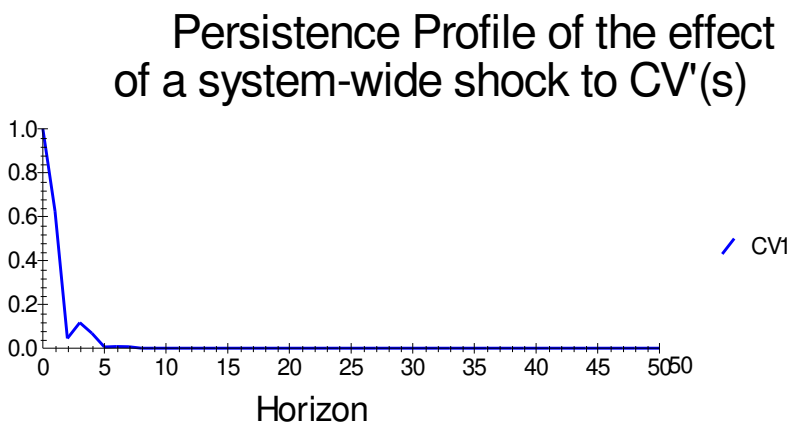




The above Generalized Impulse Response function are generated when we impose a one standard error shock in the equation for LCPI

### 4.8 Step 8: Persistence Profile

The persistence profile will indicate the time horizon required for all variables to get back to equilibrium when a system-wide shock occurs. The main difference between the persistence profiles and IRFs is that the persistence profiles trace out the effects of a system-wide shock on the long-run relations. On the other hand, the IRFs trace out the effects of a variable-specific shock on the long run relations. In the persistence profiles, we shock our whole equation whereby this shock comes from external factor outside our equation or our system. Then, we see how many periods it takes for all variables to get back to the equilibrium. When we give the external shock to our equation, the result shows that all variables will deviate from the equilibrium, meaning that each of variables will move differently in the short run. They are temporarily not cointegrated. However, according to figure 3 all variables in the cointegrating equation will require approximately 6 periods (quarters) for them to cointegrate again and return to the long-run equilibrium.

**Figure 3: Persistence Profile**




Economic stability is given special attention by many countries. This is because a stable economy portrays a positive image and good economic positioning. Strong economic stability also becomes an attraction for other countries to invest and also act as a guarantee on investments made. It can therefore be said that the deciding factor on whether a country is successful or not can be seen from its economic stability. Hence, factors determining economic stability must be given due attention. The determinant factors such as exports, consumer price index , local production (GDP), housing prices, and stock market can be a threat to the stability of country if they are not managed well.

One might consider that by improving institutions or the way of how economy operates, we can change our economic outcomes for the better. When institutions are weak, even places with abundant natural resources or other inputs will not promise high and sustain economic growth. Good governance and well managed economic resources are also important in order to sustain economic growth.

Economic growth is the result of a variety of influencing factors, which can only be approximate by growth theory. Historically, the simple growth models were extended over time by relaxing the model restrictions and supplementing new variables over time to give a better explanation on economic growth. This study confirms empirically the success of the CPI and stock exchange on economic growth of Malaysia. The results of this study show that there exists long-run cointegration and multiple short-run causal relationships between economic growth and the determinant factors. Overall, findings show that all the determinant factors (combined determinant factors) cause economic growth in the short-run.

This article indicates that CPI and stability of stock market play an important role in boosting economic growth in Malaysia. More emphasis should be accorded on these determinant factors when drafting related

economic policies of a country. Our study also found that the effect and role of housing prices and commodity exports on economic growth may be less important. Nevertheless, this does not mean that the importance of these factors in spurring continuous economic growth should be ignored. Rather, these variables may be viewed as a catalyst and complement factors of economic growth.

The findings of this study have profound implications on policy reform. Policies to promote economic growth should be based on evidence of what has, and what has not, worked for other countries. Evidences presented here compared to previous studies (in the literature review) are mixed and that economic growth is significantly influenced by various factors.

### 5.1 Limitations and future research recommendation

Some Recommendations regarding future research would include more observations and variable this study was restricted to only 50 observations due to data constrains. Data on additional variables was unavailable or very limited to lesser observations. More theoretical research needs to be carried to identify economic growth factors so that that theoretical framework would support empirical research.

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