

FINANCIAL DEVELOPMENT AND ECONOMIC GROWTH EVIDENCE FROM MALAYSIA

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ABSTRACT

For the past decade, a plenty of literature has examined the empirical relationship between economic growth and financial development. An important question of the literature is whether the financial systems influenced growth or vice versa, in the long run. The question of financial development and economic growth is an egg-and-chicken question. Which one comes first, economic growth or financial development? The study seeks to address the question of what is the relationship between financial developments and economic growth in Malaysia. This research study aims to fill the gap and provide the base for further investigation analysis. In this research the writer use dynamic ordinary least square (DOLS) and investigate the relationship between economic growth and financial developments. From (DOLS) model a further investigation of granger causality are also tested to identify direction of causality. The results indicate that there is a weak evidence of long run relationship between economic growth and financial developments. There was no causality relationship between capital market and economic growth however, banking development identified as a lead factor towards economic growth in Malaysia.

INTRODUCTION

For the past decade, a large amount of literature has examined the relationship between financial development and economic growth. The question whether financial development influences economic growth is an egg-and-chicken issue. Which one comes first, economic growth or financial development?

The objective of this paper is to examine whether financial development leads to economic growth or economic growth leads to the financial development in the small open economy specifically in Malaysia. The writer employs DOLS (Dynamic Ordinary Least Square) to investigate the relationship between financial development and economic growth.

Based on the previous literature there were various causality relationship between economic growth and financial development. To get a clear picture of this phenomenon probably the work of Jordan Shan and Allan Morris (2002) is one of the best references. They used VAR to measure total credit and economic growth in 20 countries. They found 10 countries with no support for causality in either direction of total credit and economic, 4 countries with two way causality, 4 countries with one way causality from economic growth to total credit and 2 countries with one way causality from total credit to economic growth. This outcome is more specific to the country and varies from one to another.

The outcome of the causality links between financial development and economic growth has both theoretical and policy implication. Based on economic theoretical implications, Levine and Zervos (1998) argued that more developed financial systems lead to economic growth. For those who stand with this view claimed that well developed financial system may increase the effectiveness of the mobilization of savings and facility investment.

On the other hand, some of the economists claimed that economic growth promote or lead to financial development. They believed that positive economic development creates additional demand for financial services, which in turn brings about a more developed financial sector.

The outcomes of causality relationship between financial developments and economic growth will affect country policy implication especially in a developing country such as Malaysia. Levine (1998) has pointed out that

evidence concerning the causality between financial development and economic growth could assist government in developing countries to determine whether priority should be given to reform in financial sector.

In this paper the writer has used (DOLS) analysis to investigate the relationship between financial developments on economic growth. For that purpose financial development is measured by banking development. Total credit and Aggregate money demand used as an indicator for banking development. From the DOLS model, the writer than investigate the long run relationship and causality relationship between financial developments on economic growth.

The paper is organized in the following manner. Chapter two introduces the reader to the literature review. It discusses about the general idea of Malaysia, development of banking sector and capital market in Malaysia. In this chapter, the writer also discusses the theory of financial development and economic growth. He also discusses about the empirical evidence of financial development for the past ten years. Lastly, the writer discusses the overview of literature review. Chapter 3 contains a research method apply. The writer discusses the determination of order of integration and development of DOLS model for all variables. The granger causality test to identify the direction of causality is also discussed in chapter 3. Chapter 4 contains the empirical analysis of the variables and the analysis of each DOLS model. A summary and conclusion appear in chapter 5.

LITERATURE REVIEW

Introduction of Malaysia

Malaysia is a federal elective monarchy. Malaysia is headed by Yang di-Pertuan Agong and commonly referred as the King of Malaysia. Malaysia well endowed with natural resources in areas such as agriculture; forestry as well as minerals. Malaysia is the world's primary exporter of palm oil and natural rubber. Palm oil is a major income for Malaysia.

Beside palm oil, petroleum and natural gas also among the major income and exporter of Malaysia. In 1980 Malaysia began to imitate Asian Tigers and committed itself to a transition from being reliant on natural resources

and agriculture to an economy that depend on manufacturing. With foreign investment heavy industries flourished and in a matter of years Malaysia export became the country's primary growth engine. Malaysia consistently achieved more than 7% GDP along with low inflation in the 1980 and 1990.

This all ended when the Asian Financial Crisis hit in the fall of 1997 delivering a massive shock to Malaysian economy. There was speculative short-selling of the Malaysian currency (*Ringgit Malaysia*). Because of this crisis Malaysia experienced low foreign investment and at the same time capital flowed out the country. Because all of these thing the value of the *Ringgit* depreciated from RM2.50 per USD to at one point RM4.80 per USD. At that time Malaysian government under Prime Minister Tun Mahathir Mohamad refused economic aid from the International Monetary Funds and the World Bank. The government imposed capital controls and pegged the Ringgit at RM3.80 per USD.

The fixed exchange was abandoned in July 2005 in favour of a managed floating system. This new policy has showed positive impact on domestic economy. In the same week, the Ringgit strengthened a percent against various major currencies and was expected to appreciate further. At present exchange rate between Ringgit in dollar is RM3.45. Ten per cent appreciation based of pegged value of RM3.80 of USD. Malaysia economy is now in a recovery process. It was achieved positive growth in 2005 (5.2%) and (5.8%) in 2006.

For first quarter of 2008, the Malaysian economy registered a strong growth of 7.1%. This is 0.8 increased compared than 2007 performance. The growth momentum was led by double digit expansion in private and public consumption spending, while investment activities remained resilient (BNM Report).

Despite the continuing uncertainties in the global financial markets, which led to some volatility in the domestic financial markets, domestic credit conditions remained favorable. Demand for financing continued to be supported by ample liquidity in the domestic financial system.

On a net basis, banking system loans and PDS outstanding expanded at a faster pace of 12.7%, loans outstanding increased markedly by 10% at end-March 2008 due to both the business and household sectors, with loans outstanding to these sectors expanding at higher annual rates of 11.6% and 8% respectively. (BNM Quarterly Bulletin).

During the period of 1 January – 26 February 2008, the ringgit strengthened by 2.9% against the US dollar. The ringgit exchange rate was affected by volatile portfolio flows arising from the uncertainties prevailing in the major financial markets. Although the downturn in global equity markets caused the ringgit to weaken in mid-January, improved investor confidence led to renewed inflows. The ringgit appreciated against the euro (2.3%) and British pound (4.6%), but depreciated against the Japanese yen (-0.8%). On the regional front, the ringgit strengthened against most currencies in the range of 0.3% to 4.1%, except against the Thai baht and Indonesian rupiah (BNM Report).

The Malaysian financial sector continues to be progressively transformed followed the restructuring and reform undertaken since the Asian Financial Crisis. Measures adopted include the rationalization of existing institution as well as the introduction of new institution and foreign competition. The consolidation of finance companies and commercial banks into single entities was successfully completed by January 2006 leading to more efficient use of capital. Another strategic initiative involved the development of investment banks through merger and acquisition between merchant banks, stock broking companies and discount houses.

The financial landscape has also witnessed greater regional and international integration. Three new foreign Islamic Financial Institutions approved to operate Islamic Banking in Malaysia. In addition the foreign participation limit was raised from 30% to 49% for Islamic subsidiaries, investment bank and Takaful (Islamic Insurance) operator.

The capital market remains an integral component of the Malaysian financial system, amounting to RM1.1 trillion as at the end of 2005. Of this amount, the equity market accounted for RM695billion and the debt market accounted for RM416billion.

Capital Market Master Plans has been introduced in February 2001. The CMP is a comprehensive plan for charting the strategic positioning and future direction of the Malaysian capital market for the next 10 years. It will prioritize the immediate needs of the capital market and will chart its direction and long-term growth in anticipation of deregulation and liberalization. Implementations of CMP have contributed towards building an efficient, resilient, dynamic and competitive capital market to support the economy.

The Malaysia bond market with outstanding value of USD119, 765 million as at end June 2006, is the largest in South East Asia. Malaysia also internationally recognized, Islamic Capital Market, being among the world's most active issuers of Islamic bond. It has also successfully attracted supranational agencies to raise *Syariah-compliant* Ringgit denominated bonds in the domestic capital market.

Among new initiatives taken towards developing Malaysia into a world class capital market include the introduction of foreign listing. Foreign companies will be allowed to list on Bursa Malaysia, while Main Board Malaysia companies are allowed to seek secondary listing abroad. This will enable domestic companies to finance cross-border mergers and acquisition through the equity market.

Financial Development and Economic Growth

The issue between financial development and economic growth begin since 1911 by Schumpeter. Many other such Ang and McKibbin (2007), Demetriades and A. Hussien (1996) and Calderon and Lim (2003) discuss about this issue. Schumpeter claimed that the services provided by financial intermediaries are essential drives for innovation and growth. A well developed financial system channels financial resources to the most productive ways. Levine (1997) stated economist hold different opinion regarding importance of the financial system for economic growth. Bagehot (1873) on the other hand argued that it played a critical role in industrialisation expansion in England by facilitating the mobilisation of capital.

Ang and McKibbin (2007), Calderign and Liu, and Demetriads and Hussien (1996) discussed the alternative explanation of financial development and economic growth initiated by Robinson in 1952. Robinson argues that finance does not exert causal impact on economic growth. Instead, financial developments follow economic growth and as a result of higher demand for financial services. He argued that, when economy grows, more financial institution, financial products and services emerge in the market in response to the higher demand of financial services.

Ang and McKibbin (2007) also said an expansion of financial system can also be induced by economic growth. They quoted that (Berthelemy and Varoudakis, 1996) said economic growth may create demand for more financial services and hence the financial system will grow in response to economic growth or

expansion. As economic activities grow, there will be more demand for both physical and liquid capital. Therefore, growth in the real sector induces the financial sector to expand. This also will increase competition and efficiency in the financial intermediaries and financial markets. Ang and McKibbin (2007) also emphasized the cost of financial service involves as a significant fixed component so that the average cost will fall if the volumes of transactions increase.

Therefore, wealthier economies have a greater demand for financial services and more able to afford a costly financial systems. Since transaction volume is positively associated with level of income, financial institution will emerge once some critical level of income is reached.

Based on the above, we can conclude that, economist hold different perspective on theoretical relationship between financial development and economic growth. Demmeriades and Hussien (1996) said even there are positive relationship between financial development and economic growth, there are insufficient in establishing the direction of causality between financial development and economic growth. They also quoted "Although a higher rate of financial growth is positively correlated with successful real growth, problems remain unsolved: referred to Patrick (1996), what is the cause and what is the effect? Is financial development leading sector in economic development or does it simply follow growth in real output which is generated elsewhere.

Levine (1997) stated financial system functions into five basic functions. (1) To facilitate the trading, hedging, diversifying and pooling of risk, (2) To allocate resources, (3) to monitor managers and exert corporate control, (4) mobilizing savings and (5) to facilitate the exchange of goods and services. He examined that financial system may affect economic growth through channels which are capital accumulation and technological innovation.

On capital accumulation, one class of growth models uses either capital externalities or capital goods produced using constant return to scale but without use of none reproduce able factors to generate steady-state per capita growth. Capital accumulations performed by the financial system affect steady state-growth by influencing the rate of capital formation. The financial system affects capital accumulation either by altering the saving rates or by reallocating savings among different capital producing technologies.

On technological innovation, a second class of growth models focuses on the invention of new production process and goods. In this model, the functions performed by the financial system affect steady-growth by altering the rate of technological innovation.

In conclusion, economists were divided into two main opinions regarding the question of financial development that lead to economic growth. One opinion says that financial development plays important roles and cause economic growth. On the other hand, other economists say economic growth leads to the financial development.

Empirical Literature

Demetriades and Hussien (1996) carried a study to conduct causality test between financial development and real Gross Domestic Products (GDP). They used recent developed time series analysis of vector auto regression (VAR) and error correction model (ECM). In this study they used ratio of broad measured of money stock, usually M2 to real GDP and ratio of bank claims on the private sector to nominal GDP. In this study they found a very little support to the view that financial development is a leading sector in the process of economic growth and found evidence that in few countries economic growth systematically causes financial development. They also found most of the evidence seems to favor the view that the relationship between financial development and economic growth is bi-directional. They conclude from the evidence of causality test that the results are very much country specific. This highlights the risk from lumping together in cross-section equations countries with very different experiences in relation to financial development which may reflect different institutional characteristic, different policies and difference in their implementation. In the sense of the result echo the views expressed by the World Bank concerning the East Asian Miracle (World Bank, 1993) that is to say, economic policies are country specific and their success depend on the effectiveness of the institution or country which carry such policies.

Beck *et al* (2000) examined the impact of financial development on the sources of economic growth. They used two econometric methods to assess the long run impact of the exogenous component of financial intermediary development on the sources of economic growth. In order to overcome drawbacks of cross country regression analysis they used dynamic Generalized-Methods-of-

moments (GMM) panel estimator. They employed cross countries sample with data averaged over the period 1960-1995 and using legal origin of countries as instruments.

They evaluate empirical relation between the level of financial development with economic growth, total factor productivity growth, physical capital accumulation and private saving rates. They found an economically large and statistically significant relation between financial intermediary development and both for real per capita GDP growth and total factor productivity growth. The long runs links between financial intermediary development and both physical capital growth and private savings rate are tenuous. This paper result also support the view that better functioning financial intermediaries improve resource allocation and accelerate total factor productivity growth with positive repercussion for long run economic growth.

Arestis *et al* (2001) had done a similar study utilizing time series methods and data from five developed economies, United Kingdom, France, United States, Japan and Germany examine the relationship between stock market development ad economic growth. Empirical analysis shows that while stock markets may be able to contribute to long-term output growth; their influence is at best small fraction of that of the banking system. It was found that stock markets and bank seems to have impact on output growth in France, Germany and Japan. They also found the link between financial development and growth in the United Kingdom and the United States was weak. The results are consistent with the view that bank-based financial systems may be more able to promote long term growth than capital-market based.

Shan and Morris (2002) used Toda and Yamamoto (1995) to investigate the relationship between financial development and economic growth. They used quarterly data from 19 OECD countries and China and used total credit and interest rates spread as indicators of financial development. They also consider the impact of financial development on investment and productivity. They found financial development yielded little support to the hypothesis that financial development leads to economic growth. For majority of the countries, studies showed there is no or one way causality and only few countries have reverse causality from economic growth to financial development. Results do not imply that financial development plays no part in fostering growth. In approximately half of the sample found evidence of bidirectional causality that suggest that financial development and economic growth have reinforced each other.

Gillman and Harris (2005) used panel data evidences for 13 transition countries on inflation, financial development and economic growth. The study presents new evidence that inflation significantly and negatively effects economic growth in transition countries. This shows that their experience, contrary to some conventional wisdom, is not different from developed countries in this aspect.

As in developed country samples, once inflation and the investment rate are included, financial depth as measured by liquid liabilities does not positively affect growth. Rather such financial depth shows positive effect on growth through its interaction with inflation rate. A positive interaction could be the result of jumps in the productivity in the finance industry, as the transition countries deregulated their banking system following the changes regimes in 1989.

Tang (2006) using the modified growth model to study and examine whether financial development would facilitate economic growth among the Asia-Pacific Economic Cooperation (APEC) countries from 1981 to 2000. He focused on the three aspect of financial development on growth: stock market, banking sector and capital flow. He also differentiate the country base on develop and developing member countries. Among three financial sectors only stock market development shows strong growth enhancing effect especially among developed countries. Results indicate the stock market rather than banking development would promote high economic growth, but only in developed countries. The result is consistent with the fact that the developed countries with well structured stocks market derive higher growth affects than the developing countries. The result also showed that there in no relationship between capital flow and economic growth. From the finding he found increase in capital flow would not facilitate high economy growth among the APEC countries in general.

Shen and Lee (2006) used panel estimation data study on how financial development affects the growth of real GDP per capita in 48 countries. They examined whether the result are affected by financial and economic conditional variables. Conditional variables consist of financial liberalization, banking crisis, currency crisis, two set of country development dummies, and creditor protection index along with the anti-director and corruption indices. Using a linear model only stock market development has a positive effect on the growth of real GDP percapita whereas banking development has an favorable or no effect at all on the economic growth.

Ang and McKibbin (2007) study about financial liberalization, financial sector development and growth for Malaysia case. In this study they attempted to address the difficult problem of measuring the depth of financial development and the extent of financial repression by using principal agent component analysis to construct summary measures. The constructed index for financial repression captures several aspects of financial sector policies including interest rate control and directed credit programs. Result showed that although financial sector reforms have enlarged the financial system these policy changes do not appear to have led to higher long run growth. Instead financial deepening is an outcome for the growth process in Malaysia. Hence the result offer support for the demand hypothesis that economic growth leads to higher financial development but not vice versa.

Overview of literature review

Based on the journal discuss above there are few conclusion that can be made as follows. First is about the measurement of the economic growth. Based on the journals discuss almost of the economist used real GDP as a proxy to measure the economic growth. However one of them Kassimatis and Spyrous (2001) used the logarithm of industrial production as a proxy for economic development. According to them this contrary to the earlier and previous study which almost has been used GDP as a proxy of economic growth because of some problems of getting continuous series GDP. Thus on this study they employed long run monthly observations for the empirical testing and therefore they used industrial production as a alternative proxy of economic growth. The industrial production has included manufacturing, mining, construction and public goods production. It includes a wide range of economic production and thus it should be good proxy for real economic activity.

The study conducted also divided in to two most popular method. Demetriades and Hussien (1996), Rousseau and Watchel (2000), Kassimatis and Spyros (2001), Arestis *et al* (2001), Shan *et al* (2001), Ang and McKibbin (2007) employed time series nalysis and specifically used VAR analysis. There were few critics given by them regarding cross sectional analysis and why they estimate using time series analysis. Arestis and Demetriades (1997) noted that cross sectional analysis simply assume that all countries having and share similar characteristic, economic structure, population, technologies and this is not true. Additionally Demetriades and Hussien (1996) noted and argued that

causality patterns vary across countries and therefore highlight the dangers of statistical inference based on cross-country studies. Shan *et al* (2001) found on evidence of reverse causality in some countries and bidirectional causality in others countries. they found that the relationship between financial development and economic growth may-be country specific and the use of time series nalysis as opposed to cross sectional data is more revealing. This finding similar with other research such as Demetriades (1997), Demetriades and Hussien (1996) and Kasimatis *et al* (2001).

Beside the methodology time series analysis and cross sectional analysis, they are also different proxy used to measure financial development and stock market development. On overall the proxy of financial development can be divided in to three main groups. First is use of definition of money, second the use of credit measure and lastly the use of asset measurement. The application of money definition has been applied by Demetriades and Hussien (1996), Gillman and Haris (2001), Shan and Lee (2006) where they used the ratio of M2 to GDP as a proxy of financial development. On the other hand, other study by Rousseau and Watchel (2000), Ang and McKibbin (2007) used the ratio of M3 to GDP.

Credit measure of proxy of financial development can be divided in to loan made to private sector by commercial banks/other financial institution and domestic credit. Beck *et al* (2000), Kassimatis and Spyros (2001), Shan *et al* (2001), used the ratio of loan made to the private sector by commercial banks and other financial institution to GDP as a measure of financial development. On the other hand Arestis *et al* (2001), Shan and Morris (2002), Khan and Senhadji (2003) used domestic credit as a proxy to measure financial development. Third measure of financial development proxy is the ratio of commercial bank asset to total of commercial bank asset and central bank asset. This commercial bank asset has been used as a proxy fo financial development of Levine *et al* (2000), Tang (2006), Ang and McKibbin (2007).

Thus based on the above, we can say that various proxies have been used by the economist to measure the financial development. This is different with the proxy to measure stock market development where on average almost of the economist usually measure market capitalization as a proxy for stock market development. Rausseau and Watchel (2000), Kassimatis and Spyros (2001), Arestis *et al* (2001), Shan *et al* (2001), Khan and Shejadji (2003), Tang (2006), Lee and Shan (2006) employed market capitalization as a proxy of stock market

development. However, other study such Arestis *et al* (2001) also used other measure as a proxy of stock market development. They used stock market volatility. On other study Shen and Lee (2006), Ang and McKibbin (2007) used volume trade and stock turnover as proxy of stock market development but they also include market capitalization in their analysis.

THEORETICAL FRAMEWORK

The research/ study employ a “Dynamic Ordinary Least Square” (DOLS) methodology for investigating the interaction between economic growth and financial development. Beside that the test also between the interaction of economic growth, banking development and stock market development with other economics variables which are inflation rates and Japan’s GDP. At the beginning investment also included in these two additional variables, however it was excluded because of incomplete data and information.

The selections of the variables for inclusion in this model is governed by the time-series are commonly included in studies of the interaction between economic growth and banking development.

Hence the variables included in the DOLS are the Malaysia’s GDP and domestic credit.

- **GDP**

GDP is measured by the logarithm of real GDP (lgdp). Based on the discussed journal GDP is the most popular measures of economic development/ growth proxy. Based on those journals all of the previous research employed GDP as a measure variables except with Kassimatis and Spyros (2001) which used industrial production as a variable to measure the economic or development. As per Burder and Wyplosz (2005) GDP is the sum of factor, incomes earned from economic activities within geographic location deriving a from a specific period of time. Here geographic locations refer to countries or region. They consider GDP as the most important indicator of economic health and development. For Malaysia GDP we used quarterly data from 1989-1996. Sources of the data came from IMF international Financial Statistic.

- Banking development

For banking development, domestic credit and monetary aggregate are measured as a proxy for banking development. These two variables are also among the most popular variables that have been used by the economist to measure banking development. Domestic credit is measured by the logarithm of the ratio of domestic bank credit to GDP (Idc). As per earlier work by Arestis and demetriades (1996) suggested that domestic credit measure or economic credit based indicators are more likely to exhibit stable long run relationship in the developed economies.

- Inflation

Williamson (2005) defines inflation as a rate of change in the average level of prices. This definition is similar with Parke and Bade (1988) which defined inflation as the percentage rate at which the general level of prices as the price level.

Scott and Miles (2005) stated that inflation may also seem costly because of its complicated economic life. Inflation harms long run growth. Evidence suggest that an increase in inflation of 10% leads to decline in growth per year of between 0.2% and 0.3% and a fall on investment to GDP ratio of 0.4% and 0.6%. Inflation is represented by logarithm of inflation (lr). A source of data is from Malaysian Statistical Office and is measured in percentage. It is also a quarterly data from 1989 to 2006.

- Japan's GDP/Malaysia's GDP

Malaysia is a small open economy. Therefore it will expose to the external economic situation such as world economic and regional economic movement. At the same time, it also involves in international trade activities which sometimes the performance or situation of internal economic of foreign countries will also have an impact to the Malaysian economy.

The selection of Japan is because it is a well developed country in far east and also among the major trade partner of Malaysia. This variable will investigate the performance of Japan's economic towards Malaysian's economic growth. This will be represented by logarithm of Japan's GDP

to Malaysian's GDP (both measured in US\$) and denoted as $lgdp$. The source of data is on quarterly basis from 1989 to 2006 by IMF international Financial Statistic.

Order of integration

Dickey - Fuller test

The early work on testing for a unit root in time series was done by Dickey and Fuller (Dickey and Fuller, 1979). The basic objective of the test is to test the null hypothesis that $\phi=1$ in

$$y_t = \phi y_{t-1} + u_t \quad (1)$$

In practice, the following regression is applied rather than (1)

$$y_t = \psi y_{t-1} + u_t \quad (2)$$

So that a test of $\phi=1$ is equivalent to a test of $\psi=0$, since $\psi=\phi-1$.

Augment Dickey- Fuller test

However, the tests above are valid only if u_t is white noise. u_t is assumed not to be autocorrelated, but would be so if there was an autocorrelation in the dependent variable of the regression which has not been modelled. If this is the case, the test would be oversized. The solution is to augment the test using p lags of dependent variable. The alternative model is written as

$$y_t = \psi y_t + \sum_{i=1}^p \alpha_i y_{t-i} + u_t \quad (3)$$

The test is known as an augment Dickey-Fuller (ADF) test. The frequency of the data can be used to determine the number of lags of the dependent variable. The data are quarterly, therefore use 4 lags.

Testing for higher orders of integration

After identifying the order of integration for every variable, we estimate a model of economic growth that includes variables which represent banking development, stock market development, inflation and ratio of GDP between Japan and Malaysia. The variables are specified using a model that was built on previous effort by Kaufman (1995) as follow.

$$\text{Lgdp} = \alpha + \beta_1 \text{ld} + \beta_2 \text{lmm} + \beta_3 \text{lr} + \beta_4 \text{ljm} + \varepsilon_t \quad (4)$$

All the variables are transferred into log form because the change in the log of variable approximates to the percentage change in the variables in which:

- lgdp : Gross of real GDP at market prices in local currency units (LCU's).
- ld : Ratio of domestic credit to GDP. This is a proxy of banking development.
- lr : The inflation rate.
- ljm : Ratio of Japan to Malaysian real GDP. Both measured in constant United State dollar (US\$).

We need to estimate the integration for the above model and thus Engel-Granger will be applied. One of the requirement to conduct Engel-Granger two steps approach is the order of integration for all the individual variables I (1) and only applicable to estimate only up to one co-integrating relationship between the variables (Brooks, C., 2005). However, in this model there are seven variables in the system and therefore there could potentially be up to two linearity independent co-integrating relationship. Additionally, there is a possibility of the variables orders of integration I (1).

As an alternative to overcome the above problems, which has certain advantages over ordinary least square (OLS), it has been proposed by (Stock and Watson, 1993). Their method improves on OLS by coping with small sample and dynamic sources of bias known as dynamic ordinary least square (DOLS).

The study employs the DOLS method developed by Stock and Watson (1993) to estimate the co-integrating vector. One of the advantageous of this model is that the model does not require that all individuals series to be integrated of

order one, I(1) and it is also applicable to the model of study that has more than two variables. The DOLS is developed to cater the above problems. This study also used a fourth lead and lag terms to augment the co-integrating equation and estimate the model.

DOLS models

This study is going to test six variables again GDP. We divide this test into 4 models instead of (1). The DOLS models are as follows:

For Domestic Credit:

$$\text{Lgdp} = \alpha + \beta_1 \text{lr} + \beta_2 \text{ljm} + \beta_3 \text{ld} + \sum_{i=1} \delta_{i1} \Delta \text{lr} + \sum_{i=1} \delta_{i2} \Delta \text{ljm} + \sum_{i=1} \delta_{i3} \Delta \text{ld} + \varepsilon_t$$

$$I=1,2,3,4 \quad (5)$$

From the equation 5 ignoring of lead and lag, we then estimate for the error correction term of ε_t

$$\varepsilon_t = \text{lgdp} - \alpha - \beta_1 \text{lr} + \beta_2 \text{ljm} + \beta_3 \text{ld} \quad (6)$$

Equation 6, we call it as an error correction term. From 6 we will estimate ADF test to know whether there is co-integration exist or not for DOLS model (1). If ADF test suggests that the null hypothesis of a unit root should be rejected at any reasonable level of significance, therefore it is considered as co-integration and the result shows that the models work in long run.

Granger Causality with co-integrated variables

Granger causality is a technique for determining whether one time series is useful in forecasting another. G.S Mandala (1992) noted that the future cannot cause the present or the past. If event A occurs after event B, it does not necessarily imply that A causes B.

Mandala cited *“That does not mean that the weatherman causes the rain. In practice, we observe A and B as the time series and we would like to know whether A precedes B or B precedes A or they are contemporaneous.* For instance in this study, do movements in financial development precedes movements in economic growth or it is the opposite or are the movements contemporaneous.

For testing of granger causality with co-integrated variables, we specify each equation as below. **For lgdp**

$$\Delta \text{Lgdp} = \sum_{i=1} \delta_1 \Delta \text{ld}_{t-1} + \sum_{i=1} \delta_2 \Delta \text{lmm} + \sum_{i=1} \delta_3 \Delta \text{lmv} + \sum_{i=1} \delta_4 \Delta \text{li} + \sum_{i=1} \delta_5 \Delta \text{lr} + \sum_{i=1} \delta_6 \Delta \text{ljgdp} + \varepsilon_t \quad (13)$$

Based on the regression output, we will test for granger causality. Value of the null chi square will be used to reject the null hypothesis of not granger causality from lgdp to ld, lr and ljm

THE RESULTS

The preliminary step in result analysis is concerned with establishing the degree of integration of each variable. For this purposes, the test for the existence of a unit root in the level and first difference of the logarithm of each variable has used the well known Augmented Dickey Fuller procedure, (Dickey and Fuller, 1981).

The results of the unit root test are reported in the tables as below:

Variables	Level	First Different
Lgdp	-3.33368 (0.0697)	-.4283161 (0.0060)
Ld	-2.652554 (0.0878)	-3.992601 (0.0026)
Lr	-1.866425 (0.3960)	-3.844149 (0.0041)
Ljm	-1.375876 (0.5890)	-3.139767 (0.0284)

The null hypothesis for each of both test reported that the variables in questions contain a unit root and the alternative hypothesis is that the variables is trend stationary. Based on the above table, ADF tests showed that we do not reject the null hypothesis at level of all the variables. However, for first difference test of ADF, we found that all of the null hypothesis should be rejected. Given the result of unit root test, we conclude that all of the variables are integrated order at first difference $I(1)$. After identifying the order of integration for each variables, we can now employ DOLS model for co-integration and causality analysis.

DOLS estimation for model DOLS

Dependent Variable: LGDP

Included observations: 63 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	12.89258	0.188218	68.49806	0.0000
LR	0.033722	0.004230	7.971283	0.0000
LJM	-0.953092	0.014332	-66.50170	0.0000
LDC	0.084687	0.011410	7.422091	0.0000

Based on the regression generated for DOLS 1, it was found that inflation and domestic credit have a positive relationship with the lgdp. On the other hand, ratio of Japan GDP over Malaysia’s GDP has a negative relationship. The P-values of all coefficient is zero, thus we do not accept the null, that the coefficient is zero.

R-squared	0.999851	Mean dependent variable	11.06989
Adjusted R-squared	0.999736	S.D. dependent variable	0.457913
S.E. of regression	0.007445	Akaike info criterion	-6.661514
Sum squared residual	0.001940	Schwarz criterion	-5.709009
Log likelihood	237.8377	F-statistic	8686.172
Durbin-Watson statistic	1.406304	Prob (F-statistic)	0.000000

R-squared indicates that 99.9851% of the movements of the gdp are explained by the LR, LJM and LDC.

Diagnostic Tests

Test Statistic	
A: Serial correlation	11.90367 (0.018082)
B: White heteroskedasticity	60.39851 (0.255742)
C: Functional form	1.765872 (0.413567)
D: Normality	0.313738 (0.054816)

A: Bruesch-Godfrey serial correlation LM test

B: Observation R-Squared

C: Ramsey RESET test.

D: Jarque-Bera probability

The diagnostic tests are satisfactory. There is no serial of heteroscedasticity, the functional form is correctly specified and the data is normally distributed. However, we face the problem of serial correlation. The co-efficient restriction test showed that all of the coefficients are significant.

Co-Integration and Causality

In terms of ECT of DOLS (1), the ADF test suggests that the null hypothesis of a unit root should be rejected at any reasonable level of significance at first difference. We conclude that the order of integration of ECT (1) is I (1). The results showed that the model is not working in long-runs and there is no co-integration in long run.

For causality

Direction of Causality				Direction of Causality		
Lgdp	≠	Lr		Lr	≠	Lgdp
Lgdp	→	Ljm		Ljm	→	Lgdp
Lgdp	≠	ld		ld	→	Lgdp

Based on the above table, we conclude that there is no granger causality between lgdp and lr, bi-directional of granger causality between ljm ad lgdp and one way granger causality between ld to lgdp. Form this granger causality test, it showed that banking development lead to the economic growth.

CONCLUSION

The relation between financial developments is a much discussed topic among the economist in academic circles, but also very popular topic among the politicians for policy purposes. Previous research based on either the panel data estimation or VAR model investigated the relationship between financial development and economic growth. In this paper, the writer studies not only on

the relationship between financial development and economic growth but at the same time studies the effects of inflation and other countries income towards the economic growth in Malaysia. For this purposes, Japan has been chosen because of its leading economic in East Asia and major trade partner of Malaysia.

The main findings are:

1. There is a weak evidence of long run relationship between economic growth and financial developments.
2. There is a positive relationship between inflation and economic growth for Malaysia. This finding is inconsistent with the previous research analysis. This conclusion is not that one would expect and deserve further investigation.
3. Strong relationship exist between financial development and economic growth both being positively related.
4. For direction of causality between financial development and economic growth. It was found that there is one way direction of causality between banking development and economic growth.

In terms of comparison, it is difficult to compare with the pervious research findings as the results found for this causality relationship are very much country specific.

One of the limitations of this study is the limited period of observation due to lack of data availability. The analysis only covers the time period from 1989 to 2006. Thus, for the future research the writer is advised to employ long data observations. This is correct as per Cesar Calderon and Lin Liu (2003) that has proven, the longer the sampling interval, the larger the effects between financial development and economic growth.

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