

ECONOMIC FLUCTUATIONS AND GROWTH: AN EMPIRICAL STUDY OF THE MALAYSIAN ECONOMY

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This paper investigates the relationship between major macroeconomic variables and the economics performance as measured by the mean value of real Gross Domestic Product (GDP) in Malaysia from 1975 to 2002. Specifically, it examines how the fluctuations in money supply, budget deficits and domestic capital formation affect economic growth in Malaysia. The analysis used the time-series approach of multivariate cointegration, Vector Autoregressive modelling (VAR) and causality test. Empirically, the results show that fluctuations in policy instruments, namely money supply and government budget deficits significantly affecting the real GDP. However, this is not the case for capital formation. In conclusion, the results support the interventionist argument where government policies play a fundamental role in influencing economic growth in Malaysia.

Most nations, if not all, seek stable economic growth as their major macroeconomic goal. Economists and policy makers have been entrusted to find ways to sustain economic growth in order to guarantee a higher and stable standard of living. However, history has repeatedly shown that long run economic growth has never been stable; rather, it is interrupted by periods of economic instability. Economists have defined this alternating boom and bust in economic activities as the business cycle. A great deal of work has sought to examine empirically the link between economic growth and a number of macroeconomic variables, such as interest rates, exchange rates, productivity, private and government spending, money supply, just to name a few, to identify the causes

of the economic fluctuations or business cycles. However, recent research on business cycles has shifted the focal point of study. Instead of studying what caused business cycles, researchers are more concerned with examination of the relationship between changes in the size of fluctuations of major economic variables and economic growth. The findings from such studies will definitely be useful to policy makers, especially when the economy is in a crisis period, to enable them to identify key variables to monitor and to revitalise the economy at the fastest rate.

This paper examines the relationships between fluctuations of major macroeconomic variables and the mean value of real GDP in Malaysia from 1975 to 2002. This period is chosen to cover the three major crises experienced in Malaysia, namely commodity crisis, electronic crisis and financial crisis. Over the last three decades, Malaysia has, in general, achieved positive and robust economic growth, with average GDP growth rate over six per cent and both inflation and the unemployment rate less than four percent. However, the growth patterns in Malaysia have not been smooth at all times. There were considerable fluctuations, both in its real and its nominal sides. To elaborate, real growth, inflation, investment, budget deficits, and interest rates have all been very volatile. In this regard, there were on-going debates on whether government should intervene or let markets operate in order to maintain a sustainable economic growth in the country, or, when the economy is in recession, what actions should be taken to bring the economy back to its growth momentum. Inspired by the motivation to examine empirically the related argument based on the Malaysian experience, this study thus includes in the model policy variables, such as money supply, budget deficits and domestic capital formation, to capture the relationship between fluctuations of major economic variables and economic growth. This study attempts to answer important questions, such as: how

important are fluctuations in each variable with regards to growth? What shock is the most important one that affects the economy?

The structure of the paper is as follows: [Section 1](#) gives an overview of the Malaysian economy from the 1970s through the 1990s. [Section 2](#) provides a review of empirical studies on business cycle and economic growth, while [Section 3](#) explains the methodology and data used in this study. This is followed by [Section 4](#), which presents the empirical results of the analysis, as well as discussion of the estimation results. Finally, [Section 5](#) provides some conclusions.

1. THE MALAYSIAN ECONOMY: AN OVERVIEW

Malaysia is a resource rich country. In the early days of her independence, the economy relied to a large extent on exports of primary commodities, such as rubber and tin. Rubber accounted for two-thirds and tin for one-fifth of total exports in the 1960s. Nevertheless, during the last three decades, the economic growth in Malaysia was accompanied by considerable changes in the sectoral composition of GDP. While agriculture remained a significant sector in the economy, the manufacturing sector emerged as the most important sector to the country since the implementation of the Pioneer Industries Ordinance in 1958. The contribution of agriculture to GDP fell from 31.5 per cent in 1963 to 12.7 per cent in 1996, while the manufacturing sector's contribution to GDP increased from 8.3 per cent in 1963 to 34.5 per cent in 1996 ([Ministry of Finance, *Economic Report*](#), various issues). Today, as we ventured into the new millennium, the focus point of economic development in Malaysia has shifted to information-technology based industries.

The past three decades not only witnessed considerable structural changes in the nation, but also recorded four episodes of crises in the country. The four economic crises are: (i) the 1971-73

downturn (First Oil Crisis); (ii) the 1980-81 downturn (Commodity Crisis); (iii) the 1985 recession (Electronic Crisis); and (iv) the 1997-98 recession (Financial Crisis). A careful examination of all four downturns revealed that the natures of each cycle were clearly distinct from those of the others (Okposin & Cheng 2000).

The 1971-73 downturn occurred when the country was at its early stage of rapid economic expansion. The tremendous surge in oil prices following the world oil crisis and subsequent slowdown and recession in industrialised countries affected Malaysia's exports, which jeopardised the country's expansion. With the onset of a recessionary tendency in this period, monetary policy was gradually eased, to stimulate expansion in business activity. However, by late 1973, there was a cyclical upswing in economic activity, spurred mainly by a boom in export prices, much of which was associated with the first oil shock. The government was then faced with inflationary pressures. To resolve these economic ills, the government introduced a series of monetary measures, such as increased deposit and lending rates, in 1974. The fiscal policy practised at the same time was directed primarily at reducing the expansionary impact of government operations, alleviating the burden of inflation through compensatory payments to public employees and also subsidising basic essentials, such as rice.

During the commodity crisis of the early 1980s, the slowdown was inevitable, as a result of the second oil crisis, which lasted from late 1978 to 1980. In addition, the abrupt drop in commodity prices and the surge in the domestic and external debt, as well as government budget deficits, had created short run financial imbalances and strains in the conduct of fiscal and monetary policies in the country. The monetary policy was selectively restrictive during the early 1980s, with a gradual rise in the general level of interest rates as a measure to counteract the fiscal expansion.

By 1983 and 1984, the Malaysian economy started to show signs of recovery, with a GDP growth rate of over five per cent for this two-year period. However, behind the illusion, in 1985, the economy plunged into its first recession since independence. As a consequence, the economic growth recorded in 1985 was negative 1.1 per cent. This recession was caused by both external and internal factors. Externally, the world's growth rate and trade had been on a persistent downtrend since the late 1970s. The slowdown in world growth and international trade led to weak demand for electronic and commodity products in particular. Prior to the 1985 recession, the Malaysia manufacturing sector was actively promoted by the government to produce electronic and electrical products. As the 1985 recession was induced mainly by the declining prices of electronic goods, it was bound to have an exaggerated impact on Malaysia's overall GDP performance. Internally, the deficits in the budgetary account in the early 1980s exacerbated this and subsequent crises. Though the economy was hit severely by the electronic crisis in 1985, it rebounded quickly to its recovery path in 1986, which resulted in 1.3 per cent GDP growth rate. The recovery was mainly due to strong contributions from net exports and investment and was also attributed to government efforts to reduce the budget deficit by encouraging greater participation by the private sector in the economy.

The recent economic crisis in 1997 evolved from the financial sector, which created a major havoc on the stock market, exchange rates, and banking sector in the country. The crisis started with a sudden withdrawal of short-term capital flows from the country following the floating of Thailand's baht in July 1997. It then created a wave of uncertainty and volatility in the foreign exchange and equity markets. Panic-stricken investors started to pull out of short-term capital on a large scale. This caused a steep depreciation of the Malaysian currency and forced interest rates to skyrocket. Major investment plans were shelved, because of the

sharp increase in interest rates, and many businesses were faced with the risks of bankruptcy and non-performing loans. The deep drop in the economy abetted a severe downturn in share prices and other asset prices, particularly property prices, due to the over-exposure of the property sector, fuelled by speculative demand for properties during the period before the crisis. The impact of the breakdown in the financial sector immediately took a heavy toll on the real economy, leading to an unprecedented contraction in GDP of 7.5 per cent, a rise in the inflation rate to over five per cent and a high unemployment level in 1998.

However, in 1999, real GDP grew by 5.6 per cent, rebounding from the 1998 recession. The Malaysian economy surged by a strong 11.7 per cent growth in the first quarter of 2000, giving further evidence that it is recovering rapidly. Domestic demand, partly healed by expansionary monetary and fiscal policies, has contributed to a faster than expected recovery in Malaysia.

2. LITERATURE ON BUSINESS CYCLES AND GROWTH

Macroeconomics emphasises the interrelation of the various sectors of the economy. Hence, any disturbance in one sector of the economy would cause fluctuations in other sectors that seem far removed. The discussion on the relevant issue reveals that there is continuous disagreement on what causes instability in the economy. The mainstream view, which is Keynesian-based, holds that instability in the economy arises from two sources, namely *investment spending and government deficits*, which change aggregate demand, and, occasionally, *adverse aggregate supply shocks*, which change aggregate supply. Investment spending, in particular, is subject to wide “booms” and “busts.” Significant increases in investment spending are multiplied into even greater increases in aggregate demand and thus produce

demand-pull inflation. In contrast, major declines in investment spending are multiplied into even greater decreases in aggregate demand and thus cause recessions.

On the other hand, monetarists claim that inappropriate monetary policy is the single most important cause of macroeconomic instability. An increase in the money supply directly increases aggregate demand. Under conditions of full employment, this increase in aggregate demand increases the price level. For a time, higher prices cause firms to increase their real output and the rate of unemployment falls below its natural rate. But once nominal wages rise to reflect the higher prices, restoring real wages, real output moves back to full-employment level and the unemployment rate returns to its natural rate. Thus, an inappropriate increase in the money supply leads to inflation, together with instability of real output and employment.

Real business cycle theory attributes the cyclical ups and downs in economic activity to changes in productivity. Of all the reasons that changed productivity over time, improvements in the technology for producing goods and services and improvements in workers' skills are the most important. However, productivity could also change for other reasons. According to real business cycle theory, an above average rate of growth of total factor productivity (TFP) means that more than the usual opportunities exist for the employment of labour and machinery. To seize this benefit, firms invest more than usual in equipment and hire more than the usual number of workers. The additional income generated by above average TFP growth leads to an increase in consumption. Thus, macroeconomic variables, such as total output, consumption, investment, and hours worked, simultaneously rise above their respective long-term trends. In addition, the carryover effect of a quarter of above average TFP growth to following quarters explains why the increase in macroeconomic variables

tends to persist for some time. That is how real business cycle theory explains a boom.

Instead of digging out the causes of economic instability, an increasing number of studies is devoted to examining how fluctuations in major economic variables have affected growth. Is there any evidence that volatility or shocks have an impact on long-run growth? The results are mixed. In an early study, [Kormendi and Meguire \(1985\)](#) found that variability in output is positively related to mean growth in a cross section of countries. A study by [Rotemberg and Woodford \(1994\)](#) showed that the implications of forecastable movements in labour productivity are small and only weakly related to forecasted changes in output. On the contrary, the same study revealed that forecasted movements in investment are positively and significantly correlated with movements in output. More recently, [Ramey and Ramey \(1995\)](#) found that higher volatility in prices decreased growth in a cross section of countries. Empirical work that relates policy variability, mostly inflation and growth, also seems to point to a negative relationship ([Judson & Orphanides 1996](#)). Simple regressions of mean growth rates on measures of volatility of growth rates suggested a U-shape relationship, with an upward sloping segment only at very high levels of volatility ([Jones, Manuelli & Stacchetti 1999](#)). In another study, [Chatterjee \(1999\)](#) found a strong association between up-and-down movements in the money supply during the pre-war period in the United States and up-and-down movements in the pre-war GNP. This lent credence to the view that better monetary control was the key factor in the decline in volatility of post-war GNP in the United States.

To explore the quantitative importance of uncertainty on growth, [Jones, Manuelli and Stacchetti \(1999\)](#) simulated a simple model. Their numerical exercises revealed the interesting result that when the economy moves from a world of perfect certainty to one with uncertainty that resembles the average uncertainty in a

large sample of countries, growth rates increase somewhere between 0.17 per cent and 0.80 per cent. In general, increases in the coefficient of risk aversion decrease the growth rate and increases in the serial correlation of the exogenous shocks also increase the serial correlation of growth rates.

Despite the voluminous research on fluctuations in aggregate economic activity, there appears to be nothing that resembles a consensus among economists and policy makers about the impact of such fluctuations on growth. In addition, to the knowledge of the author, so far there have been no studies to analyse the effect of such fluctuations on growth for fast developing countries in Asia, such as Malaysia. To fill that gap in the literature, this paper provides empirical evidence on the issue that remains unresolved so far.

3. DATA AND METHODOLOGY

The objective of this paper is to examine the relationships between the fluctuations of major macroeconomic variables and the mean value of real GDP in Malaysia from 1975 to 2002. Due to the limited observations available for the case of Malaysia, only a limited number of variables can be incorporated in the model to save the degree of freedom for the analysis. The data set considered for the analysis thus contains four variables. These variables are mean value of real GDP (LY); standard deviation of money supply, M2 (LM); standard deviation of budget deficit (BD); and standard deviation of domestic capital formation (LF). These four variables are selected based on relevant business cycle theories, namely Keynesian and monetarist theories, to capture the basic arguments on economic fluctuations and growth. The data from 1975:I to 2002:IV on a quarterly basis are collected from various issues of *International Financial Statistics* published by the International Monetary Fund, *Annual Reports* and *Quarterly*

Bulletins of Bank Negara Malaysia, and *Economic Reports* of the Finance Ministry of Malaysia. One simple way to look at yearly economic volatility is to compute the standard deviation of key economic variables based on quarterly observations. Therefore, except for real GDP (LY), which uses mean values from quarterly observations after adjustment for the effect of price changes, the volatility of annual macroeconomic indicators is based on the standard deviation of quarterly data collected from various sources.

All variables are transformed to natural logarithm form as a mean to render homoscedastic observations. To investigate the time-series property, in order to avoid the spurious regression problem, an Augmented Dickey-Fuller (ADF) test is conducted to test for the order of integration of all series. The ADF test is based on the null hypothesis that a unit root exists in the autoregressive representation of the time series. After conducting the test for stationarity and identifying the time series property of the series, the model in Equation (1) is constructed to test whether the variables are co-integrated. If the variables are found to be co-integrated, the analysis will be proceeded with impulse response function analysis and variance decomposition in Vector Error Correction Model (VECM).

$$\begin{bmatrix} DLF \\ DBD \\ DLM \\ DLY \end{bmatrix} = \begin{bmatrix} \theta 1 \\ \theta 2 \\ \theta 3 \\ \theta 4 \end{bmatrix} + \begin{bmatrix} \lambda_{1,1} & . & . & \lambda_{1,4} \\ . & . & . & . \\ . & . & . & . \\ \lambda_{4,1} & . & . & \lambda_{4,4} \end{bmatrix} \begin{bmatrix} DLF \\ DBD \\ DLM \\ DLY \end{bmatrix} + \begin{bmatrix} \mu 1 \\ \mu 2 \\ \mu 3 \\ \mu 4 \end{bmatrix} \quad (1)$$

where

DLF = standard deviation of total capital formation

DBD = standard deviation of budget deficits

DLM = standard deviation of money supply (M2)

DLY = mean value of real GDP

4. RESULTS AND DISCUSSION

Examination of the time series property reveals that we could not reject the null hypothesis of non-stationary for any of the series in levels, but the stationarity of all series at first difference indicates that the time series collected are integrated of order one.

Table 1: Unit Root Test (ADF Test)

	Level	First Difference
DLF	-2.2525	-4.3058*
DBD	-2.7917	-4.9620*
DLM	-1.7608	-3.9456*
DLY	-0.4065	-3.4217*

Notes: The null hypothesis is that series is non-stationary. The critical value for rejection at 5% significance level is -3.41 for model with a constant and trend. The * indicates rejection of the null hypothesis.

The results of the co-integration analysis are presented in Table 2, which lists the Likelihood Ratio values from the multivariate co-integration test. The value of the test statistics indicates the existence of two co-integrating vectors among the set of variables. This implies that the four variables in the system are tied together by some long-run equilibrium relationships. The existence of common trends in the model implies that there are some causal relationships among the variables in the system. The future variations in growth variable could be forecast, to some extent, using the relevant information set provided by the model. The intensity of the causal effects, however, can be determined only in the Vector Error Correction Model (VECM).

Table 2: Johansen Multivariate Co-integration Analysis

$H_0 : \text{rank } r \leq k$	Likelihood Ratio
$r \leq 0$	93.92059**
$r \leq 1$	44.82769*
$r \leq 2$	23.77293
$r \leq 3$	7.64396

Notes: r indicates the number of co-integrating vectors. The (*) indicates rejection of null hypothesis at 5% significance level while (**) indicates rejection at 1% significance level.

To analyse the dynamic properties of the system, the forecast error variance decomposition (VDCs) and impulse response functions (IRF) are computed from the moving average (MA) representation of the VECM. The variance decompositions break down the variance of the forecast error for each variable into components that can be attributed to each of the endogenous variables. On the other hand, the impulse response function is a process tracing through the effect of a shock (or change in residuals) to each endogenous variable in the system. The impulse response function can be thought of simply as a type of dynamic multiplier that shows the response of each variable in the system to a shock in one of the variables in the system. By introducing a one-period standard deviation shock to one of the endogenous variables, the observable responses of the system to the innovations can be determined by using the IRF. The size and characteristics of the effects (either a positive or a negative reaction) can be identified from the IRF. To actually calculate both the VDCs and IRF, the ordering of the variables is of utmost importance. This is because the orthogonalising process requires a particular causal ordering of variables, as different ordering will yield different results. To overcome this problem, the common practice is to put the policy variables at the beginning of the list,

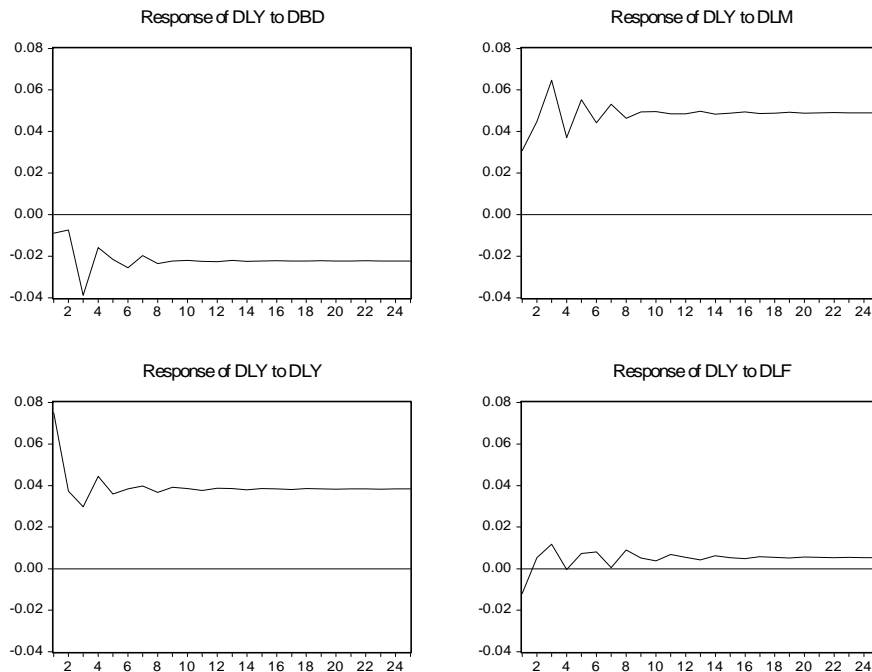
Table 3: Variance Decomposition of DLY

Period	S.E.	DBD	DLF	DLM	DLY
1	0.082308	0.963241	3.278143	15.09991	80.65871
2	0.100554	2.127176	2.428594	33.16117	62.28306
3	0.127462	10.30752	2.251558	45.24106	42.19986
4	0.139580	10.16994	1.877577	44.83493	43.11756
5	0.155889	10.37833	1.573592	49.66653	38.38155
6	0.167383	11.40462	1.597492	49.97593	37.02196
7	0.180231	11.30505	1.378597	51.85832	35.45803
8	0.190770	11.71324	1.339153	52.55040	34.39721
9	0.201383	11.88946	1.256667	53.29592	33.55795
10	0.211329	12.02864	1.167173	53.91339	32.89079
11	0.220845	12.15632	1.114655	54.47138	32.25764
12	0.229833	12.29759	1.076526	54.80831	31.81758
13	0.238708	12.36353	1.021147	55.23103	31.38429
14	0.247091	12.45731	0.989452	55.53813	31.01512
15	0.255243	12.53420	0.960366	55.79522	30.71021
16	0.263182	12.59068	0.927232	56.05053	30.43156
17	0.270852	12.64835	0.903185	56.27137	30.17709
18	0.278300	12.70342	0.882597	56.45122	29.96276
19	0.285594	12.74443	0.859852	56.63270	29.76302
20	0.292677	12.78667	0.842048	56.79073	29.58055
21	0.299593	12.82577	0.826212	56.92828	29.41974
22	0.306368	12.85816	0.809896	57.06119	29.27075
23	0.312986	12.88965	0.796081	57.18161	29.13266
24	0.319465	12.91939	0.783682	57.28860	29.00832
25	0.325824	12.94506	0.771298	57.39116	28.89249

Ordering: DLM DBD DLF DLY

while the target variable will be at the last of the list. Hence, the ordering used in this study is as follows: DLM, DBD, DLF, DLY. The dynamic properties of the real GDP beyond the sample period are illustrated in Table 3 for VDCs and Figure 1 for IRF.

Figure 1: Response to One Standard Deviation Innovations



The variance decomposition result indicates that 80.66 per cent of the forecast error of the Malaysian real GDP is explained by its own innovation in the first period of estimation, while the influence from its own shock gradually reduced to 28.89 per cent after 25 years beyond the sample period. Fluctuations in the money supply explained 57.39 per cent of the forecast error variance in real GDP after 25 years, while fluctuations in the budget deficits

contributed 12.94 per cent and domestic capital formation only 0.77 per cent. Of all the shocks, changes in the variability in money supply and budget deficit are likely to have an increasing impact on growth, while variation in capital formation has declining influence on economic growth. The empirical evidence highlights the critical roles played by the government policies, namely fiscal policy and monetary policy, on the nation's growth performance. Though fluctuation in domestic investment is an important variable that significantly explained growth in most countries, for example, in the United States, it does not apply to the Malaysian scenario. The reason is that the extent of the relative volatility of investments as compared to other aggregate quantities is less in Malaysia than in other countries. The incident could be explained by the fact that the domestic investment was fairly stable for the 15-year period from 1975 to 1990, with the exception of a higher volatility in the 1990s, for the period before and after the financial crisis in 1997–98 ([Appendix 4](#)).

The impulse response functions (IRFs) examine the dynamic characteristics of the variables in the VECM model by tracing the response of one variable to a shock introduced by another variable in the system. Since the targeted variable in this study is the economic growth variable (LY), the IRFs analyse the effect of a change in the domestic capital formation (LF), budget deficits (BD) and money supply (LM) on LY. The IRFs showed that there is a positive relationship between fluctuations in capital formation and money supply on economic growth, but a negative relationship between shocks in budget deficit and growth.

The first observation from the IRFs revealed that when the fluctuations in the domestic capital investment increase, there is a positive impact on economic growth, but the impact is not persistent and not significant, as depicted by the line closer to the horizontal axis. This result is supported by the variance decomposition analyses. In fact, a more significant contribution of

the domestic investment variable on economic growth was observed only for a few years in 1990s, particularly during the high growth period before the financial crisis ([Appendix 4](#)). Meanwhile, in the 1970s and 1980s, this variable was growing at a rather stable rate; therefore, the impact of the volatility of this variable on economic growth is not significant and the IRFs showed that the impact has no prolonged effects on economic growth.

The second observation from the IRFs indicated that a shock in the money supply created a permanent and positive impact on economic growth. The behaviour of the money supply (M2), as shown in [Appendix 1](#), implied that few years before the commodity crisis of the early 1980s and the electronic crisis of the mid-1980s, there was a clearly declining trend in the growth rate of money supply. A negative fluctuation in the money supply was associated with the negative growth rate during these two crises periods. At the same time, a growth in the money supply immediately after the crisis was followed by an upturn in economic growth, as shown in [Appendix 1](#) and [Appendix 3](#). However, the impact of the fluctuations in the money supply on growth during the financial crisis was not obvious, as the money supply was very volatile for the period between 1993 and 1997, with excessive ups and downs in the rate of change in the money supply.

The third observation on budget deficits and economic growth is interesting. IRFs shows a negative and prolonged relationship between budget deficits and economic growth. This means that, when there are excessive budget deficits in the economy, this will eventually bring the economy down to crisis. This result is supported by and explains the major crises experienced in Malaysia. For instance, one of the factors contributing to the commodity crisis in the early 1980s (as explained on [page 54](#) of this paper) was high government budget deficits, which eventually limited the effectiveness of monetary and fiscal policy to manage economic performance. When the

government cut its budget deficit during the crisis periods, for instance in 1987 to 1990, it gave the stimuli for positive economic growth.

The results implied that, in a crisis period, the government should introduce shocks in the money supply (to increase money supply) to spur economic growth, because a high degree of fluctuation in the money supply leads to higher growth. However, this conclusion should not be applied to budget deficits, because excessive volatility in the budget deficit would curtail economic growth.

5. CONCLUSION

During the past three decades, Malaysia has experienced considerable fluctuations in its economic growth. It is generally agreed that to analyse the business cycle model is not an easy job, because of feedback between the macroeconomic fluctuations. Hence, in this study, a different approach has been taken to analyse the problem of business cycles. Rather than focusing on what caused the business cycles, we now examine co-movements and interactions of fluctuations of major economic variables on economic growth.

To achieve the objective of the study, four variables were chosen to be incorporated in the model. These variables are mean value of real GDP (LY); standard deviation of money supply, M2 (LM); standard deviation of budget deficit (BD); and standard deviation of domestic capital formation (LF).

The results of the empirical estimation reveal that those policy variables, namely money supply and budget deficits, make a significant contribution to the performance of real GDP, while the contribution of capital formation is insignificant. This study concludes that, for Malaysia, government policies play an important role in economic performance. Thus, prudent policy

design is the foremost important factor for economic growth in this nation.

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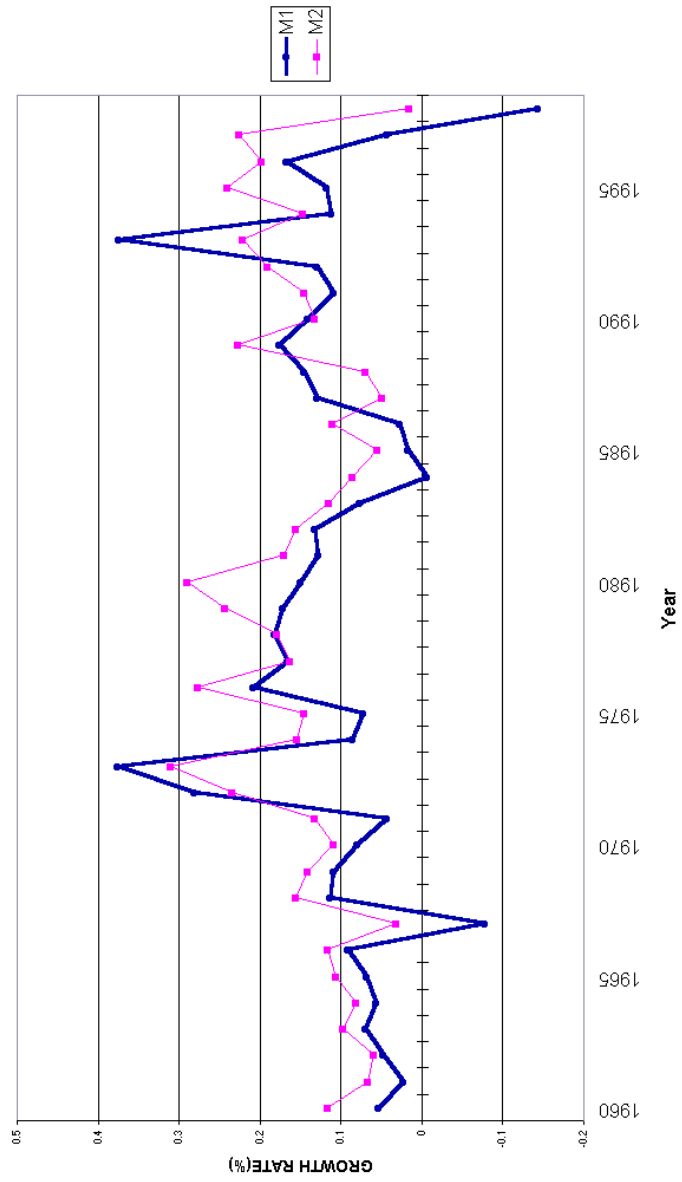
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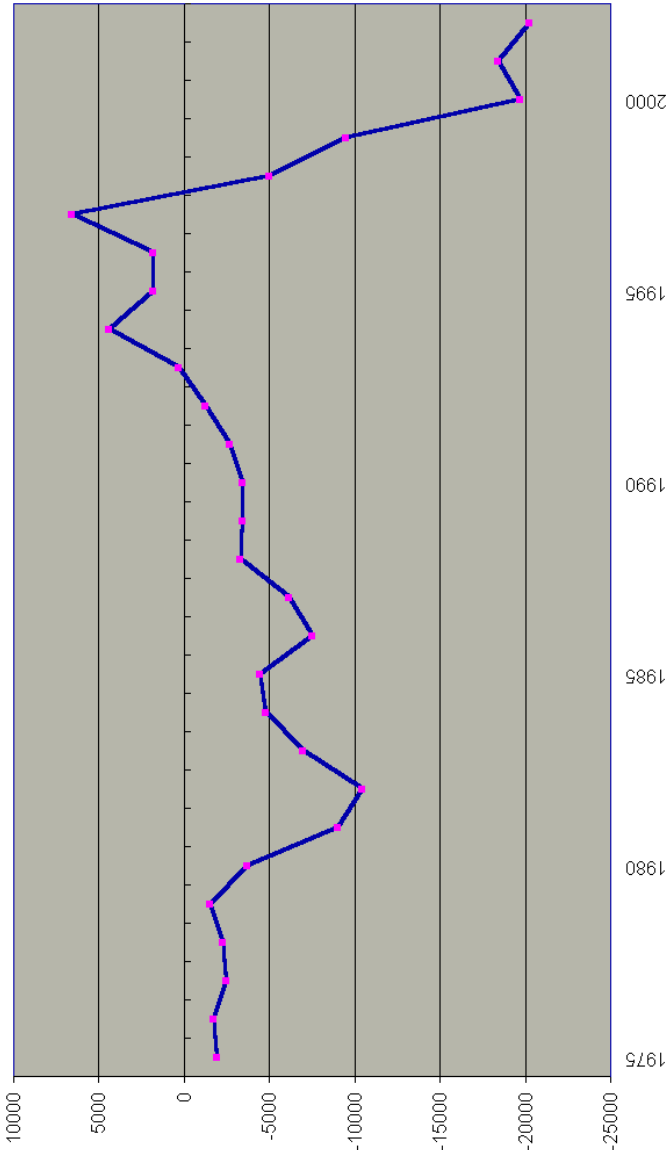
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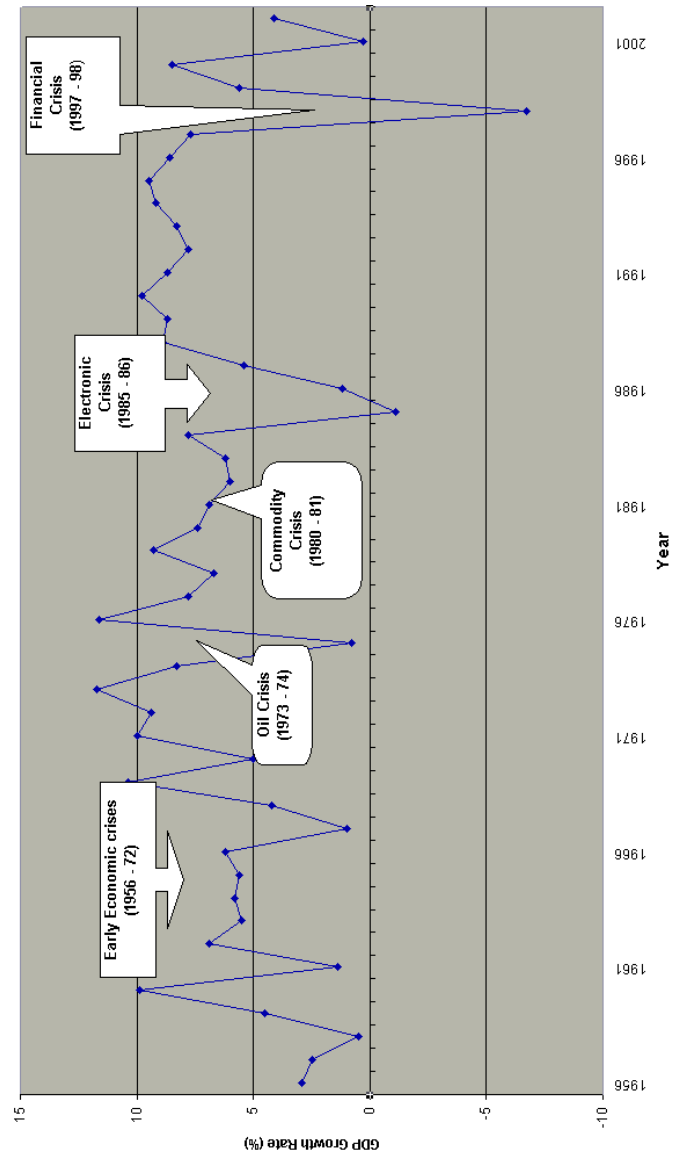
Appendix 1: Monetary Instruments (M1 & M2)



Appendix 2: Government Budget



Appendix 3: Identification of Economic Crises in Malaysia 1956-2002



Appendix 4: Capital Formation in Malaysia

