MONEY-OUTPUT GRANGER NON CAUSALITY IN A SMALL OPEN ECONOMY: MALAYSIAN EXPERIENCE
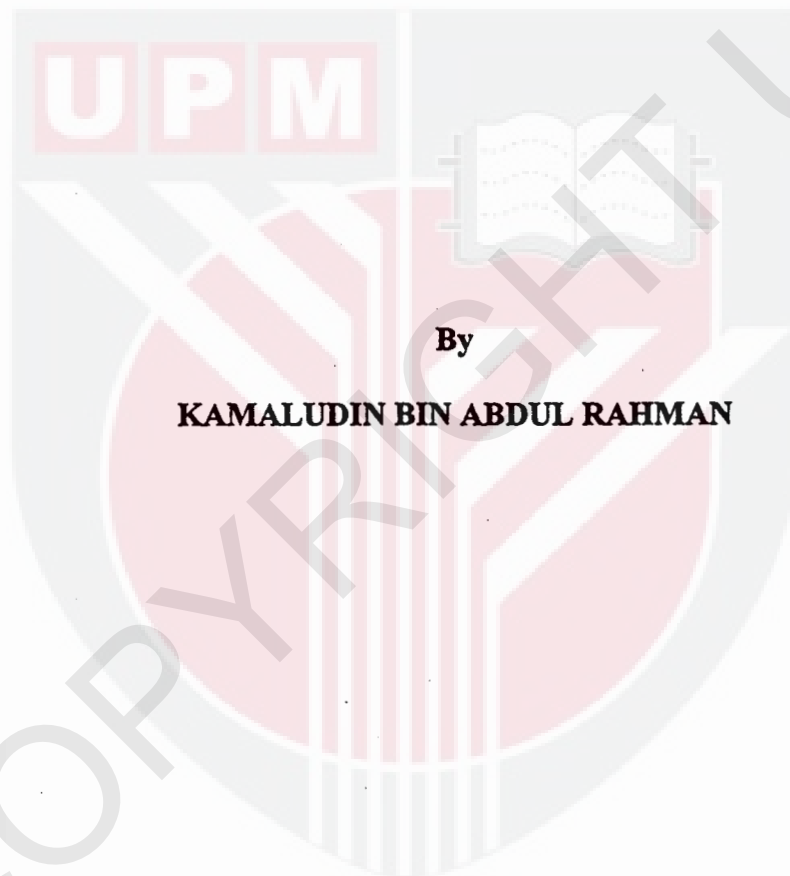
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By

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Project Paper Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Economics in Faculty of Economic and Management Universiti Putra Malaysia

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ABSTRACT

Abstract of project paper submitted to the faculty of the Economic and Management, Universiti Putra Malaysia in partial fulfillment of the requirements for the degree of Master of Economics.

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The monetary expansion policy together with policy responses to development by the authorities to a much greater extent during the period of study (1976-1996) have resulted the causality running from money to output. Since we find that M1 has strongly influenced output, it is suggests that the authorities may use M1 as intermediate target for output growth without giving much pressure on price in the long-run. We also find that M1 is suitable intermediate target for maintaining price stability to curb inflation in the long-run. Strong M1 causal linkages on output is consistent with the huge amount of non performing loans and large inflows of FDI in Malaysia which both finally created excessive demand for money in the period of study. In the case of M2, it does not have any causal linkages with output as this findings support the monetary neutrality theory where M2 is found to be neutral in the long-run. From this study we conclude that monetary targeting is still a relevant policy amid the fast changing world, however, there must be in harmony with other policy (e.g. trade, fiscal and exchange rate policy) to achieve sustainable economic growth with price stability and external equilibrium.

ABSTRAK

Abstrak kertas kerja yang dikemukakan kepada Fakulti Ekonomi dan Pengurusan, Universiti Putra Malaysia sebagai memenuhi sebahagian daripada keperluan untuk ijazah Sarjana Ekonomi.

WANG-KELUARAN GRANGER NON-KAUSALITI DALAM EKONOMI KECIL TERBUKA: PENGALAMAN MALAYSIA

Oleh

KAMALUDIN BIN ABDUL RAHMAN

Oktober 2000

Polisi pengembangan wang serta tindakbalas polisi untuk pembangunan oleh pihak berkuasa semasa tempoh kajian (1976-1996) telah menyebabkan kausaliti bergerak daripada wang kepada output. Kami mendapati M1 kuat mempengaruhi output, adalah dicadangkan pihak berkuasa boleh menggunakan M1 sebagai sasaran untuk pertumbuhan output tanpa memberi tekanan terhadap harga dalam jangkamasa panjang. Kami juga mendapati M1 sangat sesuai sebagai sasaran yang digunakan untuk memerangi inflasi dalam jangkamasa panjang. Perhubungan M1 yang kuat dengan ouput adalah konsisten dengan jumlah pinjaman lapok yang tinggi serta jumlah kemasukan FDI yang besar ke Malaysia yang akhirnya membentuk permintaan wang yang berlebihan. Kami mendapati M2 adalah neutral dalam jangkamasa panjang kerana tidak mempunyai pehubungan kausal dengan output. Dalam kajian ini kami merumuskan sasaran wang masih merupakan polisi yang sesuai ditengah-tengah dunia yang berubah, namun mestilah ujud keharmonian dengan lain-lain polisi (seperti perdagangan, belanjawan dan polisi pertukaran asing) untuk mencapai pertumbuhan ekonomi yang berkekalan.

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In the Name of Allah, the Merciful, the Compassionate

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My greatest appreciation is dedicated to my affectionate wife, Nurul Ashikin Jauhari, who allows me to pursue a master degree amid demanding time for study, family and career. Her patients, sacrifices and encouragement has inspired me to finish this study. To all my kids, Noor Syarafina, Muhammad Heiqal, Noor Syaqirah and Muhammad Luqman Arief – "you can do it if you belief you can".

I am also very grateful to my staff; Rosminah, Normilah, Nur Intan and Noor Fazliza who were displaying extremely excellence job while I was away for studying. Your overwhelmed support and loyalty during the recent economic crisis will not be forgotten forever.

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CHAPTER ONE

1.1 Inroduction

Malaysia is a small open economy, with a population of 22.7 million. In view of the openness of the economy, Malaysia is vulnerable to world economic cycles. A combination of fiscal and monetary measures implemented in a flexible and pragmatic manner and the structural adjustments undertaken have enabled Malaysia to adapt to the changing environment. This willingness to adjust and adapt to the changing international and domestic economic situation has underscored Malaysia's policy response and allowed Malaysia to remain competitive in the world market.

The maintenance of an open and liberal trading regime, sound macroeconomic management to address internal and external imbalances and the longer-term adjustment policies to address supply-side rigidities enable Malaysia to achieve rapid economic growth over the past four decade, with macroeconomic stability and social progress. With the combination of market-oriented reforms implemented within the context of a series of five-year plans for the development of the Malaysian economy, Malaysia has made significant progress toward the transformation of its economy from one characterized by agricultural production and mining to one driven by manufacturing and services. The government commitment to the implementation of these five-year plans and development policies have encouraged foreign direct investment and the private sector to be the main engines of growth in the Malaysian

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economy. Therefore, Malaysia has enjoyed higher economic growth for almost a decade prior to the economic crisis which invaded South East Asian region in 1997. As such, this paper attempts to explore the relationship between money and gross domestic product (GDP) during the period of high economic growth in Malaysia.

This chapter is organized as follows: Section 1.1 deals with business cycle and the conduct of monetary policy in Malaysia. This section addresses the relationship between money-output and business cycles as well as its connection with monetary policy framework. Subsequently, section 1.2 explains and defines pertaining to the money-output Granger causality and it uses in the empirical study. While section 1.3 elaborates the variables used and its definitions within the scope of this study. Section 1.4 specifically focuses on four types of hypotheses that will be tested in this paper. Finally, section 1.5, emphasizes the problem statement plus the objectives of the study.

1.2. Business Cycles and Conduct of Monetary Policy in Malaysia

1.1.1 Business Cycles

According to Sims (1980), the study of the business cycle, fluctuations in aggregate measure the economic activity and prices over periods from one to ten years or so, motivates a large part of what we call macroeconomics. Thus, there are many macroeconomic variables whose cyclical fluctuations are of interest and we would further agree that fluctuations in these series are interrelated. Based on these

arguments, we are very keen to know what constitute business cycle as well as its connection with other macroeconomic variables in the Malaysian economy.

Since 1987, the economies of Malaysia and many other ASIAN countries have grown tremendously. That growth has transformed economies and greatly improved living standard. However, in 1997 the Malaysian economy has severely contracted due to regional economic crisis. Yet even in prosperous countries, economic expansion has been periodically interrupted by episodes of declining production, income and spending and raising unemployment. This repeated sequence of economic expansion giving way to temporary decline followed by recovery, is known as business cycles.

One ought to know what is business cycle? Burns and Mitchell (1946) have defined business cycle more exactly as follows;

"Business cycles are a type of fluctuation found in the aggregate economic activity of nations that organize their work mainly in business enterprise. A cycle consists of expansion occurring at about the same time in many economic activities, followed by similarly general recessions, contractions and revivals which merge into the expansion phase of the next cycle; this sequence of changes is recurrent but not periodic; in duration business cycles vary from more than one year to ten or twelve years".

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The above definition covers five points that should be clarified and emphasized (Abel and Bernanke,1995). First, business cycles are defined broadly as fluctuations of aggregate economic activity rather than as fluctuations in a single, specific economic variable such as real GDP. Apart from real GDP, Burns and Mitchell also thought it important to look at other indicators of activity, such as employment and financial variables (e.g. interest rates).

Second, business cycle has to do with the expansion and contraction of the economy. The period of time during which aggregate economy activity is falling is a contraction or recession. If the recession is really severe, it becomes depression. While during the period of time which aggregate economic activity grows is an expansion or a "boom". The entire sequence of decline followed by recovery, measured from peak to peak, is known as a business cycle .

Third, business cycles do not occur in just a few sectors or in just a few economic variables. Instead, expansions or contractions "occur at about the same time in many economic activities". Many other economic variables such as prices, productivity, investment, and government purchases also have regular and predictable patterns of behavior over the course of the business cycles. This tendency is called comovement which means that many economic variables to move together in a predictable way in a predictable way over the business cycle.

Fourth, the business cycle is recurrent but not periodic. It is not periodic in that it does not occur at regular, predictable intervals and does not last for a fixed or predetermined length of time. Although the business cycle is not periodic, it is recurrent; that is, the standard pattern of contraction-trough-expansion-peak recurs again and again in industrial economies.

Fifth, the business cycle is persistence. The duration of a complete business cycle can vary greatly, from about a year to more than a decade, and predicting it is extremely difficult. However, once a recession begins, the economy tends to keep contraction for a period of time. Similarly, an expansion once begun usually lasts a while. This tendency for declines in economic activity to be followed by further declines, and for growth in economic activity to be followed by more growth, is called persistence. Having to know all about business cycles features, can we predict when the next recession will come ? According to Blanchard (2000) the timing is very difficult to predict, but there are signs of danger, some from low unemployment rates, some from high stock market prices.

For a much better understanding, let we have a look at the Malaysian business cycles and its pattern prior to and during the economic crisis (1997-1999). This will, at least for refreshment. Malaysia has been relatively successful in maintaining a low inflation environment with relatively high GDP growth. In this respect, Malaysia has had a record of achieving the second highest GDP growth of 9.3 % per annum for the period 1988-97 compared with 20 other Asian countries while at the same time

achieving the second lowest inflation rate of 3.4 % per annum (The Central Bank and the Financial System in Malaysia, 1999). The recent Asian economic crisis devastated several successful economies in the region. At the beginning of the economic crisis, Malaysia's growth rate was estimated at 7 percent in real terms for 1988. In view of the continued economic difficulties, Malaysia's growth rate for 1998 has been contracted to –1.0 percent for the baseline outlook and   –2.0 percent for the low-case outlook (National Economic Recovery Plan, August 1998). The full impact of the crisis on the domestic economy will be felt in the first half of 1998. As shown by the statistic for the first quarter of 1998, real GDP growth rate was –1.8 percent on the annual basis. The recent economic crisis also has fallen the Kuala Lumpur Stock Exchange (KLSE) sharply as well as depreciation of the ringgit (see Figure 1 and 2). Hence, the Malaysian recent economic crisis involved almost all macroeconomic variables; real GDP has contracted to negative, ringgit depreciated to the highest RM4.88 per U.S. dollar, KLSE composite index sank to the lowest 467.55

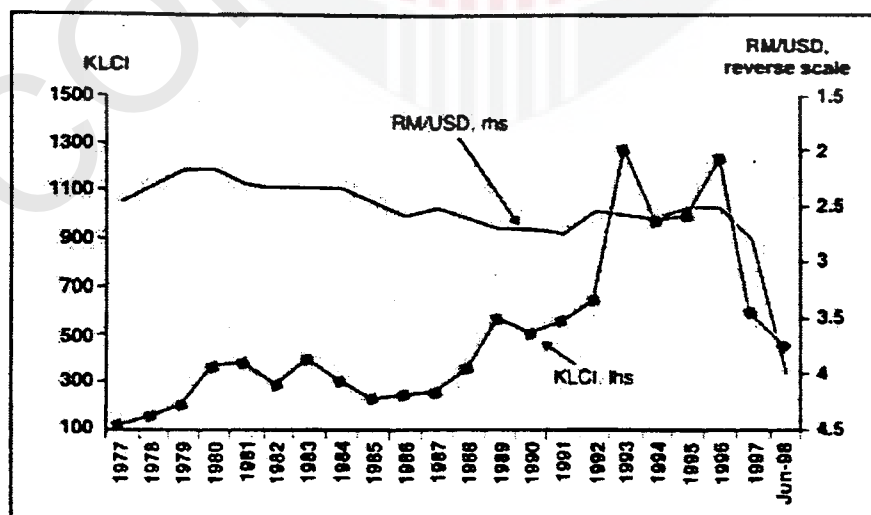Figure 1: Malaysia Asset Prices, 1997 – June 1998.

Figure 2: Asset Prices & Exchange Rate (Jan 1997- June 1998)
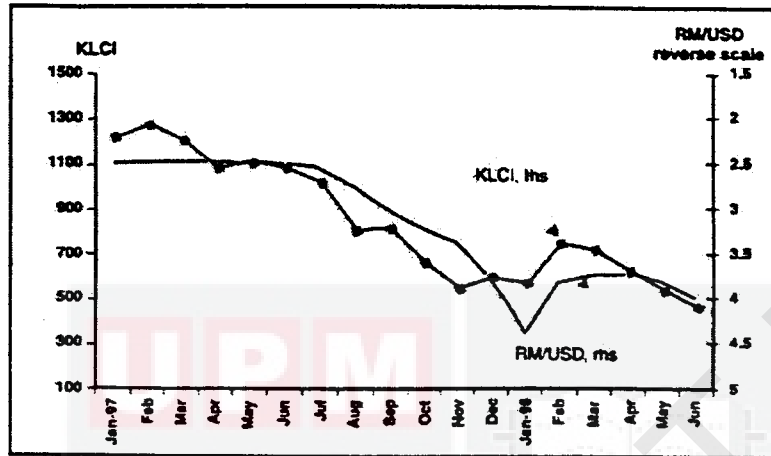
, inflation increased to 7.0 % and unemployment ascended to 6.4%. Therefore, all these economic facts really affected the aggregate economic activity or business cycle; expansion and contraction of the economy being the central unresolved issues amongst economists. Since apart of the real business cycles theory accounted for the correlation between money and business cycles (King and Plosser, 1984) it is of our paramount interest to elaborate the conduct of monetary policy in Malaysia.

1.1.2 : An Overview of Monetary Policy Framework in Malaysia

Monetary policy plays an important role in designing the appropriate policy framework for such a country. Therefore, Bank Negara Malaysia (BNM), as the nation's Central Bank, is entrusted with the responsibility for the formulation and implementation of monetary policy to attain price stability. BNM, therefore , constantly reviews the monetary policy framework to ensure that it remains relevant

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amid the dynamic changes in the financial and economic environment. Indeed, the early 1990s marked a major milestone in the conduct of monetary policy, which saw significant changes in terms of strategies, approaches and instruments. Thus, the evolution of monetary policy framework can be broadly characterised by the following developments.

Shift Away from Monetary Targeting to Interest Rate Targeting

Prior to the mid-1990, the Malaysian monetary policy strategy had been based on targeting monetary aggregates. This was an internal strategy and was not formally announced to the public. The development of this strategy was based on evidences that monetary aggregates were closely linked to the ultimate objectives of monetary policy. According to Merican, et. al (1994), in a correlation test conducted using quaterly data from 1980-1992, monetary growth (M3) was shown to be positively and highly correlated with inflation. Given that price stability was the ultimate objective of monetary policy, monetary targeting was seen as a suitable target for policy. During this period, the day-to-day volume of liquidity in the money market was carefully monitored and judiciously influenced by BNM, consistent with the money growth target. This was to ensure that the supply of liquidity was sufficient to meet the demands of the economy, consistent with the BNM's monetary policy objectives of price stability.

Monetary targeting, therefore, was aimed at ensuring that the excess liquidity did not translate into an acceleration in loans which will in turn expand money supply

beyond its target rate and fuel inflation. Up until 1987, M1 was the main policy target. However, with the financial liberalisation and innovation, BNM subsequently placed greater importance on broad monetary aggregate, M3, as the policy target.

However, subsequent developments in the economy and the financial system during the early 1990s weakened this relationship and highlighted the problem associated with using monetary aggregates as policy targets. The larger capital flows in 1992-93 followed by a reversal in the following year brought to the forefront the instability of the monetary aggregates as targets. As can be seen in Figure 3, the annual growth of money supply measured by M3, was extremely volatile during the

Figure 3: Capital Flows and Instability of Monetary Growth.

Annual percent growth of M3
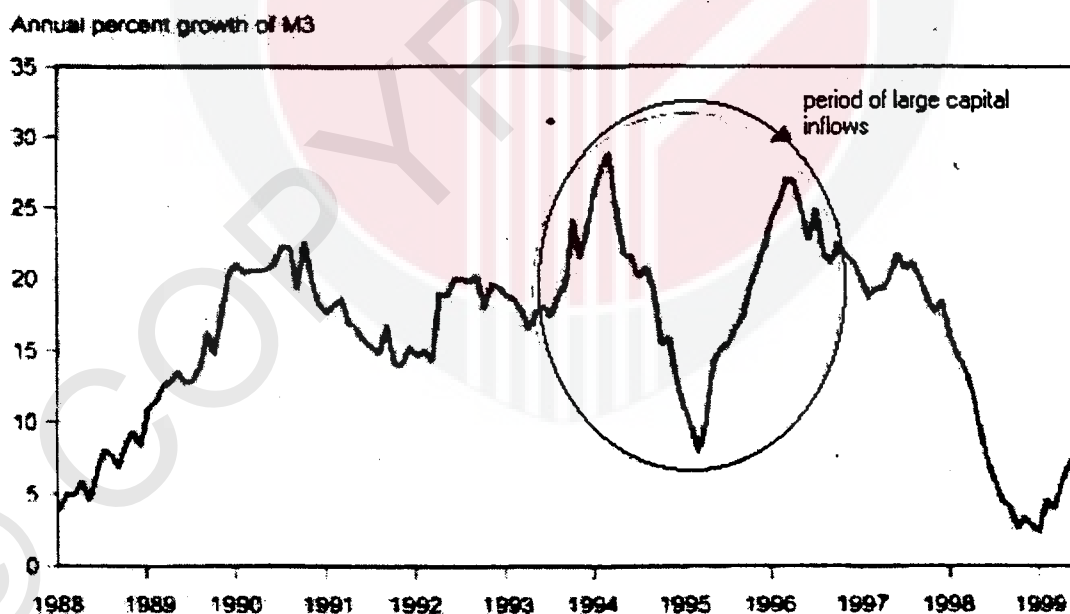
period of large capital flows. The large swings in the monetary aggregate reduced the viability of M3 as an intermediate target. Studies have shown that monetary growth no longer provided any additional explanatory power beyond that provided by the output gap. This could be interpreted as suggesting that monetary growth is caused by output growth and not vice versa, making monetary aggregates a lagging indicator and, therefore, unsuitable as an intermediate target (The Central Bank and The Financial System in Malaysia, 1999).

The relationship between monetary aggregates and nominal GDP in Malaysia appeared to be insufficient stable for monetary aggregates to provide a robust indicator of future inflation. Consequently, towards the mid-1990s, BNM shifted its focus from monetary targeting to interest rate targeting. Today, many economies have also shifted away from monetary targeting to interest rate targeting , inflation targeting or exchange rate targeting. The shift away from monetary targeting reflected the common problem faced by central banks that the rapid evolution in the economy and the financial system, amidst greater globalisation, have made it increasingly difficult to target a particular monetary variable to achieve price stability.

Towards a More Market-based Monetary Policy Procedures

As part of the strategy to enhance the effectiveness of monetary policy in the medium to long run, monetary policy implementation procedures have evolved significantly towards a more market-based system. BNM has embarked on a three-pronged strategy to facilitate this transition process, namely, enhancing transparency;

improving the payment and settlement arrangements; and accelerating regulatory and prudential reforms.

Firstly, BNM has stepped up its effort to enhance transparency in the conduct of monetary policy by improving BNM's communication strategy and enhancing the dissemination of information to the market. In the wake of rapid developments in the financial sector and the economy as well as the broader-based market participants in the financial markets, there emerged increasing risk of misperception of BNM's policy changes. Secondly, monetary policy success is dependent on its ability to influence expectations in the desired directions. As the policies are effected through changes in market liquidity and interest rates, monetary policy will be more effective if the markets respond correctly and rapidly to BNM's policy direction. Hence, an effective communication strategy becomes important in the conduct of monetary policy. Thirdly, BNM undertook measures to improve the trading, payment and settlement arrangement to reduce the potential problems created by the handling of large volume of securities, as well as the settlement lags, thereby, enabling a larger volume of transactions to be undertaken. Fourthly, BNM accelerated both the regulatory and prudential reforms to foster an environment for sound credit decisions, enhance bank soundness, and improve bank liquidity management. Amongst the measures taken to improve liquidity management of banking institutions was the introduction of a new liquidity framework, replacing the liquidity requirement imposed on banks.

For the most part, the transition in the monetary policy framework towards a more market-based approach proceeded at a relatively smooth pace, largely owing to three main factors. Firstly, the existence of a coherent policy strategy between financial sector liberalisation and monetary policy reform. This is in view that the financial stability is crucial in the conduct of monetary policy, special emphasized has been placed by BNM on policy co-ordination and measures required to strengthen the effectiveness of monetary policy and to maintain financial stability. Secondly, the transition toward a more market based system was facilitated by appropriate sequencing of reforms. BNM was only allowed liberalization at a pace that is consistent with the prevailing market conditions and the evolution in the structure of the economy and the financial system. In addition, financial discipline and prudent fiscal policy has contributed positively to macroeconomic stability, which allowed a smooth implementation of financial reforms.

Nowadays, the financial sector policy management has moved towards greater market-based approach. However, during period of extreme market volatility recently, recourse to administrative measures had been made by BNM but these have been temporary in nature. The Malaysian experience in 1992-94 and 1997-98 showed that only during periods of heightened instabilities in the financial markets, did the government resort to selective administrative measures or controls to ensure stability in the markets. The Malaysian authorities, however, have implemented such policies pragmatically and recognised that these moves, while not market-oriented, were necessary to stabilise the financial markets. Both of the above policies are

expected to influence the inflation, strong capital inflows, the availability of adequate financing to support the domestic demand and to strengthen the GDP growth in 2000.

1.3   Money-Output Granger Causality

This section will look into the crux of our study; that is money-output Granger causality. The question whether money causes output appears to be important for many economists working in the area of macroeconomics. One often applied method to investigate the empirical relationship between money and real activity is Granger-causality analysis (Granger, 1969). Using this approach, the causality question can be sharply posed as whether past values of money help to predict current values of output. Pindyck and Rubenfeld (1998) defined causality is the condition whether changes in one variable can be viewed as a cause of changes in another variable.

This question on causality can simply be explained through a research conducted by Thurman and Fisher (1988). They have used causality test in determining which came first: the chicken or egg. The study uses annual data on two variables: total U.S production of eggs (EGGS) from 1930 t0 1983 and total U.S production of chickens (CHIKENS); if the coefficients on lagged CHICKENS are significant as a group, then CHICKENS cause EGGS. A symmetric regression is then used to test whether eggs cause chickens. To conclude that one of the two "came first", it is necessary to find unidirectional causality, i.e., to reject the non causality of one to the other and at the same time to fail to reject the non causality of the other to the one.

Thurman and Fisher's test results were dramatic. Using lags ranging from 1 to 4 years, they obtained a clear rejection of the hypothesis that eggs do not cause chickens but were unable to reject the hypothesis that chickens do not cause eggs. Thus they were able to conclude that the egg came first!

Sims (1972) pioneered a research on money-output Granger causality. He asserts that money stock and current dollar measures of economic activity are positively correlated. Subsequently, he finds evidence that money or its rate of change tends to lead income in some sense. He relates this finding with a body of macroeconomic theory, the "Quantity Theory" explains these empirical observations as reflecting a causal relation running from money to income. With so much research have been conducted on money-output causality, it is of our pivotal interest to investigate the relationship between money and output and other variables (interest rate and price level) in the Malaysian economy.

We find that the most common problem in economics is determining whether changes in one variable are a cause of changes in another. For example, this study is attempting to find out whether changes in money supply M, cause changes in output which proxied by GDP, $(M \rightarrow GDP)$ or are output GDP causes money supply M $(GDP \rightarrow M)$ or is there feedback between the two $(M \rightarrow GDP$ and $GDP \rightarrow M)$. In short, the question that we are raising is whether

statistically one can detect the direction of causality (cause and effect of relationship) when temporally there is a lead –lag relationship between two variables.

This study will consider a relatively simple test of causality, that proposed by Granger (1969). We explore this test using the relationship between output *GDP* and money supply *M* . The Granger causality test assumes that information relevant to the prediction of the respective variables, *GDP* and *M* , are contained solely in the time series data on these variables. The test involves estimating the following regressions:

$$GDP_t = \sum_{i=1}^{n} \alpha_i M_{t-i} + \sum_{j=1}^{n} \beta_j GDP_{t-j} + \mu_{1t} \qquad (1.1)$$

$$M_t = \sum_{i=1}^{m} \lambda_i M_{t-i} + \sum_{j=1}^{m} \delta_i GDP_{t-j} + \mu_{2t} \qquad (1.2)$$

Equation (1.1) postulates that current *GDP* is related to past values of *GDP* itself as well as of *M*, and equation (1.2) postulates a similar behavior for M_t. The causality between *GDP* and *M* now distinguish four cases (Gujarati, 1995):

1. Unidirectional causality from *M* to *GDP* is indicated if the estimated coefficients of the lagged *M* in (1.1) are statistically different from zero as a group (i.e., $\sum \alpha_i \neq 0$) and the set of estimated coefficients on the lagged *GDP* in (1.2) is not statistically different from zero (i.e., $\sum \delta_i = 0$).

2. Conversely, unidirectional causality from *GDP* to *M* exists if the set of lagged *M* coefficients in (1.1) is not statistically different from zero (i.e., $\sum \alpha_i = 0$) and the set of the lagged *GDP* coefficients in (1.2) is statistically different from zero (i.e., $\sum \delta_j \neq 0$).

3. Feedback or bilateral causality, is suggested when the sets of *M* and *GDP* coefficients are statistically significant different from zero in both regressions.

4. Finally, independence is suggested when the sets of *M* and *GDP* coefficients are not statistically significant in both the regressions.

Gujarati asserts that since the future cannot predict the past, if variable *X* Granger cause variable *Y*, then changes in *X* should precede changes in *Y*. Therefore, in a regression of *Y* on other variables (including its own past values) if we include past or lagged values of *X* and it significantly improves the prediction of *Y*, than we can say that *X* Granger causes *Y*. A similar definition applies if *Y* Granger causes *X*.

1.4   Data and Definitions

The following variables are being used in this study which are all in logarithms except interest rates. In this study, we utilize the Malaysian data series for six macroeconomic variables for the period 1976:1 to 1996:4. All variables here were

compiled from various issues of International Financial Statistics published by International Monetary Fund.

1. Real GDP (Y)

The variable employed as a proxy for output is real GDP. Real GDP measures the market value of an economy's final output at prices that prevailed during a specified base year or period. In Malaysia, GDP is calculated by adding up agriculture, forestry and fishery, mining and quarrying, manufacturing, construction and services in purchases' value. Currently, the base year used to calculate real GDP in Malaysia is based on constant 1987 prices. Since the quarterly data for output is not available, the Gondolfo's (1981) technique was used to interpolate quarterly gross domestic product series from annual observation.

According to Hayo (1999), real GDP is chosen in view it is seen as being superior to industrial production, since the share of the industrial sector in the overall value-added of the industrial economies is declining. The consumer price index (CPI) over all goods has been chosen as a deflator.

2. Narrow Money (M1)

Money are assets that are widely used and accepted as payment. For most countries narrow money is defined as M1. In economics textbook, M1 is the most narrowly defined monetary aggregates, made up of currency and travelers' checks

held by the public, demand deposits (non-interest-bearing checking accounts) at commercial banks and other checkable deposits.

3. Broad Money (M2)

The broad money is proxied by M2. It is a monetary aggregate that include everything in M1 and a number of other assets that are somewhat less moneylike, such as savings deposits, small-denomination time deposits, non institutional holdings of money market mutual funds and money market deposit accounts.

4. Interest Rates (R)

Interest rates have an impact on the overall health of the economy because they affect not only consumers' willingness to spend or save but also businesses' investment decision. Abel and Bernanke (1995) defined interest rates as a rate of return promised by a borrower to a lender. Mishkin and Eakin (1998) explained that an interest rate is the cost of borrowing or the price paid for the rental of funds. There are many types of interest rates in the economy -mortgage interest rates, car loan rates, and interest on many different types of bonds. However,this study used three month Treasury bill rate as to proxy interest rate.

5. Consumer Price Index (CPI)

Consumer Price Index is defined as a price index calculated as the current cost of a fixed basket of consumer goods divided by the cost of the basket in the base period. The most used fixed-weight price index by the economists in most literatures is the

consumer price index (CPI). Here, consumer price indices CPI (1980=100) are used to proxy for the price level.

Jabatan Statistik Negara is a resposible body to construct the CPI by sending people out each month to find the current prices of a fixed list, or basket, of consumer items, including many specific items of food , clothing, housing and fuel. The CPI for that month is then calculated as the current cost of the basket of consumer items divided by the cost of the basket of items in the base year.

1.5 Problem Statement and Objectives of the Study

1.5.1 Problem Statement

Money and output play an important role in determining a policy framework to attain economic stability. It has long been known by the economists that money and output measures of economic activity are positively correlated. Further evidence says that money or its rate of change tends to lead income in some sense. Sims (1972) assert that it is widely recognised that no degree of positive association between money and output can by itself prove that variation in output. Money might equally well react passively and very reliably to fluctuations in income. All these statements explicitly explain how closed are the relationship between money and output.

Economists have long understood that the quantity of money can play a useful role in the monetary policy process only to the extent that fluctuations in money over

time regularly and reliably correspond to fluctuations in income, prices, or whatever other aspects of economic activity the central bank seeks to influence. In the case of money, a rich literature developed over many years has investigated in some detail the requirements that relationships connecting money to income or prices must satisfy in order to warrant focusing monetary policy on money in any of several specific ways.

Indeed, globalisation of financial markets and to a lesser extent, financial developments have altered the money demand function, making it much more difficult to predict the quantitative effects of monetary policy on its objectives of price stability in the Malaysian economy. Recent studies by BNM have shown that monetary growth no longer provided any additional explanatory power beyond that provided by the output gap. BNM asserts that this situation could be interpreted as suggesting that monetary growth is caused by output growth and not vice versa, making monetary aggregates a lagging indicator and, therefore unsuitable as an intermediate target.

Based on the above arguments, the purpose of this study is two folds. First, to investigate the causal linkage between money and output growth in the Malaysian economy . This is important for us to know either monetary aggregates is suitable as an intermediate target.

Bank Negara Malaysia has implemented the monetary targeting strategy to M1 prior to 1987, then shifted to M2 due to M1 is sensitive to interest rates movement. Afterwards, in 1997 BNM shifted its monetary targeting to M3 due to M2 movement being partially distorted by disintermediation of deposits from commercial banks to the other non financial institution, particularly the finance companies, the role of M2 has been downgraded (Hui Boon Tan and A. Z. Baharumshah, 1999). Second , in view of the this complexity in choosing the monetary targeting strategy, it is vital to conduct studies to identify which of the monetary aggregates (narrow and broad money) reveal a strong link on the money-output relationship.

1.5.2 Objectives of the study

Following are three objectives of the study:-

1. To investigate either there is statistical evidence that money is "exogenous" in the money-output relationship in the Malaysian economy.

2. To investigate the causal link between money and output using various measures of monetary aggregates.

3. To investigate the effect of interest rate and price variables on money-output relationship.

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