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**MACROECONOMIC POLICY AND REAL
OUTPUT IN MALAYSIA: A MULTIVARIATE
CAUSALITY ANALYSIS**

BY

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ABSTRACT

This research analyzes the impact of key macroeconomic policy variables; specifically, money supply, interest rate, government spending, tax revenue, net export, exchange rate and prices on real output in Malaysia utilizing quarterly data for the period 1970-2000. Unit root test, cointegration, vector error correction mechanism, variance decompositions (VDC) and impulse response functions (IRF) were utilized in testing the short-run disequilibrium and long-run relationships of the variables. In addition, these techniques were utilized to analyze the type of relationships that existed among the variables whether it conforms to Classical, Keynesian or Monetarist theory.

Unit root tests indicate that all the variables in both the GDP and IPI systems were non-stationary at their level values except for government expenditure. As government expenditure was found to be stationary, it was excluded from the cointegration and VECM analyses of the GDP-system. Cointegration analyses carried out under various assumptions show that there existed long-run relationships among all the variables used in various models, consistent with other studies such as MacDonald (1995), Masih and Masih (1996a), Ibrahim (1998), and Ansari (2001). Only the results of CPI and interest rate do not conform to expectations. In this study, the CPI decreases as the output increases, which may be due to the government's policy to consciously control inflation at a low level that resulted in the CPI being low even when the overall GDP increases. Interest rate is positively related to output probably due to capital inflows during the high interest rate periods which resulted in high investment and faster domestic economic growth. The VECM analyses of both

the GDP and IPI systems show that exchange rate and M1 seem to be the dominant variables affecting other variables even when the pegged-exchange rate period is excluded in the model analysis, while the positive impact of government expenditure on IPI supports the use of fiscal variable to induce growth. The VECM analysis also shows that M1 has more influence than M2 in both the GDP and IPI-systems. Shorter sample period analyses conducted by breaking the whole sample into various sub-sample periods show that exchange rate was not the dominant variable for the period 1978-1989 of the GDP-system and also for periods 1970-1979 and 1980-1989 of the IPI-system. Exchange rate became important only after the 1990s.

Both VDC and IRF analyses also indicated that exchange rate and M1 are the dominant variables irrespective of whether the pegged-exchange period is included or excluded in the analysis. Therefore, the Keynesian stance with extended structuralist-Mundellian views on the importance of fiscal policy and the endogeneity of money supply and exchange rate conforms to the findings of this study.

ملخص البحث

يعنى هذا البحث بتحليل أثر استخدام بعض المتغيرات المهمة على الناتج الفعلى بماليزيا. و ذلك من خلال استعمال بيانات ربع سنوية للفترة من عام ١٩٧٠ حتى عام ٢٠٠٠. و تتمثل هذه المتغيرات في معدل سعر الفائدة، معدل الزيادة في النقود، الصرف الحكومي، العائد الضريبي، صافي الصادرات، معدل سعر الصرف، و مستوى أسعار السلع الاستهلاكية. لاختبار ما إذا كانت هنالك علاقة ما بين هذه المتغيرات على المدى القصير أو المدى البعيد فقد تم إستخدام اختبار "يونت روت"، "كوانتريشن"، "فيكتور، ارور كوريكشن ميكانزم"، "فيريس ديكوموزيشن"، و"امبالز ريسبونس فنكشنز". وإضافة إلى ذلك فقد استخدمت نفس هذه الوسائل في تحليل نوع العلاقات بين المتغيرات آنفة الذكر، و ما إذا كانت تتوافق مع أي من النظريه الكلاسيكيه، الكينيزيه، أم النقدية. تشير نتائج اختبار "يونت روت" على أن كل المتغيرات تبدو غير مستقرة سواء كان ذلك على نظام اجمالي الناتج القومي أو نظام معدل الناتج الصناعي. و هذا باستثناء الصرف الحكومي الذي تشير الاختبارات على أنه مستقر. و لهذا فقد استبعد عند إجراء تحليل "كوانتريشن" و "فيكتور، ارور كوريكشن ميكانزم" على نظام اجمالي الناتج القومي. توافقا مع كثير من الدراسات مثل ماکونالد (١٩٩٥)، مسيح و مسيح (١٩٩٦)، ابراهيم (١٩٩٨)، وأنصاري (٢٠٠١) فقد أثبت "تحليل كوانتريشن" وجود علاقات بين كل المتغيرات المستخدمة و ذلك في المدى البعيد. ويستنتى من ذلك متغيران هما معدل سعر الفائدة و معدل الأسعار حيث أثبتت هذه الدراسة أن معدل الأسعار يقل بزيادة الإنتاج، و ربما يرجع هذا إلى سياسة الحكومه المتمثله في الابقاء على مستوى منخفض للتضخم. و أثبتت الدراسة أيضا أن سعر الفائدة يزيد بزيادة الإنتاج. و ربما يكون هذا نتيجة لزيادة نسبة رؤوس الاموال الوافدة عندما يرتفع معدل سعر الفائدة بماليزيا، الشيء الذي يؤدي إلى الزيادة في الاستثمارات و من ثم الزيادة في نمو الاقتصاد المحلي.

وقد أظهر تحليل "فيكتور، ارور كوريكشن ميكانزم" أيضا أن سعر الصرف و معدل الزيادة في $M1$ ليعيان دورا مهما في التأثير على المتغيرات الأخرى على الرغم من استبعاد بيانات الفترة التي كان فيها معدل سعر الصرف مرتبطا بالدولار الامريكي، ولكن الاثر الإيجابي للصرف الحكومي على معدل الناتج الصناعي يؤكد استخدام المتغيرات المالية لدفع عجلة النمو. هذا وقد أثبتت التحليلات أن $M1$ له تأثير أقوى من $M2$ في نظام اجمالي الناتج القومي و معدل الناتج الصناعي. وبعد تقسيم العينة إلى عدة عينات صغيرة حسب التسلسل الزمني فقد وُجد أن سعر الصرف لم يكن عاملا مهما في تحديد بقیة المتغيرات في الفترة (١٩٧٨-١٩٨٩) على نظام اجمالي الناتج القومي. وانه أيضا لم يكن مؤثرا على نظام معدل الناتج الصناعي في الفترة من (١٩٧٠-١٩٨٩). أما

معدل سعر الفائدة فلم يكن مؤثرًا إلا في التسعينات. ولهذا فإن وجهة النظر الكينيزية المتعلقة بأهمية السياسة المالية من ناحية والسياسة النقدية ممتثلة في إستخدام عرض النقود ومعدل سعر الصرف من ناحية أخرى تتوافق مع نتائج هذه الدراسة.

APPROVAL PAGE


The dissertation of Mohd Irwan Serigar Abdullah has been examined and is approved by the following;



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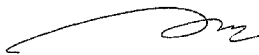


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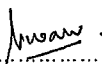


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DECLARATION

I hereby declare that this dissertation is the result of my own investigations, except where otherwise stated. Other sources are acknowledged by footnotes giving explicit references and a bibliography is appended.

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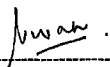
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Macroeconomic Policy and Real Output in Malaysia : A Multivariate Causality
Analysis

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Dedicated to

My wife, Rohana, daughter, Natasha and son, Nazshua

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LIST OF ABBREVIATIONS

ACF	Auto Correlation Function
ADF	Augmented Dickey-Fuller
AIC	Akaike Information Criteria
BCIC	Bumiputera Commercial and Industrial Community
CPI	Consumer Price Index
DOS	Department of Statistics, Malaysia
ECT	Error Correction Term
ELG	Export-led Growth
EXCH	Exchange Rate
GDP	Gross Domestic Product
GNP	Gross National Product
ICT	Information and Communication Technology
IFS	International Financial Statistics
IMP	Industrial Master Plan
IPI	Industrial Production Index
IRF	Impulse Response Functions
K&M	Kormendi and Meguire
LCPI	Log of Consumer Price Index
LGDP	Log of Gross Domestic Product
LGOV	Log of Government Expenditure
LIPI	Log of Industrial Production Index
LM1	Log of M1
LM2	Log of M2
LTAX	Log of Tax Revenue
NDP	National Development Policy
NEP	New Economic Policy
NERP	National Economic Recovery Plan
NETEX	Net Exports
OPP	Outline Perspective Plan
PP	Philips-Peron
RBC	Real Business Cycle
RM	Ringgit Malaysia
SMP	Second Malaysia Plan
TBDR	Treasury Bill Discount Rate
TFP	Total Factor Productivity
US	United States of America
USD	US Dollar
VAR	Vector Auto-Regression
VDC	Variance Decompositions
VECM	Vector Error Correction Mechanism

CHAPTER 1 INTRODUCTION

1.1 Introduction

The behavior of short-run and long-run macroeconomic aggregates and their relationship with real output have long been a subject of debate among economists. A large part of the debate over policy questions stems from differing views on the factors that determine the short-run fluctuations and the long-run output growth. One obvious issue of discussion is what determines real output and its causal relationship with money supply, interest rates, exchange rates and many other related policy variables (Masih and Masih, 1996b).

The Classical economists emphasized the importance of real factors in determining 'wealth of nations' and stressed the optimizing tendencies of a free market in the absence of state control (Froyen, 1999). They are non-interventionist and did not favor active monetary or fiscal policies to stabilize the economy. Conversely, the Keynesians view the economy as unstable as a result of the instability in the aggregate demand, especially the private investment component of the aggregate demand. They believe that fluctuations in aggregate demand that affect output and employment can be corrected by using monetary and fiscal policies. In addition, Wagner's view sees growth in government expenditure as a function of growth in income, implying endogeneity of fiscal policy (Ansari, 1996). Keynesians also believe that money supply has a positive impact on output and consumption depends on absolute income hypothesis (Felderer and Homburg, 1992). The Monetarists believe that changes in the quantity of money have the dominant influence on changes in nominal income and they believe in permanent income hypothesis. The stability in the stock of money will

result in stability in income growth. The New Classical Economists postulated that only unanticipated monetary expansion would result in an increase in output (Mankiw, 1990). Finally, for the Real Business Cycle (RBC) school, money expansion whether anticipated or unanticipated, will have no positive effect on output, but it will only raise interest rate and price level (Masih and Masih, 1996b). The RBC views money as endogenous and output as exogenous, which means that output is determined by factors such as technology, raw material, environment and so forth.

There are two approaches to study determinants of growth. First, a production function approach where change in output depends on input of labor and capital, and second, how economic growth is affected by macroeconomic aggregates such as money supply, inflation and government spending (Alexander, 1990). The production function approach usually analyzes the long-term determinants of economic growth whereas, the macroeconomic aggregates analyze the short-run fluctuations and their relationship with long-run stable output growth.

This study employs the second approach in analyzing the relationship among macroeconomic aggregates and their impact on output growth. The cointegration and the vector error correction modeling techniques are used to establish the existence of long-run relationship and the direction of causality among these variables using within sample period. Variance decompositions and impulse response functions are applied in order to conduct the out-of-sample analysis to analyze the influence among the variables.

1.2 Background of the Study

The long-term aim of a country is to attain continued economic stability by sustaining a stable and sustainable growth. In this respect, the Malaysian economy, despite being hit by severe crises such as in 1985 and 1997, in the long- run has experienced a stable growth with fairly low inflation and unemployment. The Gross Domestic Product (GDP) grew at an average rate of 6.7 and 7.0 per cent per annum during the 1971-1990 and 1991-2000 periods, respectively (OPP1 and OPP2).¹

One of the key elements in maintaining this sustained growth is the careful designing and implementation of government policies. Monetary policy has been implemented to support the promotion and strengthening of economic activities. Low interest rates were maintained that promoted growth in bank lending. It also helped improve the financial situation of corporations during the financial crisis of 1997-1998 by easing their debt-servicing burden. The money supply continued to expand broadly with economic recovery. The narrow money, M1 experienced a slower growth in 2000 compared to 1999. The broad money, M2 experienced a stable growth during the 1999-2000 period, except for -1.7 percent in 1998 (Bank Negara, Annual Report, 2000, pp. 70-81).

In addition to monetary policy, numerous expansionary fiscal policy measures have been undertaken to stimulate domestic demand. In the years 2000 and 2001, for instance, the government introduced fiscal stimulus packages to strengthen domestic demand that contained both tax and non-tax measures (Bank Negara, Annual Report,

¹ OPP stands for Outline Perspective Plan.

2000 p. 9). Although the tax revenue continued to increase from RM 21.2 billion in 1990 to RM 47.2 billion in 2000, however, the ratio of tax revenue to total GDP declined from 1998 onwards most probably due to the financial crisis. The growth rate of tax revenue to GDP ratio was 5.7 % in 1997 but fell to -8.7 % in 1998. This is probably due to the tax measures in the fiscal stimulus package that include reduction of personal income tax, higher tax relief and reduction of import duties on selected products (Bank Negara, Annual Report, 2000, p. 9). In terms of government expenditure, priority allocation was given to education and skills training, rural development, low-cost housing, infrastructure, and information and communication technology (ICT) development. Towards this end, the development expenditure continued to increase each year and reached almost RM28 billion in 2000. The growth in government spending was positive especially when the GDP growth was negative in 1998. The objective was to increase allocation on development programs that have greater linkages and multiplier effects to the economy (Bank Negara, Annual Report, 2000, pp. 85-90).

Finally, in the area of trade, the export and import sectors grew at the same rate of 15.2 percent during the 1970-2000 period. The export growth in real terms was double digits during the 1990-2000 period, with the exception of the year 1996, when it was 6.5 per cent (Bank Negara Monthly Bulletin various issues, 2000). The export growth was positive at 29.7 % when GDP (in real terms) growth rate was -7.4% in 1998. The high export growth during the 1970-2000 period has helped the country to maintain its stable long-term economic growth. On the other hand, the net export figures (export minus imports) were very volatile and they were usually negative prior to crisis or recession periods and positive during the crisis period. For example, net export figures

(in constant 1978 prices) were –RM73.7 million and –RM12.4 million in 1996 and 1997 respectively, and increased drastically to RM16,327 million in 1998. The exchange rate was quite unstable during the 1997-1998 crisis period and reached the highest level at RM/USD 3.88 in 1997 (the Ringgit had depreciated almost 53 per cent compared to the US dollar) after which the government pegged the Ringgit to the US dollar at RM/USD 3.8. The pegging of the Ringgit to the USD is to help stabilize the economy and avoid speculative activities (Bank Negara, Annual Report, 2000, p. 74).

Although the long-term GDP growth has been impressive, there are areas that are still vague and require careful understanding and analysis. Research on the significance of various government policies, whether fiscal or monetary policy, in influencing output growth requires an in-depth analysis. Apart from this, policy variables that support long-run stability and which cause short-run disequilibrium also need to be identified. The understanding of the relationships among macroeconomic variables that cause short-run fluctuations and long-run stability will help policy makers to design more conducive and effective policy measures for sustained output growth.

1.3 Objectives of Study

This study analyzes monetary and fiscal policies, and the external sector in Malaysia, and tries to describe their relationships and determine their relative significance in influencing real output during the last 30-year period. In this respect, the cointegration analysis is first used to see whether common trends exist between policy variables and real output. The existence of cointegration among variables suggests that the estimated relationship is not spurious and it helps in establishing a common trend among the variables.

The cointegration analysis, however, only indicates the presence or absence of Granger causality but it does not indicate the direction of causality. As such, this study also tries to determine the direction of causation and the economic theory that supports the short-term and long-term relationships whether it conforms to the Classical, Keynesian, Monetarist or RBC theory. This will provide a clear understanding of the pattern of relationships that exist among the variables. This is important in formulating future policy measures. The direction of causality can be detected through the Vector Error Correction Model (VECM).

The VECM technique used in this study allows for testing the significance of each policy variable and in determining the transmission channels that exist among these variables. In addition, the VECM also allows the distinction between short-term and long-term Granger causality among the variables concerned. Furthermore, this study attempts to determine whether the policy variables are endogenous or exogenous. This will help identify which variables react to one another in the economy and which variables are influenced by factors outside the economy. In order to establish this aspect, the t-tests and the F-tests in the VECM can be utilized to indicate the econometric exogeneity or endogeneity of the variables.

In addition to within sample analyzes such as cointegration and VECM described above, this study also used out-of-sample analyzes, i.e., Variance Decompositions (VDCs) and Impulse Response Functions (IRFs). These techniques can indicate whether a particular variable is endogenous or exogenous. Furthermore, these out-of-sample analyzes are capable of detecting the strength of influence of the variables on other variables as well as their responses to future shocks in other variables.

The main objectives of this study are summarized as below:

- i. To determine the relative significance of monetary, fiscal and external variables in influencing output growth;
- ii. To identify the economic theory that supports the relationships between real output and other macroeconomic variables whether it conforms to the Keynesian, Classical or Real Business Cycle theory;
- iii. To identify variables that experience short-run disequilibrium and variables that support the long-run stability of output growth;
- iv. To establish whether the macroeconomic aggregates are endogenous or exogenous in nature that helps in explaining the influences among the policy variables; and To establish whether the macroeconomic aggregates are endogenous or exogenous in nature that helps in explaining the influences among the policy variables; and
- v. To provide relevant recommendations based on the empirical findings for sustainable output growth.

1.4 Significance of the Study

The review of literature reveals that most of the studies conducted for Malaysia focused separately either on monetary policy or export growth or fiscal policy such as in Abdullah and Yusop (1996) and Ibrahim (1998). Other studies analyzed generally the relationship between macroeconomic aggregates and output growth, as in Tan and Cheng (1995) and Ansari (2002). However, this study attempts to provide a comprehensive approach in that it specifically combines monetary policy, fiscal policy and the external sector and analyzes their impact on output growth.