NEAR EAST UNIVERSITY

GRADUATE SCHOOL OF SOCIAL SCIENCES

ECONOMICS MASTER'S PROGRAMME

MASTER'S THESIS

THE EFFECT OF MONETARY POLICY ON ECONOMIC GROWTH THE CASE OF MALAYSIA FROM 1985 TO 2014

DILGASH AHMED MOHAMMED ISTOKORKI

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We certify the thesis is satisfactory for the award of degree of
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DEDICATION

This thesis is dedicated to my lovely and supportive parents who have always been there for me through all my endeavors in life with challenges and words of encouragement which have been very helpful. I also wish to dedicate this to my other family members.

ABSTRACT

This research examines the impact of monetary policy on the economic growth of Malaysia. Monetary Policy continues to be the most important policy instrument used by both government and monetary authorities in controlling economic realities especially in this era of very volatile economic realities. The ease in which monetary policy can be adjusted gives it a huge comparative advantage over fiscal policy. The choice of the Malaysian economy is predicated on its success and as a result can be a model for other developing countries seeking to achieve rapid economic growth.

As such, this research aims at analyzing the effect monetary policy has played in the rapid economic growth of Malaysia. The study utilizes secondary annual series data from 1985 to 2014 while employing the Ordinary Least Squares, Unit Root Test, to measure the nature of relationship between all variables selected.

Key Words: Monetary Policy, Economic Growth, Malaysia, Ordinary Least Squares, Unit Roots test

ÖZ

Bu çalışma, para politikasının Malezya'nın ekonomik büyümesi üzerindeki etkisini incelemektedir. Para Politikası, özellikle çok dengesiz ekonomik gerçeklerin bu çağında ekonomik gerçeklerin kontrolünde hem devlet hem de para otoritelerinin kullandığı en önemli politika aracı olmaya devam etmektedir. Para politikasının kolayca ayarlanabilmesi, maliye politikası üzerinde büyük bir karşılaştırma avantajı sağlamaktadır. Malezya ekonomisinin seçimi başarısı üzerine kuruludur ve sonuç olarak hızlı gelişmeyi hedefleyen diğer gelişmekte olan ülkeler için bir model olabilir.

Bu nedenle, bu çalışma para politikasının Malezya'nın hızlı ekonomik büyümesinde oynadığı etkiyi analiz etmeyi amaçlamaktadır. Çalışma, seçilen tüm değişkenler arasındaki ilişkinin niteliklerini ölçmek için Olağan En Küçük Kareler, Birim Kök Testi, testini kullanırken 1985'ten 2014'e kadar olan ikinci yıllık seri verilerini kullanmaktadır.

Anahtar Kelimeler: Para Politikası, Ekonomik Büyüme, Malezya, En Küçük Kareler, Birim Kökler testi

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LIST OF ABBREVIATIONS

GDP	**Gross Domestic Product**
PPP	**Production Power Parity**
IT	**Inflation Targeting**
BNM	**Bank Negara Malaya**
FDI	**Foreign Direct Investment**
IMF	**International Monetary Fund**
OECD	**Organization for Economic Co-operation and Development**
GNP	**Gross National Product**
MTM	**Monetary Transmission Mechanism**
GNI	**Gross National Income**
TFP	**Total Factor Productivity**
QTM	**Quantity Theory of Money**
ASEAN	**Association of Southeast Asian Nations**
OLS	**Ordinary Least Squares**
VAR	**Vector Auto Regressive**
TAR	**Threshold Auto Regressive**
ARDL	**Autoregressive-Distributive Lag**
NEP	**New Economic Policy**
OPP	**Outline Perspective Plan**
NDP	**New Development Plan**
NVP	**National Vision Plan**

CHAPTER ONE

INTRODUCTION

1.1 Study background:

The importance of government policy making and its participation in the economy cannot be over-stated. During the Great Depression, Keynes, (1930) argued that the total demand is prejudiced by many decisions of both private (domestic) and government and that there is need for government intervention and regulation of the economy. Government policy making can take two form; monetary policy and fiscal policy, Fiscal policy is the adjusting and manipulation of government spending and taxation to influence the economic outlook and position of a country (Horton, & El-Ganainy, 2009). Monetary policy is however the most important and influential economic tool of the government which it employs in the management of the economy to achieve certain desired objectives. Monetary policy manipulates the money supply and rate of interest as well as other monetary variables in order to achieve the goals and manifestation of the ruling party (Shoaib K, 2010). Most economist agree that monetary policy is best (and are) conducted by the Central Bank (or a similar institution) that is independent from the government (Mathai, 2009) although the true autonomous nature of the Central Bank from the government is one of huge debate in many countries.

Monetary policy refers to the actions undertaken by Central Bank, such as the Federal Reserve (the Central Bank of the United State) to affect and control the availability and cost of money credit with the aim to alleviate and promote national economic goals- this is the understanding of the definition given by the Federal Reserve Board. A general observation of definitions especially by Central Bank passes the notion that most Central Banks define monetary policy in terms of their aims and objectives.

The Bank of England opined that the objective of monetary policy is price-stability which implies to sustain the value of money. In other words, check inflation or the general increase in prices and services and this is accrued to the uncertainty about inflation and the need to know and if possible control future price levels which if not properly checked can be damaging to the proper functioning of the economy. Having a stable and low price level means that individual price signals can be understood more clearly, and as such more informed decisions can be made as to whether to save, lend or borrow, or the degree to invest

and to consume, and what and when to produce. If this is in place, price stability can help bring about sustainable long term economic growth.

This clearly indicates that the Bank of England view monetary policy in the perspective of price stability by controlling or targeting inflation. Inflation Targeting (IT) as a way of defining monetary policy is also evident in the definition of the Bank of Canada which defined thus

The Canadian monetary policy aims to contribute and raise the standards (of living) for all Canadians by achieving low and stable inflation rate. To be more precise, the bank's objective to keep the rate of inflation inside a target range jointly with the government.

Ever since the its establishment on 26 January 1959 as the Bank Negara Malaya (BNM), the Central Bank of Malaysia has carried out the traditional functions as all central banks do. The principal objectives of the BNM are to promote the economic stability of the country and maintaining a sound financial system. Its objectives are clearly defined as item (III) in the Central Bank Act of 1958 (Revised 1994)

"i. To issue currency and keep the reserve safeguarding the value of the economy
ii. To act as banker and adviser to the Government
iii. To promote monetary stability and a sound financial structure and
iv. To influence the credit situation to the advantage of Malaysia"

Over the years, the monetary policy in Malaysia has faced various challenges. The problematic international conditions in the late 1970s meant that monetary policy during the 1975-1984 was primarily aimed at maintaining price stability (reducing inflation) and ensuring a stable economy. The recession of 1985 in the Malaysian economy posed another big obstacle for policy makers. This made monetary policies to be eased gradually and supplementing this gradual easing of monetary policy was the depreciation of the ringgit in small steps (Shaari, 2006)

From 1987-1996 however, there was rapid domestic growth in the Malaysian economy and as a result, policy shifted in order to curtail inflationary pressures, monetary policy makers adopted tight monetary policy. Shaari, (2006) points out that this task was made even more difficult by fall in general interest of the world rate which meant interest differentials favored Malaysia and thus induced Foreign Direct Investment (FDI) making the FDI to GDP ratio to increase two folds (Ang, 2008)

The most tasking period for monetary policy in Malaysia came towards the end of 1997-2005 when the whole region was characterized by regional financial crisis (in mid 2003) which saw extreme volatility and fluctuations in the financial markets. The central bank was faced with finding a balance between various policies in the need to address the reduction of GDP and rising inflation and also needed to ensure that the banking system and financial sector remain intact.

The recent global economic crisis of 2008-2009, also affected the Malaysian economy because of its high global economic integration (24th in the world, 2015 KOF Index of Globalization). Alp et. al (2012) points out that is this period, BNM safe guarded short term funding in the banking system and was willing to back interbank lending. It also made some intervention and the depreciation of foreign exchange rate by 150 points to 2 percent.

1.2 Statement of the Problem

There has been increased attention given to monetary policy over the past decade. Both theoretical and empirical studies have increased on this subject matter. Although economic growth is optimally achieved with a combination of fiscal and monetary policies, this seemingly one sided concentration on only monetary policy can be attribute to the fact that monetary policy is more efficient in short term adjustment because it can easily be altered to adapt to the prevailing economic realities. Modern economies are highly volatile and responsive and even unpredictable to say the least especially since globalization has made international markets and economies very much interdependent and related. Although, government can adjust the economy using fiscal policy, it involves a lot of red tape changing the tax rate and it's spending, it involves lots of legislation as more often than not, these policies are laws of the land and there is always a due process before such can be changed.

The relative ease in monetary policy decision process and its effectiveness on the economy added to the difficulty and time lag of formulating and implementing fiscal policies means that the responsibility of dealing with the present economic reality of flexibility and swiftness wholly falls on the use of monetary policy adjustments and this has contributed to the proliferation of research in this field.

Typical studies such as this however often do not go far as differentiating established economies and developing countries (Haung and Wei, 2006) and as result of this flaw, we observed that Central Banks (or the relevant monetary governing institution) are misguided and adopt inflation targeting (IT) as its main monetary policy goal. This really is a misguided

But widely spread belief that economic policies irrespective of prevailing economic development status of countries will deliver the same result.

Generally, many developing countries are characterized by weak institutions and financial underdevelopment which ensure that the effectiveness, transmission and implication of policy differ from those of advanced countries (Ghatak and Sanhez-Fung, 2007). This invariably means that monetary policy consideration should first and foremost be based on the level of development in the economy.

It is the above premise that forms the thrust of this research

1.3 Objectives of the Study

The aim of this research is to investigate the nexus between monetary policy and economic growth in the light of developing economy with the case study being Malaysia. Primarily, the research will focus on the interactions between interest rate, inflation, money supply and growth in GDP; which will serve as the instrument for measuring economic growth. Limiting the scope of this research to this aspect is predicated on the fact that the economic effect of changes in monetary policy instrument is quite a vague subject and economic growth has various interactions with various economic indicators and policies.

Therefore, the objective is to ascertain the significant variable(s) in developing economy so as to properly identify the best monetary policy instruments that should be influenced in order to achieve the best macroeconomic goals and objective in any given economy.

In summary, the aim of this thesis is as follows:

- Differentiating monetary policies and their respective effect(s) on economic growth of developing economies
- Identifying the significant monetary instrument important for growth in developing countries
- Based on finding, state which and what monetary policy adjustment is best suited for developed economy in order for it to maintain a constant growth path.

1.4 Research methodology

The research will apply quantitative analysis to means the relationship between GDP growth and monetary policy instrument mainly interest rate, money supply and level of inflation. Given the advancement and achievement in econometric analysis and computer software

creation, the Least Squares Estimates analysis will be used to investigate the relationship and significance between these variables.

Due to availability of data, the scope of the analysis will be annual series data. All data used will be analyzed to make sure they are stationary so as to clarify and justify the use of our chosen econometric analysis

1.5 Research Hypothesis

H0: There is no significant relationship between monetary policy and economic growth in Malaysia

H1: There is significant relationship between monetary policy and economic growth in Malaysia

H0: There is no significant impact of monetary policy on the economic growth of Malaysia

H1: There is significant impact of monetary policy on the economic growth of Malaysia

1.6 Significance of the Study

The importance of monetary policy which is the most important economic tool of the central government cannot be over-stated. A better understanding of how these policies affect is always welcome. This study is important in various ways. It will serve as an objective view of the effectiveness of monetary policy in Malaysia which is a developing country and this understanding of the Malaysia economy can help other 3rd world countries in the formulation of their own policy. The Malaysian economy has indeed improved significantly in the past 20 years. The poverty head count ratio at national poverty line dropping from 5.7 percent in 2004 to 0.6 percent in 2014, the Gross National Income per capita was $2,370 (current US$) at 1990 but has increased to $11,120 (current US$) in 2014 (World Bank stat.).

This research will serve as a source of information on various ways of adopting monetary policy and its instruments for stabilizing and spurring the economy on the path of further development while providing policy makes recommendations.

1.7 Source of Data

All data except otherwise stated will be obtained from the data bank of the World Bank. This will be gotten from the official website of the World Bank. Data from this website are drawn from international institutions such as the International Monetary Fund (IMF), the Organization for Economic Co-operation and Development (OECD).

CHAPTER TWO

MALAYSIA ECONOMIC OVERVIEW

2.1 Introduction

The objective in this chapter is to present an oversight of the Malaysia economy and its monetary policies in the past years. It will also highlight the economic development trend and policies across various periods in the economy of Malaysia.

2.2 Overview of Malaysia Economy

Malaysia is an Islamic state in the South-eastern part of the continent of Asia overlooking the South China Sea from the north, an area of 329,758km and is bordered to the south, Indonesia, Thailand and the South China Sea from the north. Malaysia is an upper middle income developing country with a population of 29.90million (2014 est.) and a Gross Domestic Product (GDP) at market prices of $338.81b (current US$). It is currently 33rd in the world in terms of GDP (nominal). Its 2015 GDP at Production Power Parity (PPP) is estimated at $815.5b placing it 13th in the Asia and Pacific cumulative and 4th in the South Asia region. It is a private sector driven economy with government regulating and providing an enabling environment from proper functioning of businesses.

Before Independence from the British in 1957, Malaysia was a low-income country whose main support was on Rubber and tin production exportation. In 1947, agriculture employed more than two-thirds of the labor force in Malaysia with a further 22.5 percent in the tertiary sector, 6.5 percent in the manufacturing sector and 2.5 percent in the mining sector and this proportion remained unchanged until Independence (Yusof and Bhattasall, 2008). Business enterprises were predominantly localized and family based and on small scale. Over time though, the economy pushed towards diversification beyond agricultural and primary commodity. At Independence, Malaysia population stood at just 7.4 million.

Immediately after Independence, Malaysia moved towards diversification which has led to imperious growth in their economy since then. The post war growth of the Malaysia economy can be broadly characterized into four stages (Yusof and Bhattasall, 2008). The first phase which falls between 1957-70 is purely one of diversification as the country rigorously sorts to expand its income source from Tin and Rubber due to the volatility of their prices and the projected dwindling availability of the commodities. At this stage, also, diversification also

pushed from primary production to secondary production. It is worthy of note that the diversification was hugely successful.

The next phase (1970-90) was defined by policies and event designed to restructuring of the economy. This phase is seen as very pivotal in the annals of the economic development of Malaysia. It was largely characterized by major economic policies which stirred the economy towards huge developmental strides such as the New Economic Policy (NEP) in 1971, the Second Malaysia Plan (1971-1975) and the Outline Perspective Plan (OPP) of 1971-1990. There was rapid increase in construction and manufacturing with strategic emphasis on equitable distribution usually through affirmative actions. FDI activities were promoted actively through introduction of Free Zone Act of 1971, the Promotion Incentive Act of 1986 etc.

The 1991-2000 growth phase is one that traversed the difficult era of the Asian Financial Crisis and period of stricter exchange rate control measures.

The recent phase 2001 to present is one of slow growth. As an export driven country, the various activities and happening in the world had adversely affected the economic growth of Malaysia in recent years; the terrorist actions of 9/11 on the United States, the Global Recession of 2008/9 as well as more increased competitive external conditions have highlighted some of Malaysia vulnerabilities and greatly impeded Malaysia growth potentials.

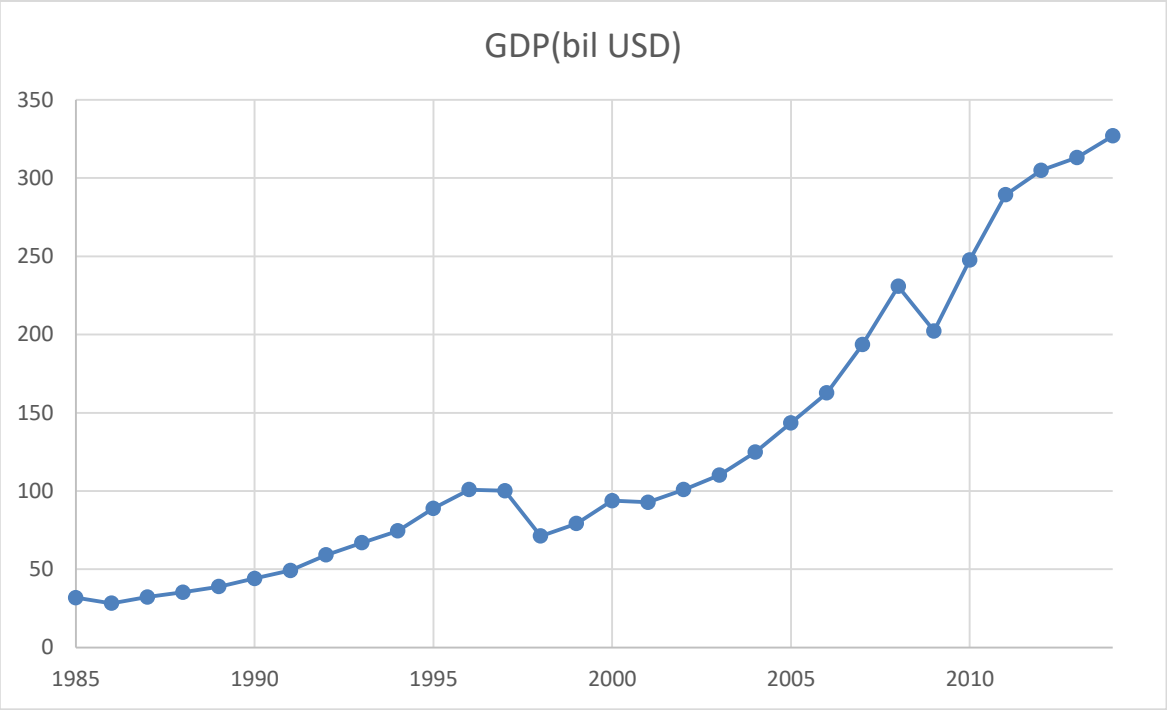
Khin et al. (2014) however divided Malaysia economic policy into three categories; the NEP during 1979-1990, the NDP executed from 1990-2000 and the National Vision Policy (NVP) from 2000 till present and opined that all these respectively economic policies have been hugely successful. For instance, not only was unemployment brought down during this period, the GDP of Malaysia grew from 4.276 billion USD in 1970 to 44.024 billion USD in 1990 during the implementation of NEP. Although the period of NDP was characterized by some external regional and international financial crisis, the GDP of Malaysia as at 2001 was 92.783 billion USD from the 44.024 in 1990. Another indication of success of these economic policies was the reduction of the inflation rate in Malaysia during these periods.

2.3 Malaysia GDP and GDP Growth Pattern

In the period under review, 1985 to 2014, the GDP of Malaysia has grown from 31.77 billion USD to 329.93 billion USD. The trend of GDP shown in Figure 2.1 below shows that overall,

the GDP of Malaysia was steadily rising from 1985 till 1998 when it witnessed a dip from 100.17 billion USD the previous year to 71.77 that year. This decline in GDP is largely attributed to the 1998 Asian regional financial crisis. After that though, GDP continued to grow steadily again till 2009 when just as almost every economy in the world at that time, the GDP dropped again compared to the previous year. Ever since that time though, the GDP has consistently been increasing.

Figure 2.1: Trend of GDP (1985-2014)



Source: Computed By Researcher Using data from World Bank

Table 2.1: Malaysia GDP Growth rate (2004-2014)

Year	GDP Growth Rate	% Change
2004	6.78	
2005	5.33	-27.20
2006	5.58	4.48
2007	6.30	11.42
2008	4.83	-30.43
2009	-1.52	-417
2010	7.43	120.59
2011	5.20	-42.88
2012	5.64	7.80
2013	4.73	-19.23
2014	6.03	21.56

Source: Computed by Researcher using Data from World Bank

In term of GDP growth rate however, over the last ten years' period, the GDP growth rate has been staggering with the biggest deep observed in 2009 where the annual GDP growth rate fell from 4.83 to -1.53 which is evidentially due to the global financial crisis of 2008/09. The biggest bump in the growth rate was however observed in the following year as swift policies towards recovery really yielded the results that they were intended with the GDP growth rate of 2010 pegged at 7.43 and after the global crisis, the GDP growth rate has continued on a steady cyclical path with increases observed in 2011, increase of 7.80% change in 2012. Overall, Malaysia GDP growth indicates a very good average.

2.4 Monetary Policy in Malaysia

The evolution of monetary policies carried out by the BMN can be divided into three periods (Shaari, 2008). 1975-86 consist of the first period of monetary policy in Malaysia. In this period, the global economic environment was one characterized by major economic strains which arose from high increasing imbalances in exchange payment and high inflation. This

resulted in economic instability in more industrialized country and a weakened US dollar. These unique challenges shaped the monetary policy formation in Malaysia in this period. Also, added to the aforementioned challenges, "second oil shock of 1979-80" and the global recession experienced in the early 1980s led to high global inflation and loose global monetary policy. The economy of Malaysia was not shielded from this inflation. Malaysian inflation was at its highest peak of 9% in this era. Faced with this challenge, the bulk of monetary policy during this time was geared at protecting the domestic economy from the external forces. The formulation of the Fourth Malaysia Plan (1981-85) signaled a major policy shift in which government and monetary authorities shielded the economy through public sector investment. This goal of this policy was to generate inward and outward domestic industrial value chains which would result to higher value added in country (Charette, 2006).

The mid 1980s came with another unique challenge for the Malaysia monetary authorities. The economy was in recession. As a response to the recession, monetary policy was eased in stages between 1984 and 1986. To their credit, policy makers continued to push towards expansion of the economy which was powered through FDI in order to create jobs and improve standard of living (Charette, 2006). In addition to these monetary policies, the local currency was depreciated against the US dollar and this provided impetus for the export market.

The next era of 1987-1996, monetary authorities were faced with a more unique problem, managing economic success (Shaari, 2008). The economy was basically operating at full capacity and it witnessed prolonged and rapid economic growth. The expansion of the economy averaged about 9.3% per year over this 9 years' period. This astronomic economic success led to a steady rise in inflation from 0.37 to its peak of 5% in 1992. Thus, the BNM adopted a tight monetary policy stance. The task of tightened monetary policy was however made more difficult for domestic monetary policy makers due to decline in global interest rates, and in the face of rising interest rate in Malaysia, led to increased inflow of short term foreign funds causing excess liquidity in the banking sector. In reaction to this, monetary policy had to strike a balance between managing excess liquidity and the inflationary pressures that comes with it.

Monetary authorities were not successful though in reducing the influx of short term foreign currency partly due to the fact that the Malaysia currency was considered by market players

in this ear to be well undervalued. This was however not accurate but there is the general consensus that monetary authorities did not allow the local currency (ringgit) to appreciate as much as it could in order not to affect the export sector. Monetary authorities however continued as other Central Banks would have done to sterilize the upward pressure on the domestic economy like the imposition of various exchange measures.

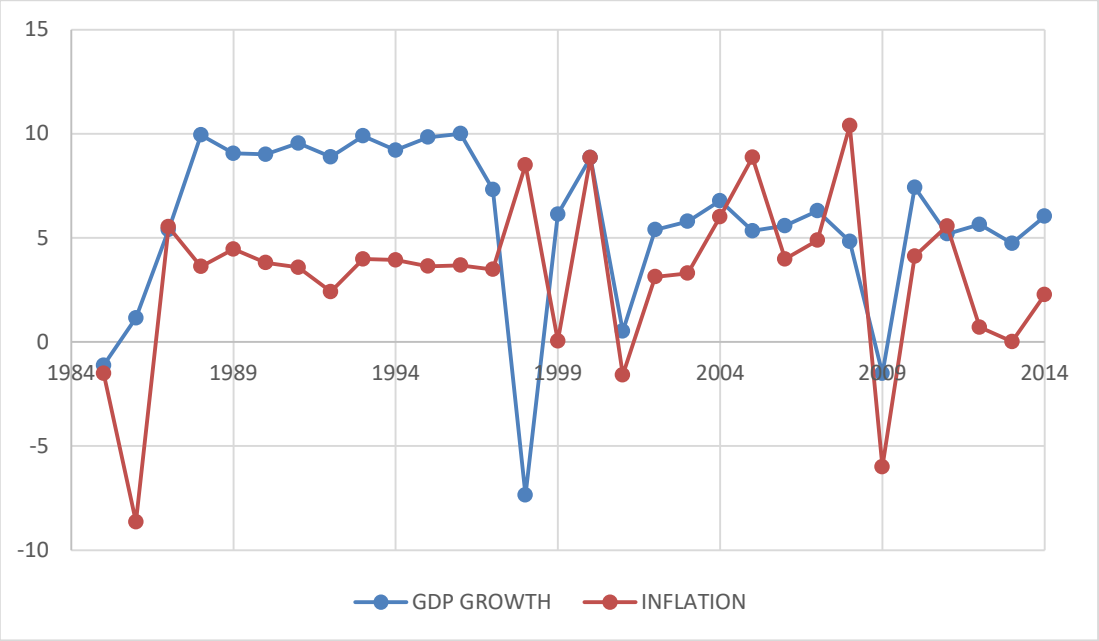
The most difficult era for Malaysian policy makers has been since 1997 with the BNM having to adopt various monetary policy stands in order to adapt to the various financial and economic irregularities that has characterized this era. Firstly, was the Asian Regional crisis of 1997/1998. This period was characterized by extreme volatility in financial markets and it had wide ranging effects on the financial and economic activities. A major challenge to the BNM was balancing declining GDP and increased inflation rate. Additionally, the ringgit decline 40% in value to the US dollars. In response to this, the BNM adopted a fixed exchange policy of $1=RM3.80 on September 2008. Complementing this fixed exchange rate policy was reducing of interest rate and easing of monetary policy in order to support economic recovery. Together with other measures, these monetary policies proved very productive as the economy of Malaysia was able to weather the storm. Most key economic indicators began showing trends of recovery in 1999. Inflation which was 6.2 percent in June 1998(its peak during the crisis) was reduced to 2.3 percent and GDP growth was at 6 percent.

The 2008/2009 Global Recession provided another shift in monetary policy implementation. As Alp, Elekdag and Lall (2012) observed, the global liquidity squeeze affected Malaysia and the downturn in global trade adversely affected exports from Malaysia with a 15 percent decline in export activities in the first quarter of 2008 alone. The BNM first monetary response was to safeguard short term funding in the financial system by announcing in October 2008 to support interbank lending. Also, in a bid to improve the dwindling export (which is a mainstay of the Malaysia economy), the BNM actively pursued some foreign exchange intervention notably, the depreciation of some exchange rate. It also cut interest rates to 2 percent. Alp, Elekdag and Lall (2012) study found out that without these bold monetary policy adjustments, the global finaicial crisis would have had a deeper contraction on the Malaysian economy. The main focus on monetary policy was discretionary interest rate cost with a very flexible exchange rate and this is well suited to the Malaysian economy because of its level of global economic integration.

2.5 Trends of Monetary Policy Instruments to GDP Growth

Having chosen inflation, interest rate and money supply as the monetary policy variables, emphasis will now shift to comparing the trend of these variables with the dependent variable. This will give a snapshot of how GDP growth has responded to the level of changes in various monetary policy instruments selected.

Figure 2.2: Trend of Inflation to GDP Growth

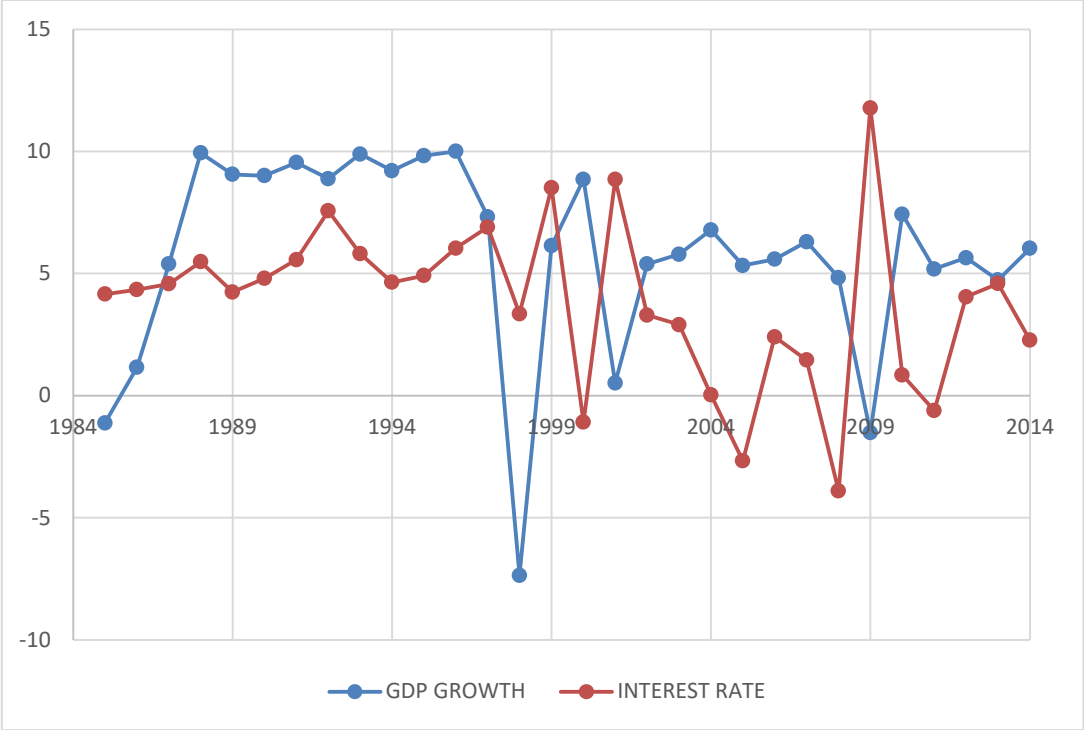


Source: Computed by Researcher using Data from World Bank

The figure above shows the trend of in the GDP growth rate and inflation. As can observe from Figure 3.1 above, in 1986, GDP growth and inflation in Malaysia moved in opposite directions; inflation dropped but there was a minimal increase in GDP growth that year. However, from 1987 to 1998, GDP growth and inflation in Malaysia moved in tandem (in the same direction). After 1998, both GDP growth and inflation continued to show similar trends over the years.

Another important observation from this graph is that GPD growth rate was only negative at two different periods 1998 and 2009 which were periods of financial distress in the Asian region and globally respectively.

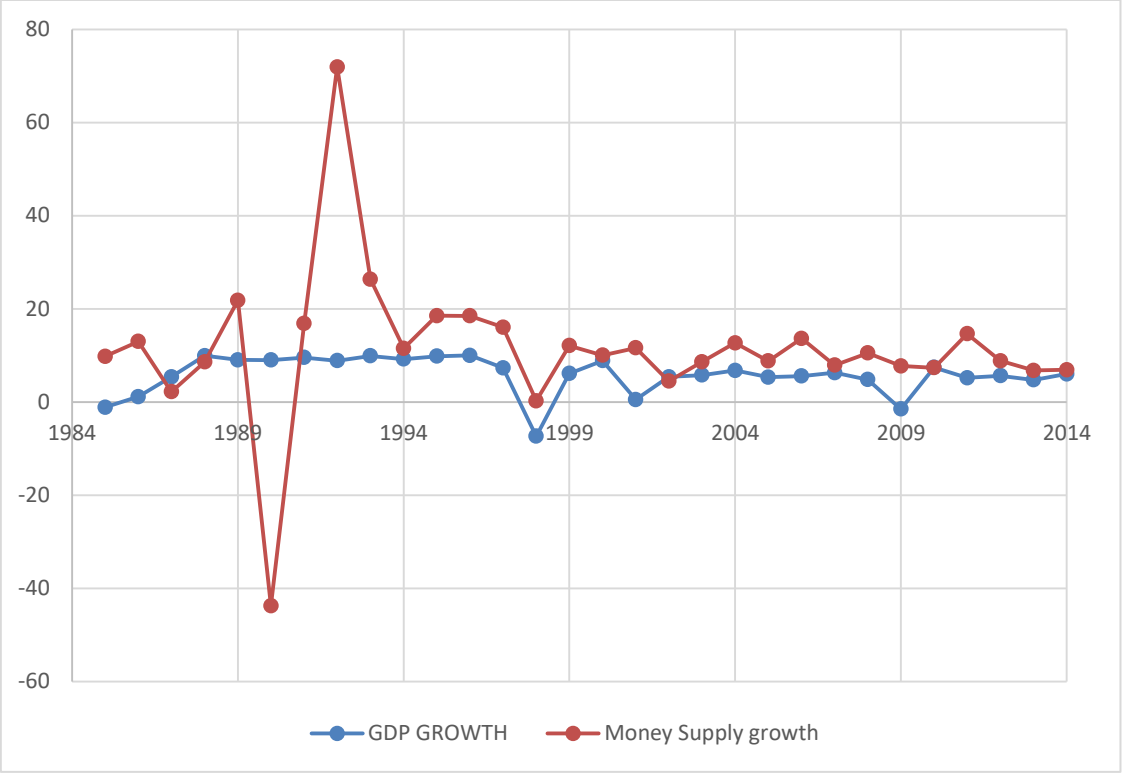
Figure 2.3: Trend of Interest Rate to GDP Growth



Source: Computed by Researcher using Data from World Bank

The graph above shows the trend of interest rate to GDP growth rate. The trends are very dynamic. While it can be observed that are some points, interest rate and GDP growth rate exhibited similar trends, the general movement of the variations shows a lot of movement in different directions. It can however be observed that in 2009 during the Global economic crisis, the monetary authorities as a response increased the interest rate to 11.78 which is the highest in the period under review. This was clearly an expansionary monetary policy aimed at boosting the economy in the depressed economic state. It can also be observed that when the economy began to grow, the interest rate was shifted to 0.8 in 2010.

Figure 2.4: Trend of Money Supply on GDP Growth



Source: Computed by Researcher using Data from World Bank

The graph above shows the trend of money supply growth and the GDP growth of Malaysia. One can observe money supply have possessed a positive trend over the years except for 1990. According to Ahim et al. (2014), in 1990, the Malaysian authorities introduced the New Development Policy (NDP) which replaced the New Economic Policy (NEP) and the implementation of this policy initially brought about some economic and financial crises as the government aimed to include more native people in the industrial sector of the country. However, the gains of the new policy began to roll in almost immediately as can be observed from the 71.91 increase in money supply the following year.

In general, both trends move in the same direction and even show the same proportionality except in 2011.

CHAPTER THREE

LITERATURE REVIEW

3.1 Introduction

The actualization of macroeconomic goals and objectives which are to wit; stable growth of Gross National Product (GNP), stable level of prices, high employment levels and stable (equal) balance of payments have from introspection been a policy precedence of every country (whether developed or developing). Delic and Kraguli (2005) reveal that in order to attain these goals, several macroeconomic instruments are used and that these instruments are fiscal policy, monetary policy, income and price policies and international economic policy. Sanni et. al (2012) however opined that the two basic policy instruments are fiscal policy and monetary policy in achieving all aforementioned objectives. This chapter will focus on works that have been done by past researchers and various academicians in this field.

This chapter will be divided thus:

1. Conceptual review
2. Theoretical literature
3. Review of empirical findings
4. Summary of empirical literature

3.2 Conceptual Review on Monetary Policy and Economic Growth

Milton (1969), regarded in many quarters as the father of monetarism gives the definition of monetary policy as the decisions carried out by monetary authorities and institutions often the Central Banks to affect and influence monetary and financial activities through exercising control over the availability and pricing of credit in pursuit of the broader aims of maintaining growth of output, price stability and healthy balance of payments positions. The discretional adjustment of money stock in his opinion involves the shrinking or expansion of money and influencing interest rate (which is viewed as the opportunity cost of holding money) to make money economical or more costlier depending on the current economic realities of the economy and the objective that the authorities wishes to achieve.

According to Rasche and Williams (2007), monetary policy can be defined as central bank actions to influence and/or target short term interest rate or nominal exchange rates.

According to them, this was a different definition to the predominant definition during the "monetarist revolution" of the 1960s and 1970s which was focused on "high-powered money"-liabilities of the central banks.

Akrani (2010) after examining definitions of Prof. Harry Johnson and A. G. Hart who respectively defined monetary policy as "a policy involving the central banks control of the supply on money as an means of actualizing the objective of general economic policy…" and "A policy which manipulates the general stock of money substitute of public demand for such assets of both that is policy which affects public liquidity position…" opined that monetary policy is related to the availability and cost of money supply in the economy in a view to attain certain broad objectives.

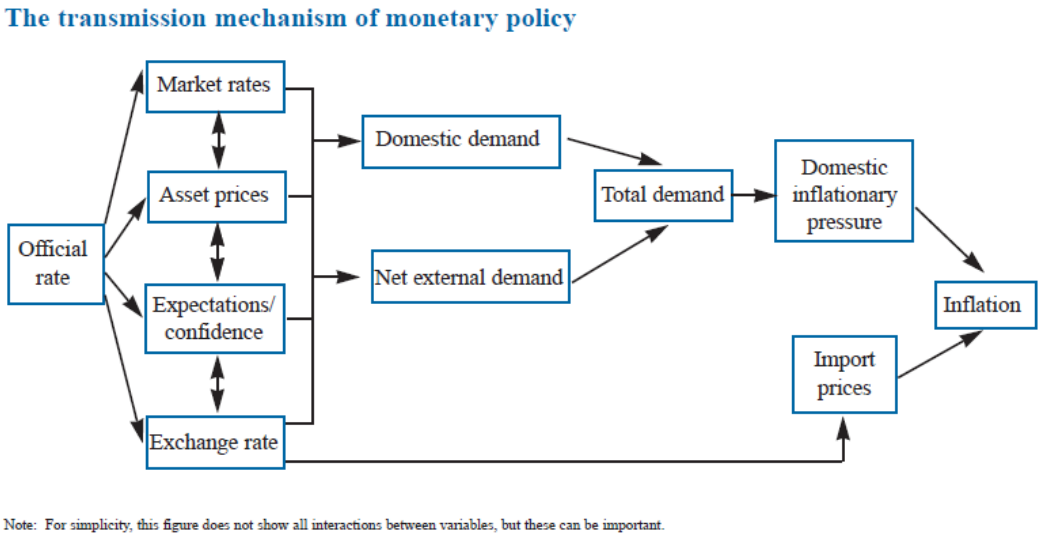
In order to fully understand the proper functioning of monetary policy, it is important to x-ray the instruments a central bank is able to use and how these instruments would have effects on the price determination.

Horngren (2005) points out that the ways in which central banks measures impinge the economy and price levels is known as Monetary Transmission Mechanism (MTM). He further explains that the general premise is that transmission mechanism is carried out through two channels; one is interest rate targeting, the practice in many industrialized countries and that the other channel is through aggregate demand and that if growth of demand exceeded expansion of production capacity inflationary pressures will grow.

Ireland (2006) agreed with the views of Horngren and but pointed out more monetary transmission channels like asset price channel (in this case, stock price falls after a monetary tightening, household financial wealth declines leading to a fall in output, consumption and employment). He also identified the credit channel which is further divided into two; the bank lending channel and the balance sheet channel.

Rummel (2012), identified with the aforementioned channels. He also drew attention to the exchange rate channel which is totally dependent on the manipulation of the interest rate and the effect all such manipulations have on the net exports, import prices and the net wealth.

Figure 3.1: The Transmission Mechanism of Monetary Policy



Source: The Monetary Policy Committee: Bank of England

3.2.1 Economic growth

Economic growth is very important. Overall, the main objective of any economy is to attain economic development. Generally speaking, it is a major macroeconomic objective which every government and monetary policy institution strive to achieve usually by setting well thought out plans and steps towards achieving such plans. There is however no full proof or generally accepted indicator for measuring economic growth. The general consensus is the use of growth in GDP or Gross National Income (GNI) but more recently, there are also other indicators which has been adopted to measure economic growth such as the stock of capital, level of employment or employment rate, investment levels, aggregate savings, consumption volume, level of government spending and as such just increase in GDP/GNI proves insufficient.

Shearer (1961) opined that the term "economic growth" generally carries a meaning of increase in terms of numbers but mentioned that there still exist widespread disparities amongst scholars as to the magnitude which is in fact the relevant measure of economic growth. Moving forward, he stressed out that the main unifying element in this "quantitative" definition is that what should ideally be measured is the contribution of economic activity to the achievement of higher state of human welfare.

Haller (2012) defined "economic growth" in a specific way increment in national income per capita and it involves the analysis, particularly in quantitative terms, of this process with a

focus on the functional between the endogenous variables. He also extended the definition to an increase of GDP, GNP and NI. In summary, economic growth is the process of increasing the sizes of national economies, the macro-economic indications with positive effects on the socio-economic sector.

3.2.2 Objectives of Monetary Policy

Cecchetti (2000) identified the following as the objectives of monetary policy

- Price Stability
- Output Stability
- Interest rate Stability

He however argued against the inclusion of exchange rate targeting which he viewed as analogous to monetary-aggregate target; a means to an end and not an end in itself. McCauley (2006) however identified exchange rate targeting as a policy objective in Malaysia. This is often the case in many other developing countries which tries vigorously to better their balance of payment position.

3.2.2.1 Price Stability

This is considered in many quarters as the most important policy objective of monetary policy. It is the popular and current approach applied by Central Banks around the world. Central banks generally view the cost of inflation as very high and try to normalize inflation at a level that is low enough that it becomes insignificant to household and firms.

Gerdesmeier (2015) pointed out that in achieving this policy strategy, there are five elements involved.

- The public announcement of numerical targets for inflation usually set up periodically, annually or quarterly depending on the country.
- Institutional committal to price stability and other goals under the price stability umbrella by government and/or monetary authorities
- An information-inclusive strategy in which other variables, not only monetary aggregates or exchange rates but even fiscal policies are used for deciding the selling of policy instruments
- Transparent money policy that shows the role of informing the public of markets plans, objectives and rationale for decisions of the central banks. This way, one and all is aware

of what the authorities are trying to achieve and put in their own effort towards achieving this

- Finally, mechanism that makes the central banks accountable for attaining its inflation objectives. A score card of some sort, where the performance in comparison to the goals is measured.

3.2.2.2 Output Stability

This is consequential of the price stability objective. Cecchetti (2000) however stressed that the inclusion of output stabilization in central bank monetary objective is very pertinent but that the problem arises as to how much importance should be attached to it relative to price stability. Mishkin (2002) however examined the role of output stabilization in the economy and concluded that monetary policy makers trying to focus on strictly on output stability in formulating policies is likely to produce worsened outcome for output and inflation because it makes monetary authorities' communication's strategy more difficult and can enfeeble the credibility of the Central Bank.

3.2.2.3 Interest Rate Stability

The Central bank takes it as a very important objective to smoothen and regulate interest rate. This is built on the knowledge that smooth interest rate is very important to the proper functioning of the financial system and there is no economy which can basically function proper well with a weak or terrible financial system. Another argument for the need for a smooth interest rate is that it strengthens and emboldens the credibility of the Central Bank. Large movements and fluctuations in interest weaken the belief in the financial system especially if there is no proper explanation for such fluctuations.

3.2.2.4 Exchange Rate Stability

Exchange rate stability is mainly indigenous to developing countries. McCauley (2006) pointed out that this objective can however come in conflict with inflation stability as exchange rate directly transfers inflationary or deflationary foreign prices. Filardo et. al (2011) however pointed out two broad motive for exchange rate stability: concerns for short term impact on macroeconomic and financial stability and concerns on middle to long term impact on resource allocation.

3.3 Theoretical Review of literatures

Just as many other economic concepts alike, various schools of thought have contributed to the theory of monetary policy. The relationship of monetary policy and its effectiveness in

affecting the developmental stride in countries have been discussed since the classical economic theory and it has undergone various diversified and complex evolution since the ages. This section is devoted to various economic theories while focusing on monetary theory with an eye on its effectiveness and policy implication without a lengthy explanation in details of the theories themselves.

3.3.1 Quantity Theory of Money (QTM)

This is possibly the oldest surviving economic theories. This theory in its simplest form states that variations in the general level of commodity prices are determined primarily by variations in the quantity of money in circulation. This dates back to the mid-16th century but has undergone several refinement, amendment but came to prominence in the next 2 centuries owing this prominence to work by John Locke, David Hume, Richard Cantillion and this theory was integrated into orthodox monetary tradition; it also formed the underpin of the classical monetary theory

In brief, the QTM postulate that the stock of money (M) is the main determinant of the price level (P). QTM contend that aggregate price (P) and total money supply are related in this equation

$$P = \frac{VM}{Y}$$

Where V = velocity of money

Y= Real Output

Expressed in percentage change (growth rates), the QTM becomes

$$p = v + m - y$$

Where p is rate of inflation;

y, v & m represent growth ratio of output, velocity and money stock respectively.

This suggests that a given change in the rate of money growth will result in an equal growth in growth in the inflation rate. This led to the famous claim of Milton Friedman that "inflation is always and everywhere a monetary phenomenon". The essential assumption behind this claim is that the velocity of money (V) or its growth rate is constant and that the rate of money growth has no effect on real GDP-or at least not significantly in the long run.

However, further analysis showed that the long run interactions between inflation and money growth are not always affected by monetary issues.

Fisher's equation of exchange:

$$MV = PT$$

Where M is the money supply,

V represents the velocity of circulation,

P represent the price level and

T represents physical volume of market transaction.

Cambridge cash balance equation:

$$M = kPy$$

M is the stock of money in circulation;

K represents the desired cash balance ratio in other words the ratio of nominal money supply to nominal income.

P represents the price level of national income and y is the real national income.

Humphrey (1974) explained that the policy implication of monetary policy is clear. Monetary policy could exert a powerful and anticipated influence on the price level. With velocity, V and transactions T assumed as constant, Fisher's equation in a nutshell states that a policy-with a percentage change in money stock would results in the exact same percentage change in the price level.

3.3.2 Modern Monetarist Method

The modern monetarist approach is the reinvigoration and renewal of the tenets of the quantity theory in contemporary times. Humphrey (1974) however posits that despite the many sophisticated and complexity in attempts to adjust the theory, there has been no significant change in its paradigm since the early 19th century. So while the chief conclusions of the classical theory are the ineffectiveness of money in the long-run equilibrium, brief non-neutrality of money in developing period, casual or non-effective role of money in

transmission mechanism, the monetary theory of price movements, Long run equality between money and price and exogenous nature of the money supply.

Proponents of this school still contend that the long-term expansion path of output is caused by real factors for example resource allocation, technology and the productiveness of factors of production (labor and capital). It is also argued that the changes in the money stock can have no long-run on the real determinants of output. Monetarists however agreed with the classical belief that the real rate of interest is explained by factors that are not monetary i.e. productivity and thrift. Monetarist also follow the classical position of short-run non-effectiveness of money which means that a swift movement in the supply of money or its growth rate will have an infinitesimal effect on output, employment and the product mix. Monetarists posit that price cannot adapt instantaneously to sudden monetary change because it takes a while for people to understand and adapt to any of such sudden monetary change.

The principal role of money is also propounded by the monetarists in their theoretical underpinning of the monetary adjustment process. Here, the monetarists view is that the driving force is a surplus of money supply; if domestic consumers have more money than they require, they spend the surplus for assets, consumption and investment goods. Thus increasing spending which translate to higher prices.

On monetary transmission, the monetarist emphasized more, the role of interest rate than did the classicalists. There is also an agreement on the exogenous nature of money supply between modern and classical monetarist.

3.3.3 Neo-Classical Growth Theory

The neo-classical growth theory places emphasis on capital accumulation and the decision to save as a very important determinant for economic growth. In the neo-classical growth theory parlance, the Solow growth model is usually the focal point of reference. In the Solow model, long run growth of output per capital depends only on technological progress. However, short run growth can come about due to technological progress or capital accumulation. Solow (1956) adopts a direct expression on the constituents of the economic growth based on the equation below:

$$\frac{\dot{Y}(t)}{Y(t)} - \frac{\dot{L}(t)}{L(t)} = \alpha_t(t)\left[\frac{\dot{K}(t)}{K(t)} - \frac{\dot{L}(t)}{L(t)}\right] + R(t)$$

Where Y represents Output, L represent labor, K represent capital and the term R(t) is called the "Solow residuals". All exponents in the equation above represent growth rates of the variable. The above equation indicates the transmission mechanism in which the variables can impact economic growth of a country. It is clear from the above that growth under the Solow model is a function of growth of capital, labor and the Solow residuals. The Solow residuals are also referred to as Total Factor Productivity (TFP) which is regarded as the index of technological progress.

Although the equation shows how the variables affect economic growth, it did not essentially point out the way monetary policy affect economic growth. Mundell (1963) however put forward a comprehensible mechanism linking inflation and output growth differently from too much demand of commodities. Mundell's model shows that a rise in inflation or inflation mechanism will cause people's wealth to dwindle. This is owes to the fact that the return rate on individual's real money balance falls. And as such, in order to accumulate the desired wealth, people will save more by switching their assets, increasing their price and thus driving interest rate down. Conclusively, in Mundell's view, more savings equals greater capital accumulation and thus faster output growth.

Tobin (1965) improvement on the Mundell's model is that individuals would switch present consumption for consumption in the future by either holding money or acquiring capital. The Tobin effect in other words, maintains that inflation causes individuals to substitute money for interest earning assets, which leads to increased capital accumulation and fosters economic growth.

3.3.4 Endogenous Growth Model

Also known as new growth theory, the endogenous growth model extend the classical theory by making rate of technological progress or the rate of population growth as both endogenous. In the monetary framework of the endogenous growth model as developed by Lucas (1988) and Greiner (2013), the rate of inflation lowers both the return on capital and economic growth. Nevertheless, some representations of the endogenous growth model revealed that inflation rate effects are insignificant.

3.4 Empirical Reviews of Literature

There is a rich stock of empirical literatures that shows the works of various scholars who at various times have carried out studies on the relationship between economic growth and monetary policy ranging from studies in developed countries to that in developing countries.

It is however evident from all these studies that there is no unique result. The effect of monetary policy varies based on the economic activities and stability of the country in focus. As an example; Hussain, Wijeweera and Hoang in their research explored the connection between macroeconomic variables; money supply, fiscal, real exchange rate, interest rate and output in view of small open Association of South Eastern Asian Nations countries using the Johansen's multivariate con-integration analysis. They also employed the Vector Error Correction Model, Granger Causality and exogenity test in checking out the Long and short run relationship, the causality etc. between these macroeconomic variables. The result of their research implied that there were stable long term interactions amongst all the variables in all the chosen ASEAN countries. Also, a one-way causality between money supply and aggregate demand (or real output) for Malaysia. There was no however nonexistence of a short run causality between aggregate demand and government spending in any country.

Chaudhry, et al. (2012) surveyed the existence of long run interconnection and correlation between monetary policy, economic growth and inflation in their research by employing the co-integration and causality analysis using the country of Pakistan as their sample case. The result in their research showed that credit to private sector (the variable for financial depth), real exchange rate and budget deficit are significant variables that influence the real GDP of Pakistan. The Pair-wise Causality result suggested that real GDP and exchange rate are causing each other bi-directionally.

Nibeza and Tumusherure (2015) in their own research, using annual series data for the period of 1980-2006 and Vector Error Correction Models analyzed how money supply (M2), Exchange rate affect the Gross Domestic Product in Rwanda. The test revealed a significant effect of monetary policy (money supply and exchange rate) on GDP. The conclusion of their findings indicated that monetary policy had a predominant influence in maintaining price stability and controlling inflation in the economy of Rwanda.

Kamaan (2014) quantitatively measured the impact monetary policy have on the economic growth in Kenya and the findings indicated that a standard deviation monetary policy shock of the Central Bank of Kenya has a positive and significant relationship with growth. The findings indicated that monetary policy will influence and ensure economic growth.

Sulaiman and Migro (2014) in their study evaluated the nexus between economic growth and monetary policy. The policy instruments they selected were Cash Reserve Ratio, exchange rate, money supply and interest rate with the time lag being 1981-2012 using co-integration

test in Nigeria. The result indicated that monetary policy has a noticeable influence on the growth of the economy. The test for causality indicated that the monetary transmission mechanism has positively affected the production level of the economy.

Kasidi and Nwakanemela (2013) used time series data for 1900-2011, Co-integration co-efficient and co-integration technique to measure the relationship between inflation and GDP in Tanzania. The coefficient of elasticity was used to measure the responsiveness of changes in GDP to changes in general price level. The result of their analysis was that inflation has a negative impact on economic growth. It also found that there was no long run relationship between inflation and economic growth in Tanzania.

Gul, Mughai and Rahim (2012) in their research applied the Least Squares (OLS) estimation model and reviewed how the decisions of monetary authorities influence macroeconomic variable. Making GDP as the dependent variable, the result of the result was that tighten monetary policy in in relation to the adjustments of money supply, exchange rate policy and increase in price level (inflation) which serves as the independent variables shows a positive relationship with dependent variable. In other words, there was a positive relationship between monetary policy and economic growth.

In examining the impact of monetary policy on economic growth in Pakistan Ullah (2013) persecuted his research using time series data from 1991-2001 of the country. Exploring each endogenous variable using Error Correction Model (ECM), findings indicted that there existed a long run relationship between monetary policy and economic growth. The study also came to the conclusion that the monetary policy instruments selected for the study (inflation rate, exchange rate and external reserve) were significant instruments that controlled the economy.

Hameed and Ume-Amen (2011) in their research focused on the impact of monetary policy n GDP using regression analysis and time series data of 30 years in Pakistan. The findings of their study were that interest rate exhibited a minor relationship with GDP but that money supply greatly affected GDP.

Alavinasab (2016), empirically measured the impact of monetary policy on economic growth in Iran over the period of 1971-2011 using regression analysis. The finding of the study was that there is a long run significant influence on economic growth by money supply, exchange

rate and inflation. Using Estimated Error correlation Model, it reveal that money supply and exchange rate significantly impact economic growth in Iran.

Soufran (2013) examined the casual relationship between GDP and money supply in Jordan using the Granger Causality method in order to determine the direction of the relationship between both variables. The result is that there is casual relationship between money supply to GDP and not vice versa.

Chipote and Makhetha-kosi (2014) explored the role played by monetary policy in promoting economic growth in South African economy. They first of all employed the Augmented Dickey-Fuller and Phillip Peron Unit test to check for the stationarity of the series. Thereafter, the Johansen co-integration and the Error Correction Mechanism were employed to test for the short and long run relationship between the variables. The empirical conclusion of this study indicated that the monetary instruments selected (exchange rate, money supply repo rate otherwise known as interest rate) are insignificant monetary policy instruments that control the economic growth in South Africa.

Amarasekara,(2009) utilizing the Vector Autoregressive (VAR) framework and both recursive and structural specification analyzed the effect of interest rate, money supply, and movement in nominal exchange rate on real GDP and inflation in Sri-Lanka from 1978-2005. The result of the findings when interest rate is considered the monetary policy variable were fully in accordance with empirical findings but when money supply was the monetary policy instruments, result contradicted empirical findings. Interest rate innovations were found to be persistent while money growth and exchange rate were not. It supported the researcher's opinion that monetary authorities adjusted interest rate gradually and consistently.

Ogunmuyiwa and Ekone (2010) empirically evalauted the impact of money supply can exert on the economic growth using GDP and GDP growth rate as the indicator of economic growth and annual series data between 1980 and 2006. They used the Ordinary Least Squares, Causality Test and ECM test. The findings of their research was that money supply exert positive effect to GDP growth but it was however insignificant to GDP growth rate in Nigeria economy; Nouri and Samimi (2011), also carried out a similar study using the same Ordinary Least Squares (OLS) and annual data from 1974 to 2008 in Iran and employing the Levine and Renelt growth model. The conclusion revealed that the existence of a positively significant relationship between money supply and economic growth in the Iranian economy.

There have also been studies that have measured the impact of monetary policy and economic growth in Malaysia.

Munir, Mansur and Furuoka (2009) empirically investigated the presence of threshold effect in the nexus between inflation and GDP growth rate in the context of Malaysia with new endogenous threshold autoregressive (TAR) models with annual time series data from 1970-2005. The conclusive finding of the study revealed that there is a statistically significant positive relationship amongst inflation and growth of the economy.

Kogid, Asid, Lily and Mulak (2014) investigated the effect of exchange rates on economic performance in terms of growth using time series from 1971-2009. The conclusion or findings of the ARDL bound test is that a long run con-integration exists between nominal and real exchange rates and economic growth. Also, a significant positive coefficient was recorded for real exchange rate. In addition, results of ECM-based ARDL reveal that both exchange rates have a causal effect towards economic growth.

Ibrahim (2005) measured the effects of monetary policy using VAR models in accordance with many already existing studies in Malaysia. The results proven supportive and lent credence to the real effects of monetary policy shocks and found in response to positive interest shocks, manufacturing, construction, finance, insurance, real estates and business service sectors seem to decline more than aggregate production. The results seem to confirm potential disparities and dissimilarities in the effect of monetary policy on the real sectoral activities.

Poon (2010) examined various transmission mechanisms in economic growth in Malaysia over the quarterly period 1980Q1-20o4Q4 using bound testing approach. The study showed evidence of co-integration between real Gross Domestic Product and the real rate ofexchange and share prices is the key transmission mechanism in the conduct of monetary policy in Malaysia.

Kin et. al (2014) studied the relationship between monetary policy and GDP in Malaysia using quarterly data from 1991Q1-2001Q1. Their study utilized various estimation techniques such as the Unit root stationarity test, Johansen Cointegration estimation analysis and vector error correction method (VECM) were applied in the study. Result was suggestive that there is existence of a long run steady and balanced relationship between GDP, M1 narrow definition of money, M2 , M3 and real interest rate; M1, M2, M3 are statistically

significant to GDP and therefore, there was a positive relationship between money supply and GDP in Malaysia

Cheng (2013) investigated the relationship between major macroeconomic variables and economic performances as measured by the mean value of GDP in Malaysia from 1975-2002; specifically, fluctuations in money supply, budget deficit and domestic capital formation. The analysis used time series approach of multivariate co-integration, Vector Autoregressive model (VAR). Empirically, results showed that fluctuations in policy instruments namely money supply amd government deficit significantly affect GDP.

Zulkhibri and Majid (2007) examined the causality relationship between monetary aggregates, output and prices in Malaysia. This study is based upon VAR model applying the Granger non-causality procedure. The result of the findings suggests that all monetary aggregates have a strong one-way causality running from prices to no evidence for the opposite causality.

Datta and Mukhopadhyay (2011) using annual data and methodologies as ADF, PP Unit Root Test, Vector Error Correction, Vector Autoregressive (VAR), Impulse response function and variable decomposition, the study findings are that there exists short run causality between variables and directions of causality is from inflation to economic growth.

3.5 Summary of Literature Review

This chapter has reviewed both the theoretical and empirical literature on the nature of the relationship between monetary policy and economic growth. Literature suggests that models developed to support the theories do not have an explicit conclusion on the exact relationship between monetary policy and economic growth especially empirically speaking. This is not only true for monetary policy theories; it is also relative to growth theories.

The Quantity Theory of Money (QTM) suggests that the rate of money growth (money supply) has no effect on real GDP or at least in the long run. The neo-classical contribution however suggests that monetary policy could exert powerful influence on price level and as such affect economic growth, Keynes contribution to the relationship between monetary policy and economic growth is that monetary policy is ineffective in regulating economic activities while modern monetarist approach support the position of the classical QTM theory with few adjustments.

Empirical studies have still given inconclusive findings as to the nature of the effect of monetary policy on economic growth. Some studies indicate a significant relationship between monetary policy and economic growth in the long and short run, others found only a relationship in the short run and not in the long run while some found no relationship between monetary policy and economic growth at all.

In the case of Malaysia, literatures reviewed shows that there has not been any study on this topic in this explicit way; while Kin et al (2011) researched the relationship between money supply and interest rate on economic growth and found a positive relationship between money supply and economic growth, Poon (2010) research only measured the influence of exchange rate and share prices, Ibrahim (2005) did a sectoral analysis of the effect on monetary policy on economic growth while Munir (2007) measured the inflation-economic growth effect and found it to be positive.

CHAPTER FOUR

METHODOLOGY AND ANALYTICAL FRAMEWORK

4.1 Introduction

Time series analysis involving unit root test, serial correlation test and other tests will be employed in this study. The unstructured Ordinary Least Squares, Unit Root Stationarity test will be utilized in the study using the Eviews software. The method of Ordinary Least Squares is attributed to Carl Friedrich Gauss (Bliss and Gul, 2012). This method was chosen because it is a powerful tool in econometric and regression analysis and widely applied in economic analysis. It is a probably the most popular technique in economic and econometric analysis and Abdi (2007), attributed this to the following reasons. Firstly, most common estimators can be casted within this framework. Second, using least squares makes Least Square Method mathematically very tractable, easily interpreted and comprehendible. Third, the mathematical tools and algorithms involved in LSM have been well studied for a relatively long time. The Least squares analysis also has its own drawbacks. Abdi (2007) points out that the main limitation is its high sensibility to outliers (extreme observations).

From empirical analysis in this kind of relationship, Vector Autoregressive (VAR) model seem to be the most popularly used for analysis of monetary policy but as Bliss and Gul (2012) points out, although this methodology has the advantage of avoiding the need for a complete model specification for the whole economy, when the effects of monetary policy actions are to be evaluated, fundamental identification process must be solved. Policy actions which are endogenous response to current developments in the economy must be distinguished from exogenous policy action.

4.2 Data Source and Variables Description

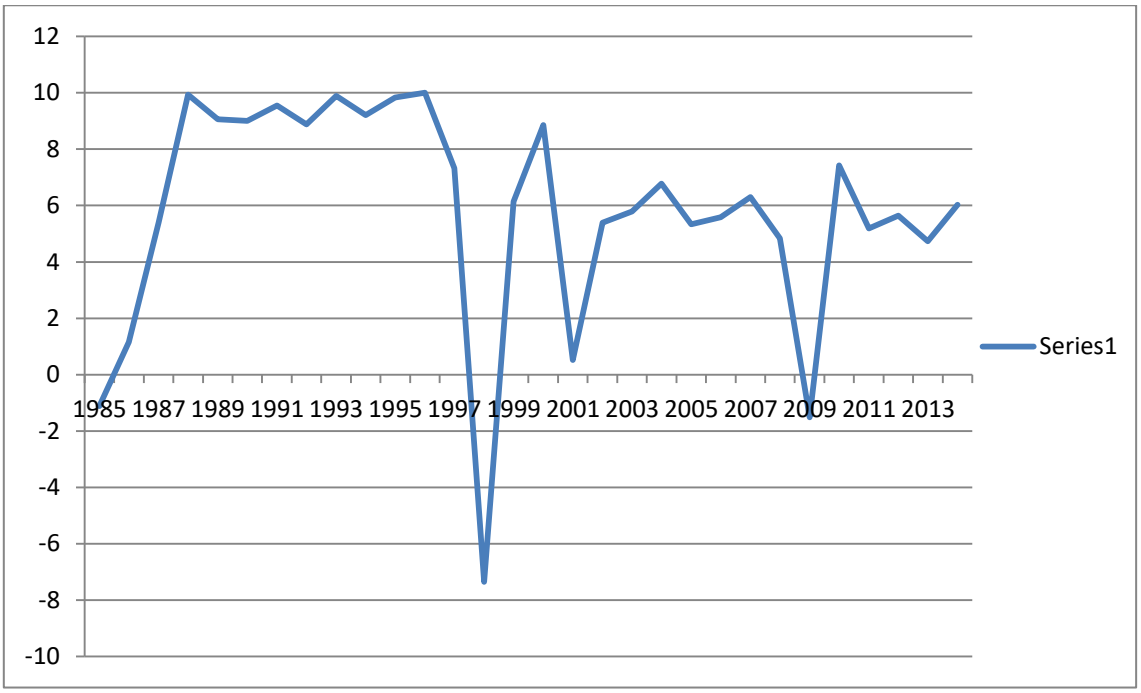
The study will be based on secondary data; which is that from publications, official bulletins, journals and websites. The importance of a very reliable source of data is very importance as any slight error in data can adversely affect the result of the analysis which can lead to errors in interpretations. The methodology and variables in this study has been selected based on their relevance to the study on theoretical and empirical bases. The data covers the period of 1985 to 2014. The variables data are taken from the official World Bank data bank which is also based on data from the Malaysian department of Statistics and Bank Negara Malaysia

(which is the Central Bank of Malaysia). This period was adopted based on the availability of data.

4.2.1 Economic Growth

While there is still no yet generally accepted indicator for measuring economic growth as has been explained earlier, the general consensus is that increase in GDP over a period of time is amongst other indicator, a very good way of measuring the economic growth in a country and thus an upward trend in GDP is usually viewed as growth in the economy. However, with the availability of an indicator for GDP growth rate readily available, it is safe to employ the GDP growth rate as the variable for economic growth.

Figure 4.1: Trend of GDP growth rate



Source: Computed by Researcher using Data from World Bank

Figure 4.1 shows the time trend for economic growth rate over the selected period of 1985 to 2014. The GDP of Malaysia has always had a positive growth rate except for 1998 when it decreased to a negative. This is due to the Malaysia financial crisis that occurred that year. Also in 2009, the global financial crisis also affected the Malaysia economy and this reflected in the negative GDP growth rate.

4.2.2 Monetary Policy Instruments

These are the variables which serve as the monetary policy instruments in which their outcome is used to cross examine the performance of the economy in terms of their impact on growth.

4.2.2.1 Inflation

Inflation is the measure of the relative aggregate growth in price level not just for one commodity but the economy in general and this rise or growth in price level. Inflation is formally defined as the rise (increase) in the general price level over a period of time usually a year (Barro, 1997) although figures of monthly and quarterly inflation are now readily available. To clarify, inflation is not a onetime rise, but a continuous rise over time. In this study, the annual inflation GDP deflator of Malaysia is used in representing the inflation parameter. The World Bank states that is inflation measured by the Consumer Price Index (CPI) or the Wholesale Price Index (WPI). It can also be measured using the not too popular method of GDP implicit deflator which is explained as the annual growth rate of the GDP implicit deflator and this entails the rate of price change in the economy as a whole. The GDP implicit deflator is the ratio (fraction) of GDP in current local currency to GDP in constant local currency.

The relationship between inflation and economic growth on its own has attracted lots of interest in both theoretical and empirical studies. It is ever worthy of note that there is still no straight forward explanation as to the nature of the relationship between inflation and economic growth. While the general consensus is that a very high inflation will hinder economic growth, some scholars have argued with evidence that the effects of inflation on economic growth can be neutral and even positive depending on various factors in the economy e.g. how low the inflation rate is.

4.2.2.2 Interest Rate

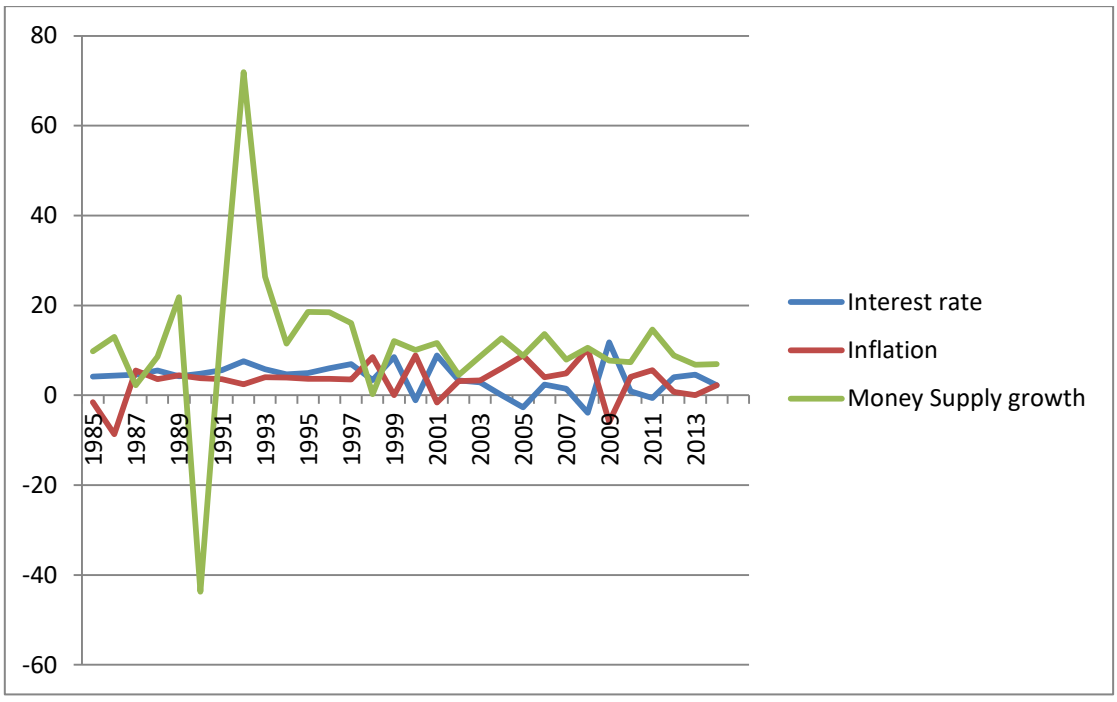
Fisher (1930) stated that the bridge or link between income and capital is the rate of interest. The adjustment of the interest rate is a major monetary policy instrument consistent with most central bank and the BNM is no exception. The real interest rate of Malaysia is used in this study. The World Bank defines real interest rate as lending interest rate adjusted for inflation as measured by the GDP deflator. The expectation according to theory is that a high interest rate will shift money from consumption to savings because demand for credit is high and low interest rate shifts funds from savings to investment and consumption.

4.2.2.3 Money Supply

Money supply simply defined is the total amount of money is existence or in circulation in any given economy. There are various definitions to the composition of money supply. M1 which is the narrower definition of money is the sum of currency outside banks and demand deposit other than that of the central government. M2 on the other hand comprises of demand deposits other than those of the central government, and the time, savings, and foreign currency deposits of resident sectors other than the central government. There is also the Broad definition which comprises M1, M2 and all foreign reserve. In this study however, the growth of money supply is chosen by the researcher as the monetary policy instrument. This is because it is the responsibility of the BNM to determine the amount of money in circulation and their regulation of money supply is obvious through its growth.

The general agreement in the economic parlance is that increase in money supply leads to a rise in economic growth.

Figure 4.2: Trend of Monetary Policy Instruments



Source: Computed by Researcher using data from World Bank

Figure 4.2 shows the time trend for inflation, interest rate and the money supply growth which are the monetary policy instruments examined in this study. It can be observed that

during the period of 1990 to 1998, the money supply growth was erratic, however since the Malaysia financial crisis; there is consistency in almost all the monetary policy instruments.

4.3 Unit Root Test

Unit root analysis is the univariate time series analysis employed in order to check if the variables of a time series are stationary or not. A series can be said to be stationary if it has time-invariant first and second moments. That is to say, a series of data is stationary if the variance and mean are not time dependent and the covariance does not depend on time. The presence of a unit root in the entire time series variable is very important. It can determine the econometric model used and have serious implication on the economic interpretations of the model in which the variable(s) appears.

It is indispensable that we apply the unit root tests before estimation to see whether the variables are stationary or not. There are various methods for testing for the stationarity of data. The Augmented Dickey Fuller Test will be used in this study.

4.3.1 Augmented Dickey Fuller Unit Root Test

The Augmented Dickey Fuller unit root test proposed by Sjo (2008) is specified in the equation below:

$$\Delta x_t = \alpha + \pi x_{t-1} + \varepsilon_t$$

Sjo (2008) points out that the null hypothesis ˆπ will be negatively biased in a limited sample, thus only a one sided test is necessary for determining. H0: π =0(xt ∼ I(1)) against Ha : π < 0. (xt ∼ I(0)). This model is less restricted, because it allows a deterministic trend as xt = αt+ πxt−1 + εt.

4.4 Model Specification

The objective of this study is to examine the effect of monetary policy and economic growth taking into consideration the method of OLS. The advantages and limitations of this model have been highlighted at the introduction of this chapter.

Following the analysis of Bliss and Gul (2012), the model is specified thus

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \mu_t$$

Where Y=GDP growth rate

X_1= Inflation

X_2= Interest rate

X_3= Money supply growth

μ_t= error term or control variable

In essence;

$$GDP = \beta_0 + \beta_1 inf + \beta_2 int + \beta_3 ms + \mu_t$$

CHAPTER FIVE

EMPIRICAL ANALYSIS

5.1 Unit Root Test

This section presents the results for the unit root test. There are various types of Unit Root Test but the one chosen for the purpose of this analysis is The Augmented-Dickey Fuller test statistics. Tables 5.1 presents the results of the ADF unit root tests for all the variables used in the model; and they reveal that all variables are stationary at level. As a result of this, there is no reason for conversion or transformation of the data.

Table 5.1: Unit Root Tests based on Augmented Dickey Fuller

Variable	ADF-stat	Critical Value	Prob*	Level of Integration
GDP Growth	-4.437979	-3.67* -2.967767** -2.622989***	0.0015	I(0)
Inflation	-6.085581	-3.679322* -2.967767** -2.622989***	0.0000	I(0)
Interest rate	-5.814342	-3.679322* -2.967767** -2.622989***	0.0000	I(0)
Money Supply	-4.927073	-3.679322* -2.967767** -2.622989***	0.0004	I(0)

Source: Computed by Researcher using data from World Bank and Eviews 8.0

Table 5.2: Unit Root Test Based on Phillips-Perron Test

Variables	PP Test Stat	Critical Value	Prob	Level of Integration
GDP Growth	-4.410979	-3.679322* -2.967767** -2.622989***	0.0016	I(0)
Inflation	-6.085581	-3.679322* -2.967767** -2.622989***	0.0000	I(0)
Interest Rate	-5.866708	-3.679322* -2.967767** -2.622989***	0.0000	I(0)
Money Supply	-4.958604	-3.679322* -2.967767** -2.622989***	0.0004	I(0)

Source: Computed by Researcher using data from World Bank and Eviews 8.0

*denotes 1% critical level

**denotes 5% critical level

***denotes 10% critical level

The Augmented Dickey Fuller test result supported by the Phillips-Perron test results presented in the table above shows all variables are stationary at level.

As already pointed out in the earlier chapter, analysis can only be done with the variables if and only if they all possess unit root. It is also important to the researcher the level at which all variables possess unit root as it is important in choosing the appropriate test used. Since all variables possess the unit root test, they are all stationary at level. The OLS selected for this analysis is applicable and therefore they will be no need for the Cointegration Test.

5.2 Econometric Analysis

Before considering the model, the result of the effect of each independent variable to the dependent variable is summarized in the table below.

Table 5.3: Effects of the independent variables (Inflation, Interest Rate and Money supply on dependent variable GDP growth in Malaysia results

Method: Least Squares

Sample (adjusted): 1985 2014

Included observations: 30
Dependent Variable: GDP_GROWTH

Period	**R squared**	**Constant**	**T**	**t-1**
Independent Variable : Inflation				
t	0.0898549	4.847130 (5.316411)	0.298579 (1.658572)	-
Independent Variable : Interest Rate				
t	0.008039	6.200059 (5.477854)	-0.106052 (-0.47639)	-
Independent Variable : Money supply Growth				
t	0.0035705	5.254964 (5.820405)	0.046884 (1.018210)	-

Source: Computed by Researcher using data from World Bank and Eviews 8.0

After considering their individual effects, analysis is now shifted to considering the model of this research as already specified. It can however be noted that inflation and money supply are both positive while interest rate had a negative singular contribution to GDP growth in Malaysia.

The result from the Ordinary Least Square estimates is presented the table below. However, before results are to be interpreted, the residuals will have to be analyzed and found stable,

normally distributed and that there is no presence of autocorrelation or heteroskedasticity. Therefore, residual analysis is performed in the next section.

Table 5.4: Econometric Results

Method: Least Squares

Sample: 1985 2014

Included observations: 30

Dependent Variable: GDP_GRROWTH

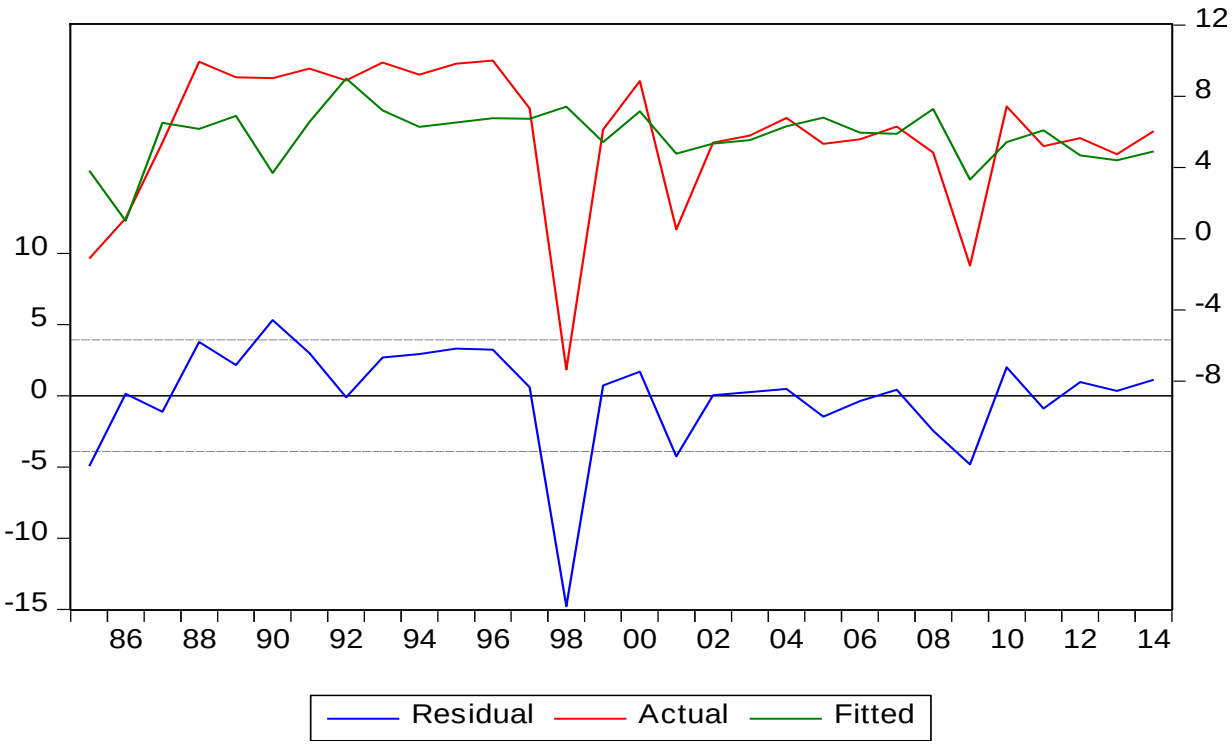
Variables	**Coefficients**	**t-Statistic**	**Prob**
Inflation	0.42	1.706241	0.0999
Interest rate	0.19	0.656487	0.5173
Money supply	0.046	1.011556	0.3211
Constant	3.19	1.680162	0.1049
R-squared	0.15		
F-stat	1.48		
Prob (F-stat)	0.24		

Source: Computed by Researcher using data from World Bank and Eviews 8.0

5.2.1 Residual Analysis

The table below shows the residual distribution graph.

Figure 5.1: Residual Analysis



Source: Extract from Eviews 8.0

From the graph above, it is observed that there was a huge skewness in the residual at 1998. This skewness if not corrected will render the analysis ineffective. There are various ways to correct this defect. These include

- Log transformation
- Introduction of dummy variable etc.

For the purpose of this research, a dummy variable will be introduced to capture the variation at 1998. In 1998, the domestic economy of Malaysia suffered from the financial crisis that caught the Asian zone which was caused by a speculative attack (Zakaria et al. 2010). The researcher believes this crisis is the reason for the huge residual variation in this period and as such the introduction of a dummy variable to cover this period should solve this problem. The result of the analysis after introducing dummy variable is presented in the table below:

Table 5.5: Econometric Results (2)

Method: Least Squares

Sample: 1985 2014

Included observations: 30

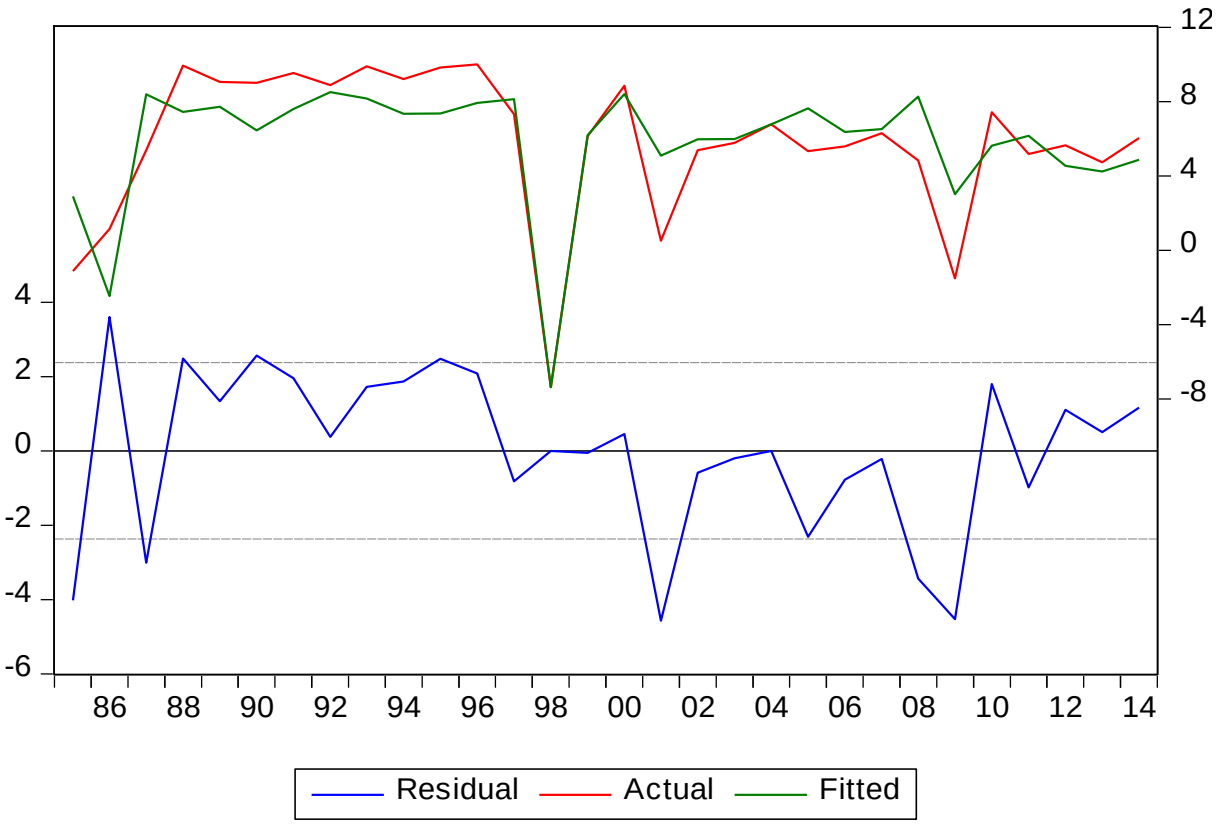
Dependent Variable: GDP_GRROWTH

Variable	Coefficients	t-Statistic	Prob.
Inflation	0.77	4.873815	0.0001
Interest rate	0.47	2.571347	0.0165
Ms growth	0.02	0.562701	0.5787
Dum	-17.43	-6.757718	0.0000
C	1.94	1.665844	0.1082
R-squared	0.70		
Adjusted R-squared	0.65		
F-stat	14.44		
Prob(F-stat)	0.000003		

Source: Computed by Researcher using data from World Bank and Eviews 8.0

As done earlier, the residual analysis will be carried out by first analysis the residual graph. The new residual graph is presented in the table below:

Figure 5.2: Residual Analysis (2)



Source: Extracted from Eviews 8.0

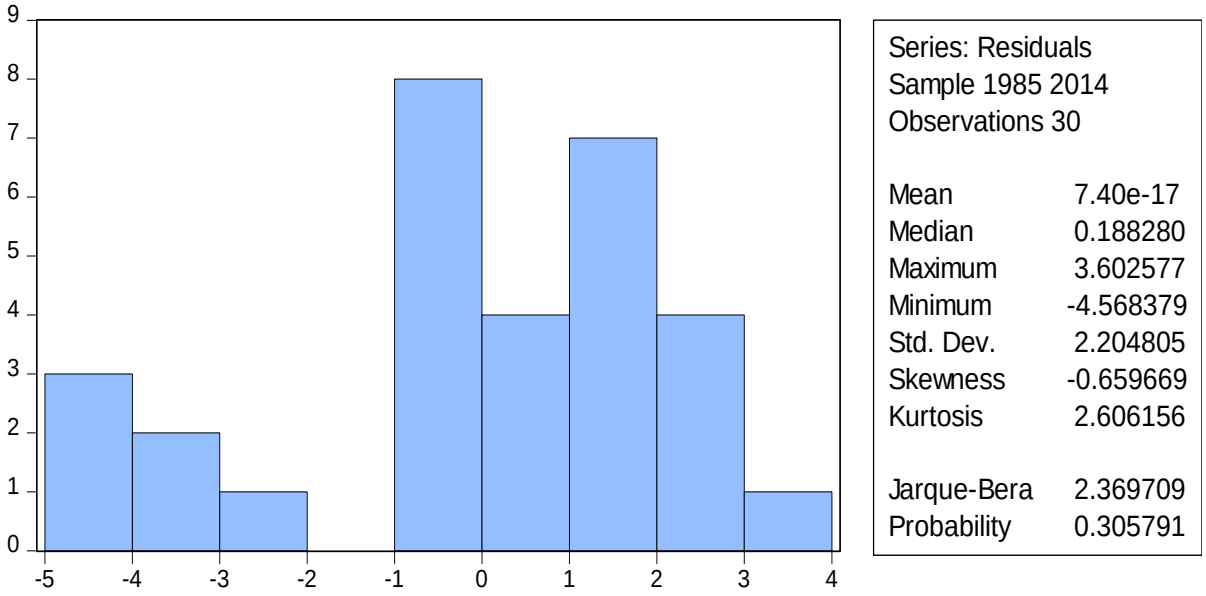
The residuals are better fitted now. Therefore, diagnosis test of the OLS model can be done.

5.2.2 Diagnosis Test of the OLS model

5.2.2.1 Normality Test

Here we test the null hypothesis that the residuals are normally distributed. It is very important that the residuals are normally distributed for the validity of the estimated statistics of our OLS model to be valid. Table 5.4 shows the Jacque-Bera test results.

Table 5.6: Normality Test Table



Source; Extracted from Eviews 8.0

In the model, the null hypothesis is not rejected. This is because the probability value for the Jacque Bera is greater than 5% which means we can accept the null hypothesis and the residual in the OLS model are normally distributed. It also shows that the model is not wrongly specified.

5.2.2.2 Breusch-Godfrey Serial Correlation LM Test

In testing for autocorrelation in the model, the Breusch-Godfrey Serial Correlation LM Test will be used. Autocorrelation in OLS residuals is tested for because the post estimation analysis to be done from the model assumes that residuals are not auto correlated. The result of the autocorrelation test is presented below:

Table 5.7: Breusch-Godfrey Serial Correlation LM Test Table

Test Stats	Coefficient
F-stat	1.30
Observed R-squared	5.96
Prob F(4,21)	0.3015
Prob Chi-square (4)	0.2021

Source: Computed by Researcher using data from World Bank and Eviews 8.0

The null hypothesis is that there is no autocorrelation in the model. The result of the test above shows that even at four (4) lags; the residuals are not auto correlated. This is because the chi-square probability value of the residuals at lag 4 is greater than 5%. Since the null hypothesis cannot be rejected; the model is not auto correlated. This gives further credence to the specification of the model.

5.2.2.3 Breusch-Pagan-Godfrey Heteroskedasticity Test

For our model to be valid as correctly specified, the residuals should be homoscedastic; that is there should be no heteroskedasticity in the residuals. There are various heteroskedasticity regression tests available in the Eviews software; the Breusch-Pagan-Godfrey test have however be chosen for this model. The researcher however checked the model using the various test and the results was similar. The table below shows the results of the heteroskedasticity test.

Table 5.8: Breusch-Pagan-Godfrey Heteroskedasticity Test

Test stat	Coefficient	Prob
F-stat	2.531916	0.0656
Observed R-squared	8.649307	0.0705
Scaled Explained SS	4.823659	0.3056

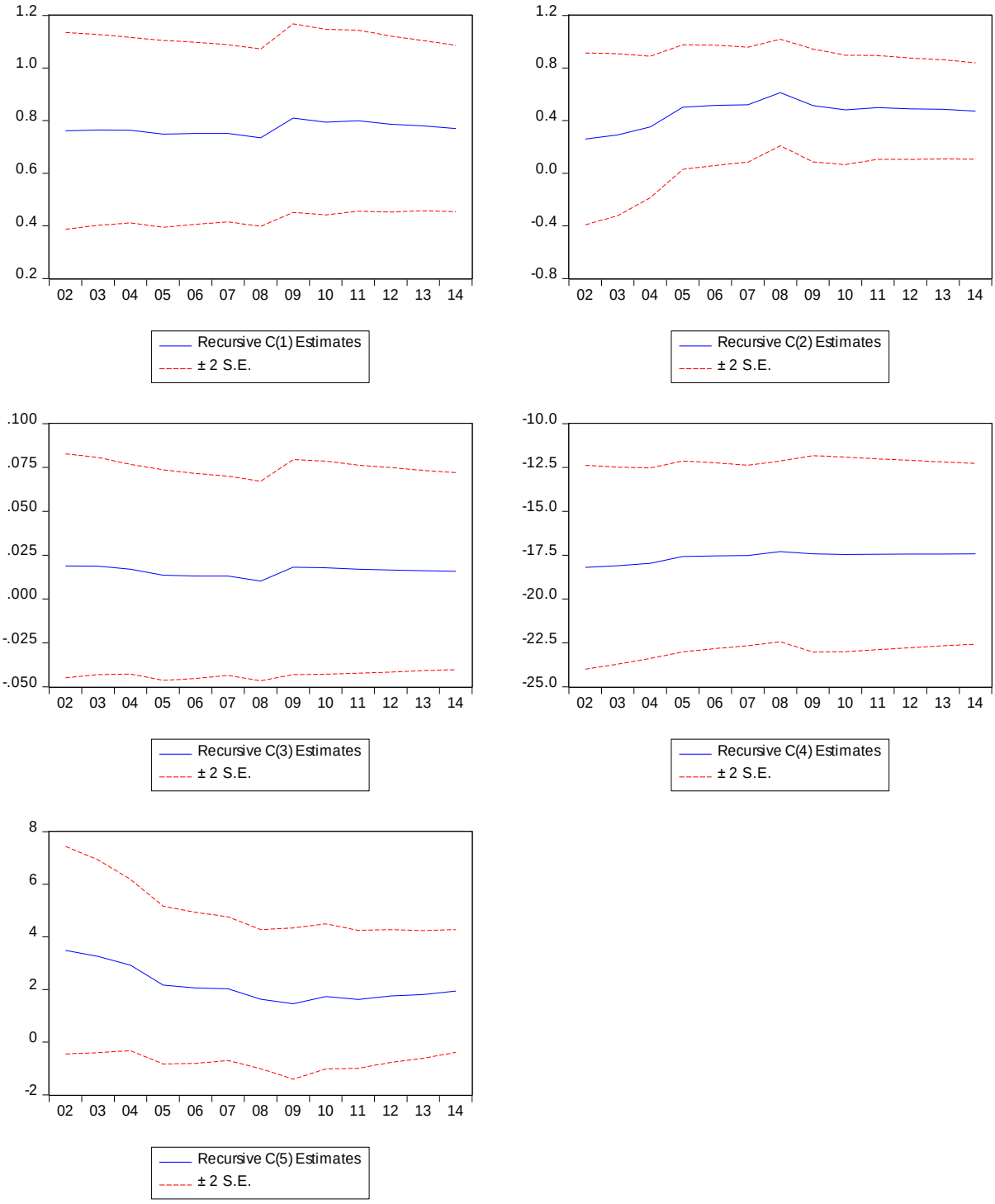
Source: Computed by Researcher using data from World Bank and Eviews 8.0

The null hypothesis is that the residuals in the model are homoscedastic. This is the desirable situation for the model. From the result in the table above, it can be observed that the chi-square probability value of the observed R-squared is 0.07 or 7%. This is greater than 5%; therefore, it can be inferred that there is no heteroskedasticity in the model and accept the null hypothesis which means that residuals are homoscedastic.

5.2.2.4 Stability Test

For the results of the coefficients to be valid and considered to be having a true representation of the model, they should be stable. If the coefficients are not stable, it means that the model is not well specified and as such the results of the coefficients may be wrong. In order to check the stability of the coefficients, the recursive coefficient test will be used. It is a simple graph test. Result of the Recursive Coefficient test is presented in the table below:

Figure 5.3: Stability Test



Source: Extracted from Eviews 8.0

From the above graph, all the coefficients fall between the level of significance, therefore it can be inferred that the model is stable.

5.3 Discussion of Results

The analysis started by conducting the unit root test. This is necessitated by the need to select the methodology used for this model. The unit root test revealed that all parameters selected were stationary at level and because of this there was no need for data transformation. It also means that a simple regression analysis can be used hence the Ordinary Least Squares estimates was selected; and as a result of there was no need for Cointegration Test.

The result of the OLS model in Table 5.2 showed a very low R-squared and Adjusted R-Squared. Also, none of the estimators were significant. However, analysis of the residual showed that the 1998 financial crisis that occurred in the Asian region and also the Malaysian economy had greatly affected the result. So in other to capture this period of the crisis, a dummy variable was introduced.

After the introduction of the dummy variable, the result of the new model showed in Table 5.3 gave the following statistics

Table 5.9: Model Result Table

Method: Least Squares

Sample: 1985 2014

Included observations: 30

Variable	**Coefficients**	**t-Statistic**	**Prob.**
Inflation	0.77	4.873815	0.0001
Interest rate	0.47	2.571347	0.0165
Ms growth	0.02	0.562701	0.5787
Dum	-17.43	-6.757718	0.0000
C	1.94	1.665844	0.1082
R-squared	0.70		
Adjusted R-squared	0.65		
F-stat	14.44		
Prob(F-stat)	0.000003		

Source: Computed by Researcher using data from World Bank and Eviews 8.0

Fitting this result into the model specified earlier

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \mu_t$$

Thus

$$Y = 1.94 + 0.77INF + 0.47INT + 0.02MS + \mu_t$$

It can be noted that the relationship between economic growth and inflation is positive. This entails that a 1% change in inflation will result in 77% increase in the level of economic growth in this economy. While this may sound unreasonable based on the conventional wisdom that inflation usually affect the economy in a negative way, the relationship between economic growth and inflation as always been a very dicey one. As Gokah and Hanif (2004) points out, the prices of goods and services can increase and output will not decline and this can be make inflation exhibit a positive relationship with economic growth. Moreover, continuous economic growth is expected to lead inflation because as the standard of living increases, people are expected to have more income which they spend on goods and services which in the short run will lead to inflation. The positive relationship between inflation and economic growth is also supported by study conducted by Gul, Mughani and Rahim (2012). The study by Munir, Mansur and Furuoka (2009) on Malaysia economic growth and inflation still show that there existed a positive relationship between inflation and economic growth in the country.

The linkage between economic growth and interest rate can also be observed to be positive. Translating this, a 1 unit increase of money supply will result in economic growth of the country increasing by 42%. This finding is reinforced by the study of Chandranath (2008) who found similar relationship while measuring interest rate and economic growth in Sri Lanka.

Finally, a positive nexus can be observed between economic growth and money supply. The coefficient value of 0.02 for money supply growth shows that it has the least effect on economic growth amongst the variables tested in the model. A one unit increase in money supply growth will exert a 2% increase in economic growth of the economic. This positive relationship is in line with theoretical assertions of the classical Quantity Theory of Money (QTM). It also has empirical support in the study of Nouri, Samini (2011) and that of Ogunmuyiwa and Ekone (2010).

The model OLS model was diagnosed for necessary requirements such as Normality test, Autocorrelation Test, Heteroskedasticity Test and Stability Test. All necessary tests were passed and as such, valid inference can be made based on the results of the model.

The test for significance of the model which is also the test for determination of the model was carried using the R-squared statistics and the adjusted R-squared which is considered a better and less biased test for determination because it takes it consideration the population size. The value 0.70 for that 70% variations or changes in the level of economic growth in Malaysia can be explained by the instruments of monetary policies used in the study which are inflation, interest rate and money supply. The same interpretation can be extended to the adjusted R-squared statistics.

The test for the overall significance of the model otherwise called the test for good fit was conducted using the probability of the F-test statistics. The probability value of 0.000003 is less than the error margin of 0.05 or 5% allowed in the estimation of model parameters. Based on this evidence; it can be inferred that this model is appropriate for determining the economic growth in Malaysia. Thus the selected monetary instruments are of good fit, acceptable and desirable for measuring economic growth in Malaysia.

The fitted OLS regression model reveal that there exist positive relationship between economic growth in Malaysia and all selected monetary instrument namely inflation, money supply and interest rate. The result shows that inflation will cause the economy to grow by 769643; while interest rate will cause the economy to grow by 472013 and money supply will affect the economy positively by 15803. The significance of the estimated parameters was examined using the probability value. While inflation and interest rate were 0.0001 and 0.0165 respectively which means that they are significant in the study because the values were below the margin of error allowed in the model specification which is 5%; money supply growth was 0.5787. This figure is above the margin of error allowed in the model so money supply was found to be insignificant.

The test for the economic or theoretical significance observed based on the signs of the parameters. It was observed that inflation; interest rate and money supply all have positive relationship with economic growth. This is in line with the priori expectations. This means that monetary policy have positively affected the economic growth. This result is in line with Nibeza and Tumusherure (2015), Kamaan (2014), Sulaiman and Migro (2014), Mughai and Rahim (2012) who also in their various empirical studies found that there existed a positive

relationship between monetary policy and economic growth, it however runs contrary to empirical findings by Hammed and Ume (2011) and Chipotle and Makhetha-Kosi (2014) whose empirical studies showed disparities to the magnitude of effect interest rate and money supply can have on economic growth in a country.

CHAPTER SIX

CONCLUSION AND POLICY IMPLICATION

6.1 Introduction

This aim of this chapter is to give a summary of the study. It also goes far as to establish the policy implications and it will end with the researcher highlighting some of the limitations of the study.

6.2 Main Findings of the Study

The aim of this study was to investigate the effect of monetary policy on economic growth with Malaysia the case study. The researcher chose Malaysia because of the developmental strides that the economy of Malaysia has experienced in the past few decades and that the case of Malaysia can be used as a role model for many developing countries in their attempt to improve their economies. The methodology applied in this study was the time series analysis using the Ordinary Least Squares regression estimates. Stationarity Test was carried and all variables both dependent and independent were found to be stationarity at level which made it meant that the OLS regression analysis could effectively measure the relationship between variables. The researcher went further to test for the structural stability of the model. Auto correlation and heteroscedasticity tests were still carried out to ensure that the estimates from the result of the analysis were as accurate as much as possible.

The result of the OLS analysis reveal that the monetary policy instruments used for the model showed that monetary policy has a positive relationship with economic growth in Malaysia. A breakdown of the individual monetary policy instruments shows that the interest rate, inflation and money supply all have individual positive relationship with economic growth. The result of inflation having a positive relationship with economic growth is not out of theory. As Gokal and Hanif (2004) points out, the prices of goods and services can increase and output will not decline and this can be make inflation exhibit a positive relationship with inflation. Moreover, continuous economic growth is expected to lead inflation.

Another major finding of this study is the devastating effect of the 1998 Asian zone financial crisis on the domestic economy of Malaysia. This effect was captured by the dummy variable in the model which reveals the 17 percent negative effect on the economic growth of Malaysia. This is indicative of how integrated the economy of Malaysia is with other economies especially those in the same geographical region. This is in fact one of the usual

arguments against globalization. The fact remains there is that while no economy can survive independently especially in this era of globalization, some form of measures should be in place to reduce the negative effects which could range from imported inflation to full time break down of economic institutions as was observed in the most recent global recession of 2009.

Malaysia adopting Inflation Targeting (IT) as its major monetary policy is also justified by the result of this study. The BNM has constantly adopted 2.5-3.5 percent inflation annually. As the result showed, inflation exerts the most influence on the level of economic growth in the country. This means that it should continually be on check. As Datta and Mukhopadhyay (2011) mentioned, a major objective for any country is to maintain high level of economic growth with low inflation.

6.3 Recommendations and Policy Implication

Based on the findings of this study, the following recommendations can be made and these can recommendations could serve as policies for other developing countries wishing to follow the admirable developmental path of Malaysia. Attempts to reduce inflation too drastically in this economy can adversely affect the economy. However, attempts to accelerate the economy by increasing the level of inflation may cause the economy to overheat and push the inflation rate to the stage of being unstable. The economy is basically on a knife-edge.

The results of this research give rise to some issues and one of it is that money supply growth does not explain a whole lot of the economic development in the economy of Malaysia. It is well known that the major monetary policy of the principal monetary organization in Malaysia Bank Negara Malaysia (BNM) and indeed many other central banks is price stability in form of low inflation rates. The reason behind this can be found in this research as it can be observed that inflation has the most contribution to the economic development in Malaysia over the studied period. Over the past two decades, Malaysia has maintained a single digit inflation rate and this has greatly contributed to the development in their economy. This can be a lesson for other developing countries.

The results also suggest that monetary stability can contribute towards price stability. This is because variations in price level are majorly caused by money supply as in the word of Milton Friedman “Inflation is always and everywhere a monetary phenomenon” (Friedman 1970).

The dummy variable which captured the Asian crisis in 1998 showed a devastating effect on the domestic economy of Malaysia which is suggestive that the economy of Malaysia is closely integrated and affected by external shocks. The researcher recommends that while still relying on market forces, demand management policies should be restrictive to achieve stability and some domestic dependence thereby reducing the vulnerability of the domestic economy to external shocks

Although monetary policy instruments are very vital in influencing changes in the prices, output and economic development, there is still need for the central bank to embark on comprehensive monitoring of monetary aggregates. For example, policy implementation can focus on controlling and manipulation of short term interest rates in form of prime lending rates, treasury bills rate as a major tool of transmitting monetary impulses for economic performance of the domestic economy. The researcher propounds that more should be done by monetary authorities in order to increase the influence of money supply growth on the economic growth of the country. Money supply is a very important tool because of its flexibility and the ease at which monetary authorities can manipulate it to fit the prevalent economic situation in the country.

6.4 Limitations and Recommendations for future Research

This study has been to a large part successful in measuring the effect of monetary policy on economic growth in Malaysia, it is however not without limitations and further research can be carried out to cover some of the limitations observed in this study.

Firstly, the use of annual data serves as an area on which this study can be improved upon. While the researcher understands that using annual series data have a chance to reduce the efficiency of the study, he is still confident that the results from the researcher are accurate. For further research, quarterly data should be used as it provides more precise and accurate results.

Furthermore, this research focuses on money supply growth, inflation deflator, and interest rate as the indicators of monetary policy. This is a restricted model as there are other factors that can serve as monetary policy instruments. For further researches, other components such as unemployment rate, balance of payment or exchange rates etc. can be considered to give a more holistic view of monetary policy.

This study also suffers in the aspect of measuring the threshold level of inflation. It cannot be expressly attained if higher inflation leads to higher inflation uncertainty or not. This provides another area in which this research can be improved upon.

REFERENCES

Abdi, H. (2003). Partial least square regression (PLS regression). Encyclopedia for research methods for the social sciences, 792-795.

Abdul-Khaliq, S., Soufan, T., & Shihab, R. A. (2013). Intensive Economic Growth in Jordan during 1978-2010. International Journal of Business and Management, 8(12), 143.

Akrani, (2010). Monetary Policy-Its Meaning, Definitions, Objectives, Articles.

Amarasekara, C. (2009). The impact of monetary policy on economic growth and inflation in Sri Lanka. Staff Studies, 38(1).

Ang, J. B. (2008). A survey of recent developments in the literature of finance and growth. Journal of economic Surveys, 22(3), 536-576.

Barro, R. J. (1997). Optimal management of indexed and nominal debt (No. w6197). National Bureau of Economic Research.

Belongia, M. T., & Ireland, P. N. (2006). The own-price of money and the channels of monetary transmission. Journal of Money, Credit, and Banking, 38(2), 429-445.

Bliss, M. A., & Gul, F. A. (2012). Political connection and leverage: Some Malaysian evidence. Journal of Banking & Finance, 36(8), 2344-2350.

Boivin, J., Kiley, M. T., & Mishkin, F. S. (2010). How has the monetary transmission mechanism evolved over time? (No. w15879). National Bureau of Economic Research.

Cecchetti, S. (2000). Making monetary policy: Objectives and rules. Oxford Review of Economic Policy, 16(4), 43-59.

Charette, D. E. (2006). Malaysia in the Global Economy: Crisis, Recovery, and the road ahead. New England Journal of Public Policy, 21(1), 6.

Chaudhry, S., Qamber, Y., & Farooq, F. (2012). Monetary Policy, Inflation and Economic Growth in Pakistan: Exploring the Co-integration and Causality Relationships. Pakistan Journal of Commerce Society Science, 6(2), 332-347.

Cheng, M. Y. (2003). Economic Fluctuations and Growth: An Empirical Study of the Malaysian Economy. The Journal of Business in Developing Nations,7(1), 51-73.

Chipote, P. & Makhetha-Kosi, P. (2014). Impact of Monetary Policy on Economic Growth: A Case Study of South Africa, Mediterranean Journal of Social Sciences, 5 (5), pp. 76-84.

Datta, K., & Mukhopadhyay, C. K. (2011). Relationship between inflation and economic growth in Malaysia-an econometric review. Int. Ferenc. Econ. Finance. Re., IPEDR, IACSIT Press, Singapore, 4.

Delic, M., & KRAGULJ, D. (2005). Objectives of Macroeconomics as the Basis for Clustering of Countries in Integrated Europe.

Elekdag, S., Lall, M. S., & Alp, M. H. (2012). An Assessment of Malaysian Monetary Policy During the Global Financial Crisis of 2008-09 (No. 12-35). International Monetary Fund.

Engle, R. F., & Granger, C. W. (1987). Co-integration and error correction: representation, estimation, and testing. Econometrica: journal of the Econometric Society, 251-276.

Filardo, A., Ma, G., & Mihaljek, D. (2011). Exchange rates and monetary policy frameworks in EMEs. BIS papers, (57), 37-63.

Fisher, I. (1930). The theory of interest. New York, 43.

Friedman, M. (1970). A theoretical framework for monetary analysis. journal of Political Economy, 78(2), 193-238.

Ghatak, S., & Sánchez-Fung, J. R. (2007). Is fiscal policy sustainable in developing economies?. Review of Development Economics, 11(3), 518-530.

Gokal, V., & Hanif, S. (2004). Relationship between inflation and economic growth. Economics Department, Reserve Bank of Fiji.

Granger, C. W. (1969). Investigating causal relations by econometric models and cross-spectral methods. Econometrica: Journal of the Econometric Society, 424-438.

Greiner, A. (2013). Sustainable public debt and economic growth under wage rigidity. Metroeconomica, 64(2), 272-292.

Gul, H., Mughal, K., & Rahim, S. (2012). Linkage between Monetary Instruments and Economic Growth. Universal Journal of Management and Social Sciences, 2(5), 69-76.

Haller, A. P. (2012). Concepts of Economic Growth and Development Challenges of Crisis and of Knowledge. Economy Transdisciplinarity Cognition, 15(1), 66.

Hameed, I. (2010). Impact of monetary policy on gross domestic product (GDP). Interdisciplinary journal of contemporary research in business, 3(1), 1348-1361.

Horton, M., & El-Ganainy, A. (2006). What Is Fiscal Policy?. Finance & Development, 43.

Humphrey, T. M. (1974). The quantity theory of money: its historical evolution and role in policy debates. FRB Richmond Economic Review, 60, 2-19.

Ibrahim, M. H. (2005). Sectoral effects of monetary policy: evidence from Malaysia. Asian Economic Journal, 19(1), 83-102.

Johansen, S. (1988). Statistical analysis of cointegration vectors. Journal of economic dynamics and control, 12(2), 231-254.

Johansen, S., & Juselius, K. (1990). Maximum likelihood estimation and inference on cointegration—with applications to the demand for money.Oxford Bulletin of Economics and statistics, 52(2), 169-210.

K. Shoaib, (2010). Definition Of Monetary Policy eHow contributor.

Kamaan, C. K., & Nyamongo, E. M. (2014). The Effect of Monetary Policy on Economic Growth in Kenya. International Journal of Business and Commerce, 3(8), 11.

Kasidi, F., & Mwakanemela, K. (2013). Impact of inflation on economic growth: A case study of Tanzania. Asian journal of empirical research, 3(4), 363-380.

Keynes, J. M. (1930). A Treatise on Money, The Collected Writings of John Maynard Keynes. Treatise on money: The collected writings of John Maynard Keynes, 6.

Khin, A. A., Thambiah, S., Chau, W. H., Mohamadpour, B., & Balkrishan, G. (2014). Monetary Policy and Gross Domestic Product in Malaysia: An Econometric Investigation. Middle-East Journal of Scientific Research, 19(4), 602-609.

Kim, A., DUKE, B., HA, C., ECKERD, G. E., FOO, S., QURESHI, Z., & ZAIDI, D. I. (2014). Economic Policy in Malaysia: Paths to Growth. The Woodrow Wilson School of Public & International Affairs, Princeton University.

Lily, J., Kogid, M., Mulok, D., Thien Sang, L., & Asid, R. (2014). Exchange Rate Movement and Foreign Direct Investment in Asean Economies.Economics Research International, 2014.

Lucas, R. E. (1988). On the mechanics of economic development. Journal of monetary economics, 22(1), 3-42.

Majid, A., & Zulkhibri, M. (2007). Causality link between money, output and prices in Malaysia: an empirical re-examination. Applied Econometrics and International Development, 7(1).

Mathai, K. (2009). What is monetary policy?. Finance & Development, 46, 46-47.

McCallum, B. T. (2011). Should central banks raise their inflation targets? Some relevant issues (No. w17005). National Bureau of Economic Research.

McCauley, R. N. (2006). Understanding monetary policy in Malaysia and Thailand: objectives, instruments and independence. BIS papers, 31, 172-98.

Mishkin, F. S. (2002). The role of output stabilization in the conduct of monetary policy. International Finance, 5(2), 213-227.

Mundell, R. A. (1963). Capital mobility and stabilization policy under fixed and flexible exchange rates. Canadian Journal of Economics and Political Science/Revue canadienne de economiques et science politique, 29(04), 475-485.

Munir, Q., Mansur, K., & Furuoka, F. (2009). Inflation and economic growth in Malaysia: A threshold regression approach. ASEAN Economic Bulletin,26(2), 180-193.

Nouri, M., & Samimi, A. J. (2011). The Impact of Monetary Policy on Economic Growth in Iran. Middle-East Journal of Scientific Research, 9(6), 740-743.

Ogunmuyiwa, M. S., & Ekone, A. F. (2010). Money supply-Economic growth nexus in Nigeria. J Soc Sci, 22(3), 199-204.

Ole Rummel, (2012). The Monetary Transmission Mechanism. CCBS Bank of England.

Poon, W. C. (2010). Testing transmission mechanisms on economic growth in Malaysia. Department of Economics Discussion Paper, 26(10).

Prof. Dr Dieter Geidesmeier, (2015) Fundamentals of Monetary Policy in the Euro Area, Concepts- Markets-Institutions. Boonbooks.com.

Robert H. Rasche, Marcela M. Williams, (2007). Effectiveness of Monetary Policy. Federal Reserve Bank of St. Louis Review, St Louis Review, Sept/Oct 89, pp 447-89

Sanni, M. R., Amusa, N. A., & Agbeyangi, B. A. (2012). Potency of Monetary and Fiscal Policy Instruments on Economic Activities of Nigeria (1960-2011). Journal of African Macroeconomic Review Vol, 3(1).

Seyed Mohammad Alavinasab. (2016). MONETARY POLICY AND ECONOMIC GROWTH A CASE STUDY OF IRAN. International Journal of Economics, Commerce and Management. Vol. IV, Issue 3, March 2016.

Shaari, M. H. (2008). Analyzing Bank Negara Malaysia's Behaviour in Formulating Monetary Policy: An Empirical Approach.

Shearer, R. A. (1961). The concept of economic growth. Kyklos, 14(4), 497-532.

Sjö, B. (2008). Testing for unit roots and cointegration. Web adresi.

Solow, R. M. (1956). A contribution to the theory of economic growth. The quarterly journal of economics, 65-94.

Sulaiman, L. A., & Migiro, S. O. (2014). The nexus between monetary policy and economic growth in Nigeria: a causality test.

Sylvie NIBEZA, Wilson TUMUSHERURE. (2015). The Impact of Monetary Policy on Rwanda's Economy: Analysis of Vector Error correction Model (1980-2006). International Journal of Contemporary Applied, Vol. 2 No. 5 May 2015.

Tobin, J. (1965). Money and economic growth. Econometrica: Journal of the Econometric Society, 671-684.

Ullah, S., Khan, S., Shah, M., & Khan, S. A. (2013). Assessment of Key Determinants for Economic Growth in Pakistan (1980-2009). World Applied Sciences Journal, 26(10), 1357-1363.

Wen, Y. (2006). The quantity theory of money. Economic Synopses, 2006.

Yusof, Z. A., & Bhattasali, D. (2008). Economic growth and development in Malaysia: policy making and leadership. International Bank for Reconstruction and Development/The World Bank.

APPENDICES

Appendix 1: Unit Root Test

Null Hypothesis: GDP_GROWTH has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.437979	0.0015
Test critical values:	1% level	-3.679322	
	5% level	-2.967767	
	10% level	-2.622989	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(GDP_GROWTH)

Method: Least Squares

Date: 11/10/16 Time: 14:17

Sample (adjusted): 1986 2014

Included observations: 29 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP_GROWTH(-1)	-0.786819	0.177292	-4.437979	0.0001
C	4.798343	1.248080	3.844581	0.0007

R-squared	0.421788	Mean dependent var	0.246729
Adjusted R-	0.400372	S.D. dependent var	4.946107

squared

		Akaike info	
S.E. of regression	3.830048	criterion	5.590104
Sum squared resid	396.0703	Schwarz criterion	5.684400
		Hannan-Quinn	
Log likelihood	-79.05651	criter.	5.619636
F-statistic	19.69565	Durbin-Watson stat	2.050721
Prob(F-statistic)	0.000138		

Null Hypothesis: INFLATION has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.085581	0.0000
Test critical			
values:	1% level	-3.679322	
	5% level	-2.967767	
	10% level	-2.622989	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(INFLATION)

Method: Least Squares

Date: 11/10/16 Time: 14:17

Sample (adjusted): 1986 2014

Included observations: 29 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INFLATION(-1)	-1.132900	0.186161	-6.085581	0.0000

C	3.754716	0.955727	3.928648	0.0005

R-squared	0.578351	Mean dependent var	0.130301
Adjusted R-squared	0.562734	S.D. dependent var	6.087204
S.E. of regression	4.025229	Akaike info criterion	5.689513
Sum squared resid	437.4667	Schwarz criterion	5.783809
Log likelihood	-80.49793	Hannan-Quinn criter.	5.719045
F-statistic	37.03429	Durbin-Watson stat	1.908490
Prob(F-statistic)	0.000002		

Null Hypothesis: INTEREST_RATE has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.814342	0.0000
Test critical values:	1% level	-3.679322	
	5% level	-2.967767	
	10% level	-2.622989	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(INTEREST_RATE)

Method: Least Squares

Date: 11/10/16 Time: 14:18

Sample (adjusted): 1986 2014

Included observations: 29 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INTEREST_RATE(-1)	-1.115628	0.191875	-5.814342	0.0000
C	4.276418	0.988852	4.324631	0.0002

R-squared	0.555969	Mean dependent var	-0.065099
Adjusted R-squared	0.539523	S.D. dependent var	5.144754
S.E. of regression	3.491149	Akaike info criterion	5.404811
Sum squared resid	329.0793	Schwarz criterion	5.499107
Log likelihood	-76.36976	Hannan-Quinn criter.	5.434343
F-statistic	33.80657	Durbin-Watson stat	1.952507
Prob(F-statistic)	0.000003		

Null Hypothesis: MONEY_SUPPLY_GROWTH has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.927073	0.0004
Test critical values:	1% level	-3.679322	
	5% level	-2.967767	
	10% level	-2.622989	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(MONEY_SUPPLY_GROWTH)

Method: Least Squares

Date: 11/10/16 Time: 14:18

Sample (adjusted): 1986 2014

Included observations: 29 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MONEY_SUPPLY_GROWTH(-1)	-0.948111	0.192429	-4.927073	0.0000
C	10.93159	3.829628	2.854479	0.0082

R-squared	0.473438	Mean dependent var	-0.100025
Adjusted R-squared	0.453936	S.D. dependent var	22.64169
S.E. of regression	16.73134	Akaike info criterion	8.538916
Sum squared resid	7558.316	Schwarz criterion	8.633212
Log likelihood	-121.8143	Hannan-Quinn criter.	8.568448
F-statistic	24.27605	Durbin-Watson stat	1.954803
Prob(F-statistic)	0.000037		

Unit Root Test Based on Phillip-Perron

Null Hypothesis: GDP_GROWTH has a unit root

Exogenous: Constant

Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-4.410979	0.0016
Test critical values:	1% level	-3.679322	
	5% level	-2.967767	
	10% level	-2.622989	

*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	13.65760
HAC corrected variance (Bartlett kernel)	11.72742

Phillips-Perron Test Equation

Dependent Variable: D(GDP_GROWTH)

Method: Least Squares

Date: 01/27/17 Time: 11:53

Sample (adjusted): 1986 2014

Included observations: 29 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP_GROWTH(-	-0.786819	0.177292	-4.437979	0.0001

	1)			
	C	4.798343	1.248080	3.844581	0.0007

R-squared	0.421788	Mean dependent var	0.246729
Adjusted R-squared	0.400372	S.D. dependent var	4.946107
S.E. of regression	3.830048	Akaike info criterion	5.590104
Sum squared resid	396.0703	Schwarz criterion	5.684400
Log likelihood	-79.05651	Hannan-Quinn criter.	5.619636
F-statistic	19.69565	Durbin-Watson stat	2.050721
Prob(F-statistic)	0.000138		

Null Hypothesis: INFLATION has a unit root

Exogenous: Constant

Bandwidth: 0 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-6.085581	0.0000
Test critical values:	1% level	-3.679322	
	5% level	-2.967767	
	10% level	-2.622989	

*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	15.08506
HAC corrected variance (Bartlett kernel)	15.08506

Phillips-Perron Test Equation

Dependent Variable: D(INFLATION)

Method: Least Squares

Date: 01/27/17 Time: 11:55

Sample (adjusted): 1986 2014

Included observations: 29 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INFLATION(-1)	-1.132900	0.186161	-6.085581	0.0000
C	3.754716	0.955727	3.928648	0.0005

R-squared	0.578351	Mean dependent var	0.130301
Adjusted R-squared	0.562734	S.D. dependent var	6.087204
S.E. of regression	4.025229	Akaike info criterion	5.689513
Sum squared resid	437.4667	Schwarz criterion	5.783809
Log likelihood	-80.49793	Hannan-Quinn criter.	5.719045
F-statistic	37.03429	Durbin-Watson stat	1.908490
Prob(F-statistic)	0.000002		

Null Hypothesis: INTEREST_RATE has a unit root

Exogenous: Constant

Bandwidth: 4 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-5.866708	0.0000

Test critical values:	1% level	-3.679322
	5% level	-2.967767
	10% level	-2.622989

*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	11.34756
HAC corrected variance (Bartlett kernel)	18.02414

Phillips-Perron Test Equation
Dependent Variable: D(INTEREST_RATE)
Method: Least Squares
Date: 01/27/17 Time: 11:56
Sample (adjusted): 1986 2014
Included observations: 29 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INTEREST_RATE(-1)	-1.115628	0.191875	-5.814342	0.0000
C	4.276418	0.988852	4.324631	0.0002

R-squared	0.555969	Mean dependent var	-0.065099
Adjusted R-squared	0.539523	S.D. dependent var	5.144754
S.E. of regression	3.491149	Akaike info	5.404811

		criterion	
Sum squared resid	329.0793	Schwarz criterion	5.499107
		Hannan-Quinn	
Log likelihood	-76.36976	criter.	5.434343
F-statistic	33.80657	Durbin-Watson stat	1.952507
Prob(F-statistic)	0.000003		

Null Hypothesis: MONEY_SUPPLY_GROWTH has a unit root

Exogenous: Constant

Bandwidth: 5 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-4.958604	0.0004
Test critical values:	1% level	-3.679322	
	5% level	-2.967767	
	10% level	-2.622989	

*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	260.6316
HAC corrected variance (Bartlett kernel)	161.3616

Phillips-Perron Test Equation

Dependent Variable: D(MONEY_SUPPLY_GROWTH)

Method: Least Squares

Date: 01/27/17 Time: 11:56

Sample (adjusted): 1986 2014

Included observations: 29 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MONEY_SUPPLY_GROWTH(-1)	-0.948111	0.192429	-4.927073	0.0000
C	10.93159	3.829628	2.854479	0.0082

R-squared	0.473438	Mean dependent var	-0.100025
Adjusted R-squared	0.453936	S.D. dependent var	22.64169
S.E. of regression	16.73134	Akaike info criterion	8.538916
Sum squared resid	7558.316	Schwarz criterion	8.633212
Log likelihood	-121.8143	Hannan-Quinn criter.	8.568448
F-statistic	24.27605	Durbin-Watson stat	1.954803
Prob(F-statistic)	0.000037		

Appendix 2: OLS Results

Dependent Variable: GDP_GROWTH

Method: Least Squares

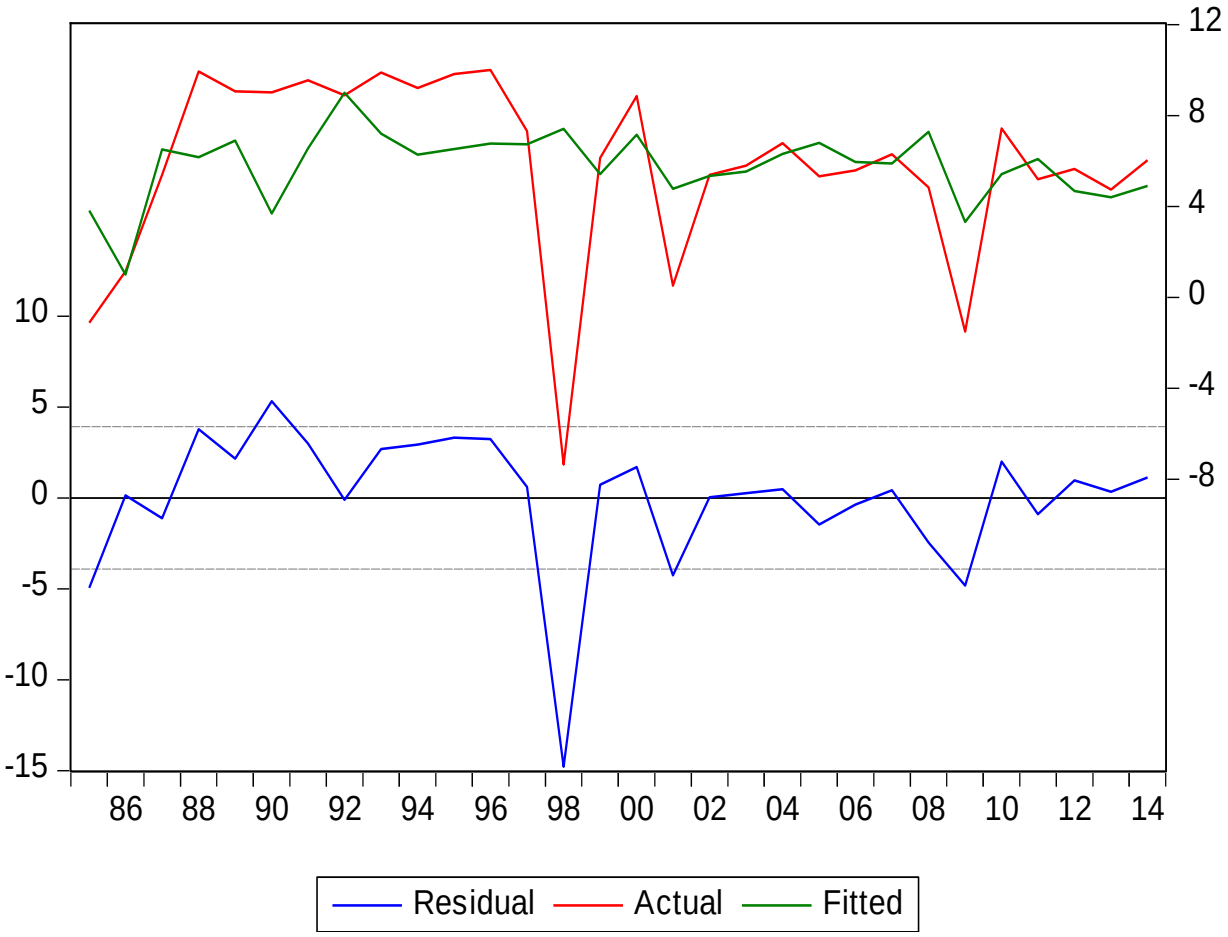
Date: 11/10/16 Time: 14:21

Sample (adjusted): 1985 2014

Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INFLATION	0.419630	0.245938	1.706241	0.0999
INTEREST_RATE	0.193605	0.294911	0.656487	0.5173
MONEY_SUPPLY_GROWTH	0.046228	0.045700	1.011556	0.3211
C	3.190069	1.898667	1.680162	0.1049

R-squared	0.146254	Mean dependent var	5.793101
Adjusted R-squared	0.047745	S.D. dependent var	4.011839
S.E. of regression	3.914895	Akaike info criterion	5.691020
Sum squared resid	398.4865	Schwarz criterion	5.877846
Log likelihood	-81.36530	Hannan-Quinn criter.	5.750787
F-statistic	1.484677	Durbin-Watson stat	1.767168
Prob(F-statistic)	0.241872		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Residual
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Dependent Variable: GDP_GROWTH

Method: Least Squares

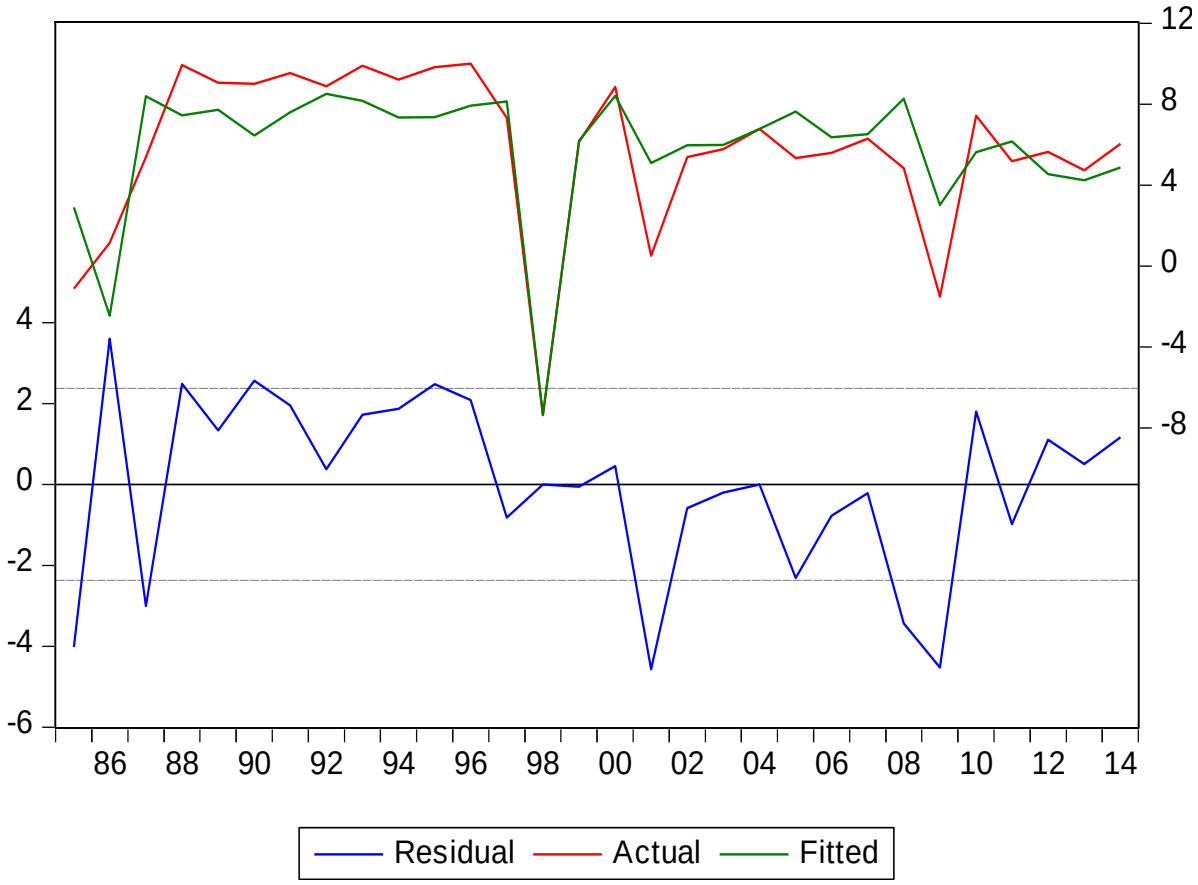
Date: 11/10/16 Time: 14:36

Sample (adjusted): 1985 2014

Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INFLATION	0.769643	0.157914	4.873815	0.0001
INTEREST_RATE	0.472013	0.183566	2.571347	0.0165
MONEY_SUPPLY_GROWTH	0.015803	0.028084	0.562701	0.5787
DUM	-17.42869	2.579079	-6.757718	0.0000
C	1.942976	1.166362	1.665844	0.1082

R-squared	0.697968	Mean dependent var	5.793101
Adjusted R-squared	0.649643	S.D. dependent var	4.011839
S.E. of regression	2.374648	Akaike info criterion	4.718587
Sum squared resid	140.9738	Schwarz criterion	4.952120
Log likelihood	-65.77881	Hannan-Quinn criter.	4.793296
F-statistic	14.44315	Durbin-Watson stat	1.865704
Prob(F-statistic)	0.000003		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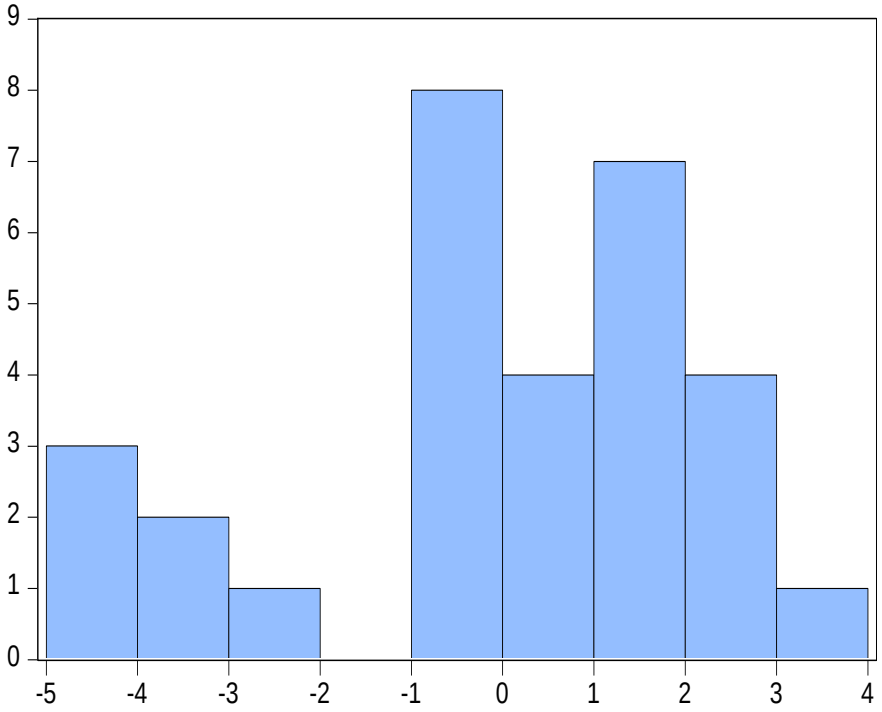
Appendix 3: Results Diagnosis Test



Series: Residuals	
Sample 1985 2014	
Observations 30	
Mean	-6.29e-16
Median	0.188280
Maximum	3.602577
Minimum	-4.568379
Std. Dev.	2.204805
Skewness	-0.659669
Kurtosis	2.606156
Jarque-Bera	2.369709
Probability	0.305791

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.301856	Prob. F(4,21)	0.3015
Obs*R-squared	5.961010	Prob. Chi-Square(4)	0.2021

Test Equation:

Dependent Variable: RESID

Method: Least Squares

Date: 11/10/16 Time: 14:59

Sample: 1985 2014

Included observations: 30

Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INFLATION	-0.113268	0.190848	-0.593498	0.5592

INTEREST_RATE	-0.261246	0.231269	-1.129619	0.2714
MONEY_SUPPLY_GROWTH	-0.011896	0.029335	-0.405513	0.6892
DUM	-1.733191	2.791903	-0.620792	0.5414
C	1.617419	1.509114	1.071767	0.2960
RESID(-1)	-0.003110	0.246275	-0.012629	0.9900
RESID(-2)	0.413215	0.232575	1.776695	0.0901
RESID(-3)	0.300120	0.255175	1.176136	0.2527
RESID(-4)	0.187613	0.215061	0.872368	0.3929

R-squared	0.198700	Mean dependent var	-6.29E-16
Adjusted R-squared	-0.106557	S.D. dependent var	2.204805
S.E. of regression	2.319301	Akaike info criterion	4.763734
Sum squared resid	112.9623	Schwarz criterion	5.184093
Log likelihood	-62.45601	Hannan-Quinn criter.	4.898210
F-statistic	0.650928	Durbin-Watson stat	1.597087
Prob(F-statistic)	0.727159		

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	2.531916	Prob. F(4,25)	0.0656
Obs*R-squared	8.649307	Prob. Chi-Square(4)	0.0705
Scaled explained SS	4.823659	Prob. Chi-Square(4)	0.3059

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

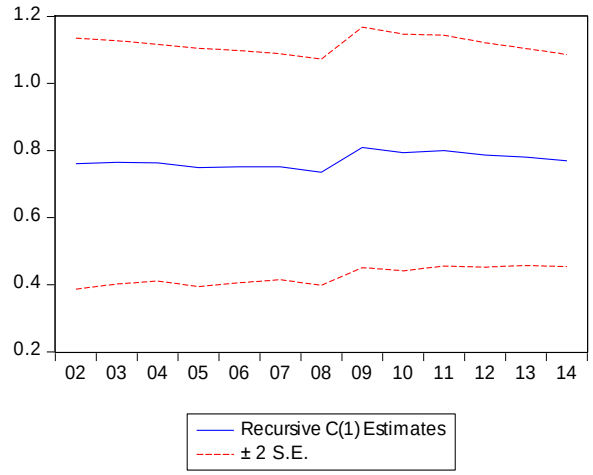
Date: 11/10/16 Time: 15:01

Sample: 1985 2014

Included observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	7.689485	2.703218	2.844567	0.0087
INFLATION	-0.729790	0.365989	-1.994019	0.0572
INTEREST_RATE	0.048604	0.425443	0.114243	0.9100
MONEY_SUPPLY_GROWTH	-0.070593	0.065088	-1.084577	0.2885
DUM	-1.633558	5.977404	-0.273289	0.7869

R-squared	0.288310	Mean dependent var	4.699128
Adjusted R-squared	0.174440	S.D. dependent var	6.057212
S.E. of regression	5.503603	Akaike info criterion	6.399695
Sum squared resid	757.2412	Schwarz criterion	6.633228
Log likelihood	-90.99542	Hannan-Quinn criter.	6.474404
F-statistic	2.531916	Durbin-Watson stat	1.647476
Prob(F-statistic)	0.065578		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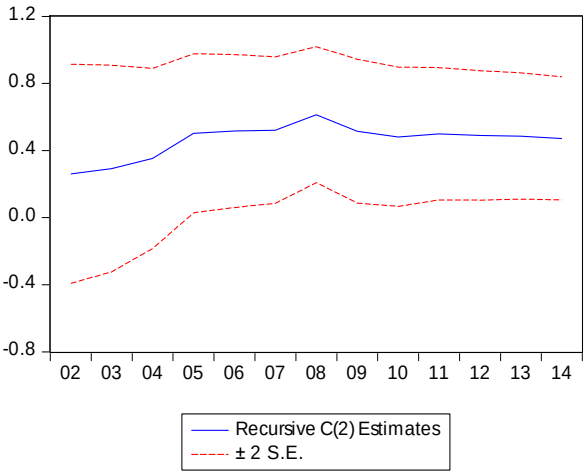
Recursive C(1) Estimates
± 2 S.E.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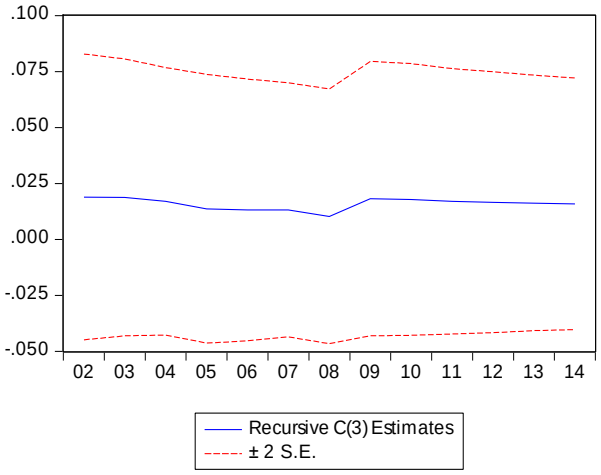
Recursive C(2) Estimates
± 2 S.E.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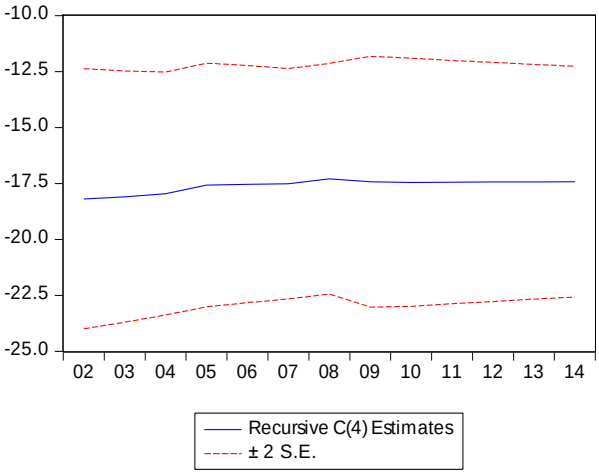
Recursive C(3) Estimates
± 2 S.E.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-12.5
-15.0
-17.5
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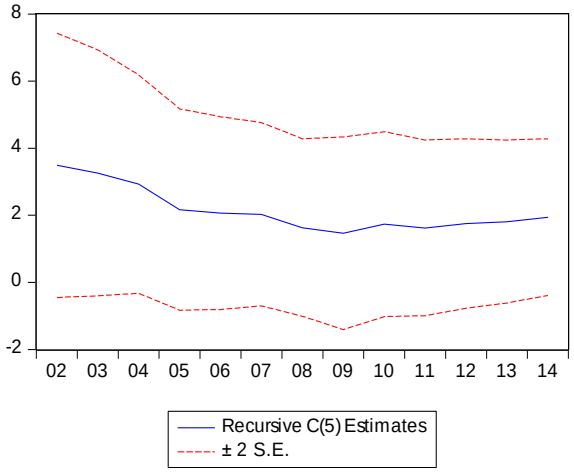
-22.5
-25.0
02 03 04 05 06 07 08 09 10 11 12 13 14

Recursive C(4) Estimates
± 2 S.E.


8
6
4
2
0
-2
02 03 04 05 06 07 08 09 10 11 12 13 14

Recursive C(5) Estimates
± 2 S.E.

Appendix 4: Data from the International Monetary Fund (IMF)

Year	GDP growth	Interest rate	Inflation	Money Supply growth
1985	-1.12224853	4.153738388	-1.50928	9.814562655
1986	1.15250889	4.342735373	-8.63783	12.98365398
1987	5.38864525	4.578533001	5.53074	2.205564966
1988	9.93772419	5.481539578	3.620027	8.584013919
1989	9.05848108	4.243675366	4.462772	21.83141976
1990	9.00964926	4.797374937	3.805876	-43.73825754
1991	9.54546485	5.563263489	3.584804	16.8771825
1992	8.88511593	7.563279867	2.415682	71.91210626
1993	9.89494683	5.813453997	3.985674	26.36249551
1994	9.21204281	4.643376275	3.937937	11.50832082
1995	9.82908211	4.918361422	3.632957	18.52547412
1996	10.0027011	6.040646208	3.680369	18.48469865
1997	7.32274295	6.905510861	3.482349	16.03559651
1998	-7.35941537	3.350316537	8.499103	0.229557897
1999	6.13760987	8.514752373	0.044769	12.09886722
2000	8.8588681	-1.08579038	8.855273	10.04776511
2001	0.5176753	8.848207468	-1.5816	11.63591058
2002	5.39098833	3.29631239	3.128883	4.484024329
2003	5.78849928	2.906032392	3.298933	8.62717994
2004	6.78343773	0.034267778	6.009506	12.68710273
2005	5.33213914	-2.67296881	8.862357	8.79316995
2006	5.58484707	2.409344183	3.980583	13.63100781
2007	6.29878593	1.456547823	4.881517	7.922535768
2008	4.8317699	-3.90377598	10.38935	10.53542511
2009	-1.51368508	11.78250584	-5.9923	7.739928126
2010	7.4259705	0.847359744	4.117748	7.347736051
2011	5.18725089	-0.61357376	5.562705	14.62793829
2012	5.64460723	4.047617519	0.709498	8.846019729
2013	4.73391982	4.592161066	0.019446	6.784527406
2014	6.03290537	2.26587131	2.269445	6.913823548