DETERMINANTS OF INFLATION IN MALAYSIA 1981-2010

By

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TABLE OF CONTENTS

LIST OF FIGURE

LIST OF TABLE

ABSTRAK

Tujuan utama kajian ini adalah untuk mengesahkan fakta-fakaya yang menentukan inflasi di Malaysia dalam jangka masa panjang dan pendek. Perhubungan di antara bekalan wang, kadar pengangguran, kadar pertukaran kewangan, dan harga minyak dengan inflasi akan dikaji. Sampel dalam kajian ini akan mengandungi data tahunan dalam jangka masa dari tahun 1981 sehingga 2010. Data siri masa untuk semua pembolehubah bersandar and tak bersandar didapati "non-stationary" dalam "level" tetapi "stationary" dalam "first difference", dengan menggunakan "Augmented Dickey-Fuller (ADF) unit root test". Keputusan dari "Johansen-Juselius cointegration test", "Vector Error Correction Model (VECM)", dan "Granger-Causality test" menunjukkan perbubungan di antara bekalan wang, kadar penggangguran, kadar pertukaran kewangan, dan harga minyak dengan inflasi dalam jangka masa panjang dan jangka masa pendek. "Diagnistic Test on VECM" juga telah dilakukan untuk menyiasat kesahihan persamaan VECM. Darim semua ujian yang the dilakukan, bekalan dan harga minyak didapati mempunyai hubugan positif dengan inflasi dalam jangka masa panjang and jangka masa pendek. Manakala kadar pengangguran and kadar pertukaran kewangan mempunyai hubungan negative dengan inflasi dalam jangka masa panjang dan pendek. Oleh itu, bukti empiric untuk menyokong teori makroekonomi bagi inflasi model dalam Malaysia kes telah disediakan dari kajian penyelidikan ini. Dengan perhubungan tersebut, kerajaan perlu melaksanakan beberapa dasar kewangan dan fiskal untuk menpengaruhi penentu-penentu makroeknomi untul mengawal and mengurangkan risiko inflasi.

ABSTRACT

The main objective of this research study is to examine the factors that determine inflation in Malaysia. The relationship between macroeconomic factors namely money supply, unemployment rate, exchange rate, and oil price with inflation are studied. This research study covers annual data for the time period from year 1981 to 2010. By using Augmented Dickey-Fuller (ADF) unit root test, the time series data for all the dependent and independent variables are found to be non-stationary at the level but stationary at first difference. The results from Johansen-Juselius cointegration test, Vector Error Correction Model (VECM), and Granger-Causality test show both long-run and short-run relationships between money supply, unemployment rate, exchange rate, and oil price with inflation. The diagnostic tests on VECM have been done to confirm the validity of VECM equation. From the results, money supply and oil price are found to have positive relationship with inflation in the long run and short run, while unemployment rate and exchange rate have negative relationship with inflation in the long run and short run. Therefore, the empirical evidence in this study supports the macroeconomic theory of inflation in the case of Malaysia. From this study, it is evident that the government should implement appropriate monetary and fiscal policies to affect these macroeconomic determinants in order to control and reduce the risk of inflation.

Chapter 1

INTRODUCTION

1.1   Introduction

Chapter one introduces the overview of the research study. It begins with the background of the study and problem statement. Next, it describes the research objectives and research questions. The significance of the study is also included in Chapter One. Lastly, this chapter will briefly provide the outline of the remaining chapters of the study.

There are two main types of inflation, which is demand pull inflation and cost push inflation. Demand pull inflation is inflation where the basic cause comes from the demand side. The constant increase in demand is due to factors such as increase in money supply, increase in government purchase, increases in exports and so on. When demand is increased and cannot be met by a equivalent increase in supply, the general price level will increase and inflation will happen.

From Figue 1.1 below, increase in demand will cause the aggregate demand curve to shift rightwards from AD1 to AD2. Therefore, the general price level of goods and services will increase from P1 to P2.
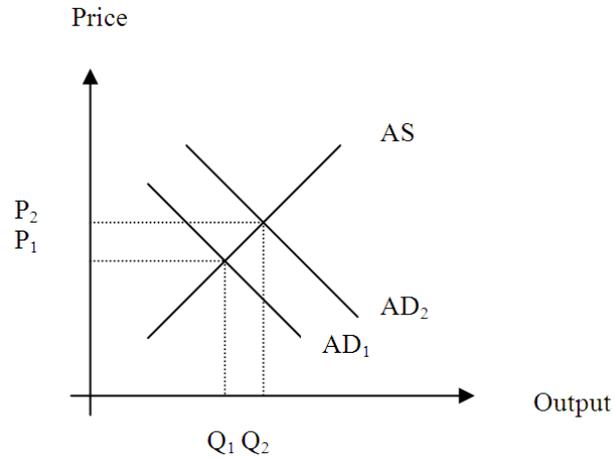
Price

Figure 1.1: Demand Pull Inflation

Cost push inflation, which is also called supply push inflation, occurs because of rising cost of production, for example an increase of price of raw materials, an increase of wage rate, and so on. The general price level of goods and services will rise when there is an increase of production costs in the industries.

From Figure 1.2 illustrated below, when aggregate supply curve shifts upwards from AS1 to AS2, the price level of goods and services also increases from P1 to P2.

Price
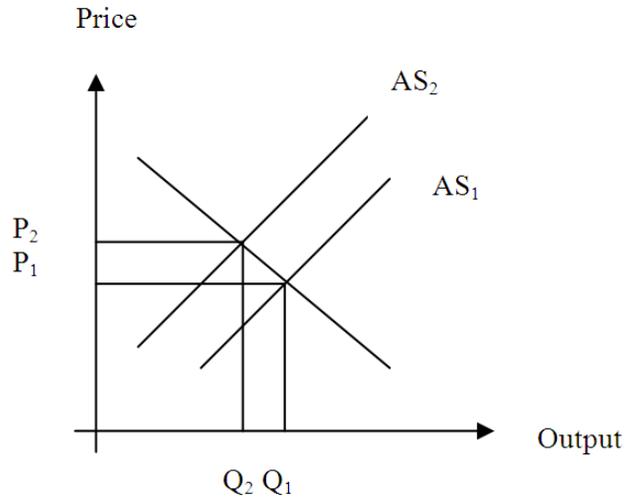
Figure 1.2: Cost Push Inflation

There are many factors that determine inflation. Some of the main theories of inflation that are normally discussed are the Quantity Theory of Money, the Keynesian Theory, and the Structuralism Model.

The Quantity Theory of Money states that price level has direct and significance positive relationship with money supply. This relationship can be demonstrated by using the quantity equation of money stated below.

$$MV = PT$$

where

M represents money supply

V represents velocity of money

P represents average price level

T represents amount of goods and services that produced

According this Quantity Theory of Money, there is a proportionate positive relationship between price level and money supply within the economy of the country. This means that when money supply increases by a certain percentage, it will cause price level to increase by the same percentage. Besides that, this theory also stated that inflation caused by a rise in money supply, is not supported by or followed by an increase of output level in a given economy.

The theory on Structuralism explains that the major cause of inflation is the rigidity in economic structure. This theory is normally used to describe the character and foundation of inflation in a developing country. According to this Structuralism Theory, inflation in a country is caused by the inelasticities in the factors such as production capacity and level, institutional framework, capital formulation, inelasticity of the employment structure and labour force.

In Keynesian Theory, the increase in aggregate demand exceeds the increase in aggregate supply. This will cause the level of price to increase and subsequently inflation happens. In the condition of full employment output level, increase of private consumption, private investment, and government expenditure, will increase the aggregate demand in a given economy and cause the increase in general price level.

Money supply is one of the monetary factors that impact on inflation. Money supply is an important determinant because money has been used in all economic transactions. So it can

affect economic activities significantly. When the amount of money supply is increased with reduced interest rates, it will stimulate economic activities as well. Investment will increase which causes a rise in liquidity. Consumers are wealthier and this causes them to spend more. When more people purchase goods and services, the sales of the business firms will increase. Hence, the firms will order more raw materials and increase their production to respond to the higher order and sales. The surge in business activities will increase the demand for labour and capital goods.

In a buoyant economy, stock price in the stock market will increase and many new equities would be issued by firms. If the amount of money supply continues to increase in a given economy, the general price level of goods and services will go up, especially when output has already achieved its capacity limits.

Unemployment has a negative relationship with inflation. This trade-off relationship can be shown by the Philips Curve in Figure 1.3 below. According to the Philips Curve, the inflation rate will decrease when the unemployment increases. On the other hand, decrease of unemployment rate will cause the inflation rate to increase.

Inflation rate (%)

Philips Curve

Unemployment rate (%)
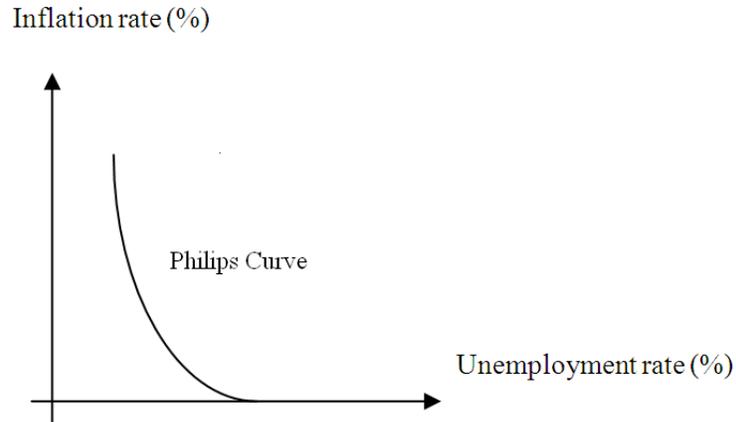
Figure 1.3: Philips Curve

When there is full employment, the labour market will face shortages and short supply. This situation will provide pressure on wages to increase. Since wages form a high percentage of total costs, price of related goods and services is increased by firms in order to transfer the increased costs to their customers. Consequently, there is a rise in general price level.

The exchange rate has a negative impact on inflation. When the currency of given country depreciates, this means that the purchasing power of currency is decreased. Consequently, the price level of imported goods and service from other countries will rise up and cause an increase in domestic inflation.

Oil price has a positive influence on inflation. When prices of oil move up, inflation will increase. This situation happens because oil is the major input in many economic activities for example as fuel for transportation, and as essential input in the production process of many industries. If the oil price rises, this means the input cost will increase and cause the increase on

the costs of end products. Consequently, general price of goods and services are increased by the firms in order to pass the added production costs to consumer.

Inflation can cause many effects in the economy. Generally, inflation will decrease the purchasing power of the currency of country because of increases in the general level of prices. This means, when the general level of prices of goods and services is increased, less goods and services can be bought by each monetary unit. High and unpredictable inflation will have harmful effects on the economy. It will add inefficiencies to the market and cause companies difficulties to make their long-term plan. Inflation also causes uncertainty on future purchasing power of money and reduces the return on saving and investment. High inflation causes falling output and consumption levels. Consequently it reduces the economic well-being of households and firms, and has disproportionate effect on poor workers, who are least likely to have their wages indexed to the inflation rate and thus avoid a real loss in purchasing power.

Besides that, high inflation rate also distorts relative prices in the market place and causes a misallocation of the resources that can have long-term economic consequences. Inflation can also increase risk and slow the economic growth. When unanticipated inflation happens frequently, the degree of risk associated with investments in the economy increases also. Investors are unwilling to invest in capital and make long-term commitments because of increase in the uncertainty of inflation. Inflation also affects debtors and creditors. Inflation that is higher than expected benefits debtors while inflation that is lower than expected will give benefits to creditors. Income of people from wages and salaries, rent, interest and profit will increase during

inflation. During inflation, most of the prices tend to rise together, and input prices determine both the income of workers, and also owners of land and capital.

1.2 Background of Study

Malaysia is one of the countries that have low inflation. The inflation rate for Malaysia averaged 2.9% per annum historically. Although Malaysia has generally experienced low inflation for around 50 years, nevertheless it had four periods of high inflation, which are mid-1970s, early 1980s, early 1990s, and late 2000s. Figure 1.4 below shows the inflation trend in Malaysia from year 1981 until 2010
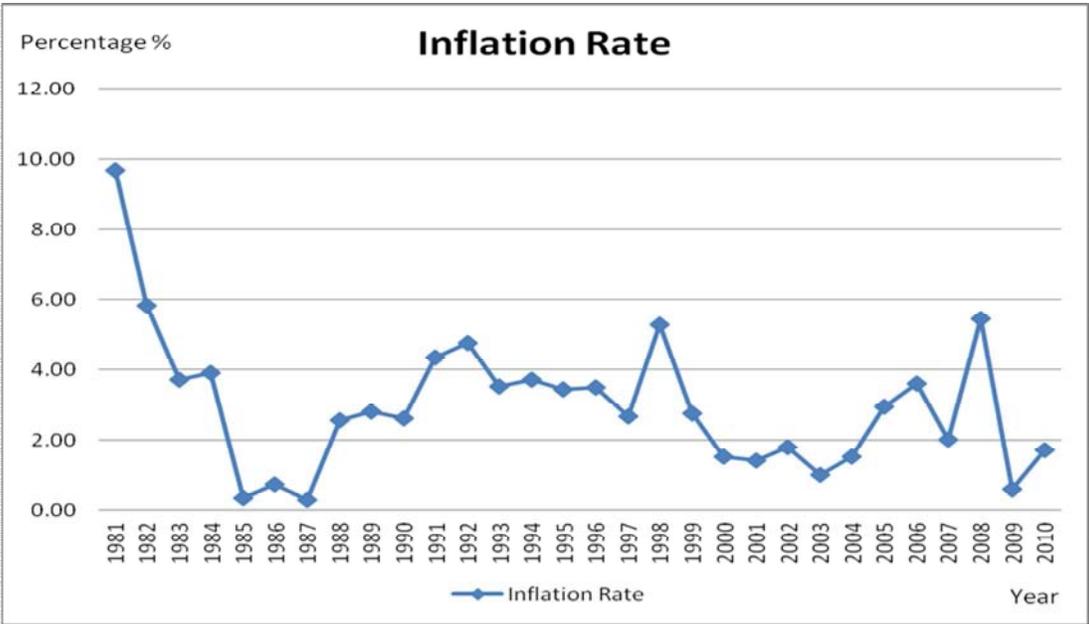
Figure 1.4: Inflation Rate in Malaysia (1981 – 2010)

During the 1970s and 1980s, because of disruption in the supply of global energy and food, prices increased significantly. Global oil prices climbed dramatically because of the Egypt-Israeli War in 1973, Iranian Revolution in 1979, and Iran-Iraq War during early 1980s. This global oil shocks causes domestic retail fuel prices to increase. Because of shortage in global food supplies, global food prices increased sharply. The domestic inflation increase by 17.3% and 9.7% in 1974 and 1981 correspondingly.

During the 1990s, inflation in Malaysia stayed above 3%, except for years 1997 and 1999. The price increases were broad-based, determined by both supply and demand factors. Throughout this period, domestic supply factors, especially food category, contributed significantly to inflation in Malaysia. Adjustments in administered prices by government, unfavorable weather conditions, labour shortages, continued shortage in cultivated land, and high capacity utilization are some of the factors that cause limitation on food supply. During the period of 1990s, prices of fruits and vegetables, fish and meat subcategories also rose.

Domestic demand factors also play a major role in inflation during the 1990s. Domestic demand was really high, due to strong income and growth of employment. There was a significant rise on the property prices and equity, sustained by strong growth of domestic liquidity and credit amid large capital inflows. Rental rates rose steadily, causing the gross rent, fuel and power category of CPI to hit a 13-year record of 4.4% inflation rate in year 1998.

In 1991-1992, inflation in Malaysia has reached around 4%. This is because the Gulf War that mainly involved Iraq and United States which caused the increase in world oil price. Consequently, the surge in world oil price caused the rise of inflation in Malaysia.

In 1998, inflation in Malaysia reached a peak of 5.3%. The ringgit depreciated around 28.3% against US Dollar towards the end of year 1997. This lead to cost increase arising from higher import prices. Malaysia also faced a cyclical shortage on essential food items. Due to high cost of import, Malaysia government imposed ceiling price of five price administered items, which is sugar, flour, milk, cooking oil, chicken.

During the early 2000s, Malaysia faced moderate to very low levels of inflation because supply and demand pressures that happened in the 1990s had decreased. However inflation started to increase in year 2005 and reached a peak of 8.5% in July 2008. External factors, for example higher global commodity and food prices, and also the global financial crisis caused higher inflation rates during this time period. The rise of global commodity prices was caused by both demand and supply factors.

Global crude oil prices increased because of disruption in oil supply and geopolitical developments. Global warming worsened the food shortages. All these incidents caused increase in global commodity prices.

1.3   Problem Statement

Over the past few decades, Malaysia's inflation is caused by many factors, either from domestic economic factors or external sources. The economic factors are either monetary or non-monetary factors.

It is believed that money supply is one of the main determinants that cause inflation in Malaysia. Studies by Cheng and Tan (2002), and Akbari and Rankaduwa (2005) found that money supply has a positive effect on inflation. If the effect of money supply on inflation is significant and important, it is necessary to implement appropriate monetary policy to control inflation in Malaysia.

It is postulated that exchange rate has contributed to inflation level in the country. According to studies from Abidemi and Maliq (2010), and Khan, Bukhari and Ahmed (2007), it was found that exchange rate has a negative impact on inflation. The inflation level also depended on imported price. The value of exchange rate will affect imported price. If exchange rate is recognized as a major determinant of inflation, monetary policies can be implemented by government that have impact on exchange rate, which in turn affects the level of imported prices.

It is also recognized that some external factors also determine the inflation level in Malaysia. One of it is world crude oil price. Studies conducted by DaCosta and Greenidge (2008), and L'oeillet and Licheron (2009) show that oil price has a significant positive impact on inflation. Increase in oil price will increase the production cost of many goods and services.

1.4   Research Objectives

The main objective for this research study is to determine the effect of some macroeconomic variables, namely money supply, unemployment rate, exchange rate, oil price, on the inflation level in Malaysia.

This research study tries to achieve four main objectives stated as below:

(1) To investigate the relationship between money supply and inflation.

(2) To examine the relationship between unemployment rate and inflation.

(3) To examine the relationship between exchange rate and inflation.

(4) To examine the relationship between oil price and inflation.

1.5   Research Questions

In order to accomplish the research objectives stated as above, this research study attempts to answer the research questions below:

1) Does money supply affect inflation in Malaysia?

2) How does unemployment rate affect inflation in Malaysia?

3) What is the effect of exchange rate on inflation in Malaysia

4) What is the impact for oil prices on inflation in Malaysia?

1.7   Significance of Study

This research study is important because it will help to determine the factors that influence inflation in Malaysia. The results of this study will be tested by using several statistical test procedures.

It is hoped that this research study will provide some contribution to investors, government, and private sector firms. The research findings would help investors in their investment strategies. The results would be useful for government planners in their monetary and fiscal policies to

control the inflation level. For the firms, the findings will help in their business strategies including price and output decisions.

The main contribution of this study differentiating it from other studies of inflation in Malaysia is that the period of this study is until the latest year, which is 2010. Besides that, the econometric procedure used in this study is different from the statistical test procedure used by other researchers in Malaysia.

1.8   Organization of the Remaining Chapters

This research study includes five chapters. Chapter 1 describes the introduction and overview of the research study. Chapter 2 provides a review of the literature. The theoretical framework and development of hypotheses are also included in this chapter. Chapter 3 covers the methodology used in this study. Chapter 4 analyzes the results of the empirical findings. The study concludes in Chapter 5 which includes the contribution and implication of the research. The limitation of study and suggestions for future research are also discussed.

CHAPTER 2

LITERATURE REVIEW

2.1   Introduction

This chapter covers previous literature that had been undertaken on the relationship between inflation with money supply, unemployment rate, real effective change rates and oil prices. A theoretical framework as well as a set of hypotheses are also developed.

2.2   Money Supply

A study by Cheng and Tan (2002) identified the main factors that have significant effect on inflation of Malaysia. Quarterly data were selected from Q1 1073 until Q2 1997. From the results of the impulse response functions, it was shown that money supply has a significant positive effect on inflation.

A study was conducted by Armesh and Salarzehi etc (2010). to verify and examine the main determinants that affect inflation in Iran. Annual time series data from 1961 to 2005 were used. The simple econometric procedure, Ordinary Least Squares (OLS) was used to examine the relationship between the inflation and its factors. According to results from the OLS

estimation, it shows that there is the positive relationship between money supply and inflation. The long-run coefficient of the regressor has a positive sign which was expected and it was also statistically significant. They concluded that money supply has long-run positive impact on inflation in Iran.

Using annual data from 1970-2002, Kennedy and Bernard (2005) studied the main factors that cause inflation in Ghana. During the period 1973 - 1982, Ghana faced large balance of payment deficits because of military expenditure. In order to solve this deficit problem, expansionary monetary policy has been implemented by the government of Ghana. Consequently, the money supply significantly increased and this pushed up the general price level in Ghana. The inflation rate in Ghana increased by 123% in year 1983. From the test results that had been obtained from using ordinary least squares econometric method which estimated the long-run inflation function, it was shown that the coefficient for money supply has a positive sign which is also statistically significant. They concluded that in the long-run, inflation rate in Ghana would increase 15.72% if the money supply increases by 1%. Thus, their study supported monetarist theory of inflation.

The important factors that have an impact on inflation in Tanzania has been studied by Laryea and Sumaila (2001). In their study, the determinants of inflation include demand-pull, cost-push and structural factors. They used quarterly data from 1992 - 1998. In year 1994, the headline inflation in Tanzania increase around 33% because of high annual growth rate in money supply which was 32.5%. Subsequently, their Central Bank implemented tight monetary policy to control inflation. As a result, the money supply growth rate decreased from 32.5% in year

1994 to around 7.7% in year 1998. Correspondingly, the inflation rate in Tanzania experienced a significant decrease from 33.1% in year 1994 to about 12.8% in year 1998. Their study illustrated that inflation rate has significant positive correlation with growth rate of money supply. From the test results using ordinary least squares(OLS) econometric method, it was shown that money supply has significant effect on inflation in Tanzania. The long run elasticity of inflation to money supply is 0.77 and the results support the view of monetarist theory of inflation. From the test results of the Restricted Error-Correction Model, it was shown that money supply is an important factor that impact on inflation in Tanzania in the short run, with the short run elasticity being 0.3.

The relationship between inflation in Nigeria and its determinants from 1970 to 2007 was studied by Abidemi and Maliq (2010). According to the results from Augmented Engle-Granger (AEG) cointegration test, it showed that money supply growth rate has long-run positive relationship with inflation. From the results of Error Correction Mechanism (ECM) regression model, it found that money supply growth rate has positive impact on inflation rate in short run.

Ginting and Bird (2009) in their study on inflation in Cambodia from 2003 – 2008, found that money supply has a long run relationship with inflation. Before year 2007, the result showed the coefficient for money supply as 0.07. This means that inflation rate will increase 0.7% if the growth of money supply increases about 10%. After 2007, because of rapid economic growth, the coefficient of money supply was 0.155. This means that rise of money supply of 10% will cause inflation to increase by 1.55%. Besides that, the test results also illustrated that money

supply has short-run positive impact on the inflation. From the results, it concluded that money supply has positive long-run and short-run effect on inflation in Cambodia.

DaCosta and Greenidge (2008) examined the economic relationships between inflation rate and its determinants in selected Caribbean countries by analyzing the time series annual data from 1970 - 2006. The long-run relationship between inflation and its determinants was found using Dynamic Ordinary Least Squares (DOLS) procedure. The short-run relationship was found by using the Error Correction Model. Money supply is expected to have a positive relationship with inflation. The test results from the DOLS procedure shows that for Guyana, in the long run inflation will rise around 0.14% if money supply increases by 10%. The results also show that the inflation rate in Jamaica will increase by 1.21% if money supply rises by 10%. From the test results of the Error Correction Model, for Guyana, a 10% rise in money supply will cause inflation to increase by 0.37% in the short run.

Mohanty and Klau (2002), using data from 1980 to 1999, also showed that money supply has a positive relationship with inflation in Brazil, Mexico, Chile, Peru, Thailand, and Poland.

Monthly data from January 1997 until December 2003 had been used by Leheyda (2005) to study the inflation in Ukraine. He concluded that consumer prices in Ukraine increase around 8.2% when money supply increases about 46.9%. From the test results of Error Correction Term (ECT), it illustrated that in the short-run, money supply has a significant relationship with inflation in Ukraine.

There is a study conducted by Guimaraes-Filho and Crichton (2006) to study the determinants of inflation in Malaysia from 1991 to 2006. According to the results from the Error Correction Model, it shows that money supply has a positive relationship with inflation in Malaysia.

In a study by Lissovolik (2003), the test results of Johansen VAR procedure found that money supply has a significant impact on inflation in Ukraine.Using the OLS procedure, Ubide (1997) revealed that money supply has a long-run relationship with inflation in Mozambique. According to the results from the Error Correction Model, it shows that the short-run elasticity of money supply is 0.5. It means that money supply has short-run positive effect on inflation.

In a study by Akbari and Rankaduwa (2005) on Pakistan, it was found that inflation has a coefficient of elasticity of about 0.078 in the short-run and 0.48 in the long-run with respect to money supply. This means that if money supply increase by 10%, inflation will rise by 0.78% in short-run and rise about 4.8% in long-run.

The study on inflation of Turkey has been conducted by Lim and Papi (1997) based on quarterly data from year 1970 until 1995. From the test results using the Johansen Procedure, money supply has a positive relationship with inflation in the long-run. According to the results from Ordinary Least Squares (OLS) and instrument variables (IV), it was found that money supply has a positive effect on inflation in the short run.

According to Khan, Bukhari and Ahmed (2007), high inflation will happen if there is expansionary monetary policy such as high money supply growth. During the 1990s, Pakistan faced upward trend in inflation because of extreme growth in money supply.

2.3   Unemployment Rate

DaCosta and Greenidge (2008) has conducted the study to examine the relationship between inflation and rates and its determinants in selected Caribbean countries by analyzing the time series annual data from 1970 to 2006. The long-run relationship between inflation and each of its determinants can be found by using Dynamic Ordinary Least Squares (DOLS) procedure and the short-run relationship using Error Correction Model (ECM). The DOLS procedure results show that there is 3.8% decrease in inflation rate in Jamaica if unemployment rate climb up about 10%. For Trinidad and Tobago, there is 0.28% increase for inflation rate when the unemployment decreases by 10%. According to the ECM results, the inflation rate in Jamaica will increase 1.12% if unemployment decreases by 10%. The results also explain that when employment rate in Trinidad and Tobago increases by 10%, it will cause the inflation rate to go down by 0.34%.

In a study by Mohanty and Klau (2001) on determinants of inflation in emerging market economies, it was shown that unemployment rate has a negative relationship with inflation in Thailand, Chile, Taiwan, Czech Republic and Korea.

Furuoka (2007) investigated the relationship between unemployment rate and inflation rate in Malaysia from 1973 to 2004. The findings using the Johansen cointegration test shows that there is a negative relationship between unemployment rate and inflation rate in the long-run. The Granger-Causality Test based on VECM is conducted to examine the causality relationship between unemployment rate and inflation rate. According to results of t-test in this Granger-Causality Test, it illustrated that inflation rates has long-run causality relationship with unemployment, because error correction term (ECT) is negative and significant statistically. From the Wald test results in Granger-Causality Test, it shows that there is short-run Granger causality between unemployment rate and inflation rate. Therefore, he concludes that there is a long-run and short-run cointegrating and causality relationship between unemployment rate and inflation rate in Malaysia. These empirical results proved that Philips Curve, which gives the trade-off relationship between unemployment and inflation, does exist in Malaysia.

The panel data analysis method was used by Turner and Seghezza (1999) to inspect the Philip curve behavior in selected 21 OECD countries with time period from early 1970s until 1997. The Seemingly Unrelated Estimation (SURE) test method has been used by the authors to analyze the results. From the test results, Turner and Seghezza found that the Philips curve phenomena exists in the selected 21 OECD countries. In other words, the unemployment rate has a negative relationship with inflation.

Panel data analysis has been used by DiNardo and Moore (1999) to observe the Philips curve in nine member countries in OECD (Organization for Economic Co-operation and Development). The methodology which is used in this study is Generalised Least Squares (GLS)

and Ordinary Least Squares (OLS). The results, it supported the Philips curve hypothesis in the selected OECD countries. They also make a conclusion that there is significant and strong relationship between unemployment and inflation.

Macroeconomic data from year 1960 until 1993 have been used by Hogan (1998) to investigate the Philips Curve in United States which describe the pattern of unemployment and inflation relationship in this country. From the findings that have been found in this study, although Philips curve over-predicted the inflation rate, it still shows that unemployment has important and negative impact on inflation.

The study of anti-inflation policy in United States has been conducted by Samuelson and Solow (1960), who were among the earliest researchers who supported the Philips Curve hypotheses. On the research that they carried out, they investigated the relationship for the two macroeconomic variables unemployment and inflation in United States. The outcome shows that unemployment has an inverse relationship with inflation rates in United States.

Other studies have the same conclusion, for example Kitov (2007) concluded that unemployment and inflation has a negative relationship. A decrease of unemployment rate will cause inflation to increase; and Hansen and Pancs (2001) showed that the actual inflation rate has significant correlation with unemployment rate in Latvia.

Kibritcioglu (2002) concluded that there is a negative correlation or trade-off relationship between unemployment and inflation in Turkey. This means that a decrease in unemployment

rate will cause an increase in inflation rate, and vice versa. If the unemployment rate is decreased, there is excess demand in labor market and for goods market. This will cause a demand pull inflation.

2.4   Exchange Rate

In Cheng and Tan (2002)'s study, it was stated that during financial crisis in year 1997, Malaysia faced great inflation pressure because Malaysian Ringgit (RM) has been depreciated by about 40%. Their multivariate causality test results from the VECM show that external factors such as exchange rate has direct relationship with inflation. This is because Malaysia is an open economy and thus foreign direct investment, foreign technology and foreign trade play a important role in the Malaysian economic growth. The variance decomposition test result shows that exchange rate has transitory and shorted-lived effect on inflation. The results from the impulse response functions also show that inflation reacted negatively very rapidly and temporary with the depreciation of exchange rate.

The relationship between inflation in Nigeria and its determinants from 1970 to 2007 has been studied by Abidemi and Maliq (2010). According to the results from the Augmented Engle-Granger (AEG) cointegration test, it shows that exchange rate has long-run negative relationship with inflation.. From the results of Error Correction Mechanism (ECM) regression model, it found that exchange rate has negative impact on inflation rate in the short run.

In Khan, Bukhari and Ahmed (2007)'s study, using Ordinary Least Square (OLS), it was found that exchange rate has a significant impact on inflation in Pakistan. If exchange rate is depreciated, imported price level for goods and services will rise. As a result, it will contribute to inflationary phenomenon in the economy. During the 1990s, Pakistan faced upward trend in inflation because of depreciation of its currency.

In a study by DaCosta and Greenidge (2008), the long-run relationship between inflation and each of its determinants can be found by using Dynamic Ordinary Least Squares (DOLS) procedure. From the test results that have been obtained from DOLS procedure, if exchange rate of Guyana is depreciated by 100%, the inflation rate will increase only 0.0134%. In Jamaica, inflation rate will rise by 1.98% if exchange rate is depreciated about 10%. The exchange rate has a negative relationship with inflation. This is because price level of related goods and services that were imported from other countries will become higher if the exchange rate of country is depreciated.

Mohanthy and Klau (2001) has performed the study on determinants that affect inflation in emerging market economies. By using data from 1980 to 1999 for analysis, the test results shows that exchange rate has a negative impact on inflation in Brazil, Mexico, Hungary, Korea, Thailand, and Malaysia.

Ubide (1997) revealed that the inflation in Mozambique rose to 54% in year 1992 because of depreciation of currency in Mozambique. In year 1994, inflation in Mozambique increased to

70% due to the depreciation of its currency in the previous year. From the test results, it shows that exchange rate has a significant long run and short-run impact on inflation in Mozambique.

Inflation in Ireland during time period 1979 until 1995 has been studed by Kenny and McGettingan (1997). According to the test results using the Johansen Co-integration Procedure, it shows that exchange rate has a significant negative effect on inflation. This means that when exchange rate is depreciated, inflation in Ireland will increase.

A study on inflation in Turkey was conducted by Lim and Papi (1997) using quarterly data from year 1970 to 1995. From the test results attained using Johansen Co-integration Procedure, exchange rate has a negative relationship with inflation in the long-run. When the exchange rate depreciates, the inflation rate will increase. According to the test results from Ordinary Least Squares (OLS) and instrument variables (IV), it was found that exchange rate has an impact on inflation in the short run.

The monthly data for economic variable from January 1997 until December 2003 has been used by Leheyda (2005) to study the inflation in Ukraine. From the test results on Error Correction Term (ECT), it illustrated that in the short-run, exchange rate has a significant relationship with inflation in Ukraine.