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通貨膨脹與失業對經濟增長伊拉克的影響研究 - 基於VAR方法。

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**A Thesis Submitted in Partial Fulfillment of the Requirements
for the Degree of Master of Economics**

**A Study of The Effects of Inflation and Unemployment on
Economic Growth in Iraq- Based on VAR Approach.**

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Ali Salman

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摘要

失业与通货膨胀之间的负相关被称为菲利普斯曲线,因为这两个变量之间的均衡关系在 1958 年由威廉·菲利普斯首次提出。几十年来,菲利普斯曲线一直是各国宏观经济政策制定的一个重要工具。

考虑到大多数菲利普斯曲线研究都是建立在发达国家以及总体经济水平的基础上。本研究着重在一个发展中国家(分散经济水平)——伊拉克,旨在经验分析失业和通货膨胀在伊拉克经济水平上对经济增长的影响。目前调查的主要发现是:失业和通货膨胀对伊拉克的影响确实存在均衡关系。换句话说,该研究结果支持菲利普斯曲线假说的正确性。

关键词:失业,通货膨胀,经济增长,菲利普斯曲线,VAR 方法,伊拉克

Abstract

The negative association between unemployment and inflation is known as the Phillips Curve because the trade-off relationship between these two variables was first pointed out by William Phillips in 1958. For several decades, the Phillips Curve has been an important tool for macroeconomic policy formulations in various countries.

Considering the fact that the majority of the studies on the Phillips Curve have been done in the context of the developed economies and on an aggregate level, this study focuses on Iraq, a single developing economy (a disaggregated level) and aims to empirically analyze the impact of Unemployment and inflation on economic growth in the economy of Iraq. The main finding of the current inquiry is that there existed an equilibrium impact between unemployment and inflation in Iraq. In other words, the results of this study support the validity of the Phillips Curve hypothesis.

Keywords: Unemployment, Inflation, Economic Growth, Philips Curve,
VAR Approach, Iraq.

华中科技大学硕士学位论文

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INTRODUCTION

1.1 Background of the Study

Three ultimate macroeconomic goals which every government strives to achieve in order to ensure sound macroeconomic policy are maintenance of relative stability in domestic prices, attainment of a high rate of employment or full employment and achievement of a high rapid and sustainable economic growth. The relationship between inflation and unemployment on growth remains a controversial one in both theory and empirical findings. Originating from the Latin American context in the 1950s, the issue has generated an enduring debate between structuralists and monetarists. The structuralists believe that inflation is essential for economic growth, whereas the monetarists see inflation as detrimental to economic progress. There are two aspects to this debate:

- (a) The nature of the relationship if one exists and
- (b) The direction of causality.

Friedman (1973) succinctly summarized the inconclusive nature of the relationship between inflation and unemployment on economic growth as follows: —historically, all possible combinations have occurred: inflation and unemployment with and without development, no inflation and unemployment with and without development. The main problems facing the economy of Iraq today are unemployment and inflation. These problems are persistently complex and cause economic and social dilemma to the economy as a whole. The inability of government to provide a lasting solution to these twin challenges has contributed to a serious problem on the economic life, political system and the entire economy.

Even though intensive research on the relationship between inflation and unemployment has unobliviously uncovered some important results, the linkages between these two macroeconomics variables as well as the precise effect is still open, and has long been a controversial topic.

The general inclusive concept that provided a negative correlation between inflation and unemployment, which has been at the center of policy discussion, was first presented

in 1958 and later became known as the Philips curve. Philips (1958) observed that, one stable curve can be used to represent inflation and unemployment trade-off. This model has been at the heart of many economists because it throws light on the effect of monetary policy in an economy. The Philips curve has played a central role in macroeconomics by enhancing policy makers' understanding of an economy whenever they deem it fit to formulate monetary policy (Fuhrer et.al, 2008). It further emphasizes the need for policy makers to act cautiously when managing monetary policies since it can push the two variables in opposing directions.

The trade-off between inflation and unemployment has been confirmed by researchers using different econometric models. Berument et.al (2008) studied the effect of policy shocks on unemployment in Turkey. Using Vector Autoregressive techniques, the study tried to find out how policy shock affects unemployment in nine sectors. The estimated result showed that, unemployment decreases whenever there is a positive income and money shock.

The reason being that policy makers would be torn between fighting unemployment either by expanding aggregate demand or reducing inflation by compressing aggregate demand. While this situation may put policymakers off in applying a Philip-based curve for inflation forecast, several studies have concluded that, the increased inflation experienced by U.S between 1970s and 1980s was as a result of productivity slowdown and also policy makers learning about the persistence of trade-off in inflation and unemployment (see for instance; Orphanides 2003, Primiceri, 2006). Other studies have also shown that the simultaneous high inflation and unemployment was due to the fact that, monetary policy makers operated with mis-specified Philips curve (Sargent et.al 2006). In spite of these contrasting arguments, the conflicting views have highlighted an important role of some Philips curve in the conduct of monetary policies hence trade-offs between inflation and unemployment as shown by the Philips curve can never be overlooked.

1.1.1 Significance of the Study

In spite of contrasting arguments in the many previous studies, the conflicting views have highlighted an important role of some Philips curve in the conduct of monetary policies which in all goes down to affect economic growth, hence tradeoff between

inflation and unemployment shown by the Philips curve can never be overlooked.

The adverse effects of unemployment and inflation on economic growth has attracted the attention of government and researchers the world over. Among the main and major problems of policy makers are how to maintain low and stable unemployment as well as relatively stable prices so as to achieve high economic growth. Several studies have been conducted on the impact of unemployment and inflation on economic growth.

Further more significance of this study lies on the fact that huge amount of resources (human and capital) are unemployed which could cause poor economic performance. This thesis will help policy makers to establish the extent of the effect of unemployment and inflation rates on economic growth. This thesis will improve the body of existing literature and also serve as a policy document in the economy of Iraq. The problems of high level of unemployment and inflation need to be addressed in order to improve economic growth in Iraq.

1.1.2 Idea/Methodology

The econometric model of this study is examined through different techniques, in order to make correct statistical inferences. The application of different techniques will allow us to verify our conclusion.

This main idea is to formulate of models that captures the relationship among the variables of interest. This is followed with analysis of data and interpretation of major findings for policy implications. The study employs Vector Autoregressive (VAR) Model Approach using annual time series data spanning from 1990-2014 obtained for the following variables: inflation rate, money supply, Gross Domestic Product (GDP), Unemployment, a percentage of total of labour force and interest rate. The data for the study is obtained from Central Bank of Iraq (CBI) Statistical Bulletin of Iraq, 2015 and World Data Bank (World Economic Indicators).

1.2 Research Questions

Given the above research problem, the research will be guided by these questions;

- ✓ Are there effects of unemployment on economic growth in Iraq?
- ✓ Are there effects of inflation on economic growth in Iraq?

✓ Is there a tradeoff between inflation and unemployment by the Philip- based curve analysis in the economy of Iraq?

1.2.1 Statement of the Research Problem

In the economy of Iraq, a day will never pass by without hearing politicians, economist and the ordinary citizen arguing about unemployment and inflation. In some cases, inflation and unemployment are high for some few months and then reduces for other months. Inflation and unemployment, the contributions of Phelps (1968), Friedman (1968), notwithstanding the empirical studies that confirms the inverse relationship between Lucas (1973) as well as the oil shocks of the 1970's have cast doubt on the validity of the Philips curve. The implication of the oil shocks which took place during the 1970's and 1980's is that if OPEC should cut output and raises world prices of oil today, then there is a possibility for some economies to simultaneously experience high inflation and unemployment which may contrast the general notion presented by Philips (1958). In such a situation, relying on the Philips curve for inflation forecast and for policy purposes will pose serious consequences. Iraq, being a major oil producing nation can improve its economy with this study since the independent variables for the study being Inflation and Unemployment is a proxy to economic development.

1.2.2 Objective of the Study

The main objective of this study is

- To find the effect of unemployment on Economic growth.
- To find the effect of inflation on Economic growth.
- To suggest some important policy about inflation and unemployment and Economic growth.

From the studying of literature review, I formulate my hypothesis i.e.

$H_0(A)$: Unemployment has significant effects on GDP

$H_0(B)$: Inflation has significant effects on GDP

1.3 Contribution /Originality

This study will contribute to the existing literature on the effects of inflation and

unemployment on economic growth in Iraq. It will however attempt to answer key questions such as; is there a relationship between inflation and unemployment on economic growth in Iraq? And also is there a tradeoff between inflation and unemployment by the Philip based curve analysis in the economy of Iraq? Furthermore the findings of my study will be relevant to draw up some highlights for setting up new strategies to improve the inflation and unemployment situation in Iraq. An investigation will be carried out to come up with possible option recommendation for policies regarding inflation and unemployment to become a better one.

1.3.1 Scope and Limitations

The study will cover the period of 1980-2013. This period is selected on the grounds that major economic reforms in Iraq took place within this period. The major limitations to this study were the unreliable data on unemployment and inflation rates. Sometimes there are conflicting data on the same variable from different sources.

1.4 Outline of the Study

This study is structured into six chapters: following the introduction in chapter one (1) will be the literature review which occupies chapter two (2). Chapter three (3) takes the review of inflation, unemployment and economic growth in Iraq. Chapter four (4) takes the methodology. Analysis of data and interpretation of findings occupies chapter five (5) and lastly chapter six (6) takes summary, conclusion and recommendation(s).

LITERATURE REVIEW

Introduction

The work popularly known as ‘the Phillips curve’ was originated by Sir A. W. Phillips in 1958. Historically, Phillips (1958) plotted 95 years UK data on wage inflation against unemployment. He discovered a short run tradeoff between unemployment and inflation. Therefore, he posited the theory that, falling unemployment might cause rising inflation and a fall in inflation might be possible by allowing unemployment to rise. If government wants to reduce unemployment rate, it could increase aggregate demand, although this might temporarily increase employment, it could also have inflationary implications in labour and the product markets. In reality, Phillips hypothesized that the lower the unemployment rate, the tighter the labor market and the faster firms raise wages to attract scarce labour. At higher rates of unemployment, the pressure abated. The Phillips curve represents the average relationship between unemployment and wage behavior over the business cycle. It illustrated the rate of wage inflation that would result if a particular level of unemployment persisted for some time. After Phillips’ work, Economists studied the Phillips curve; some validated it while others refuted it. Thus, Friedman (1977) contended that there is no trade-off between inflation and unemployment in the long run, representing a monetarist view of Phillips curve. He argued that, any attempt to hold the unemployment rate at an artificially low level would cause inflation to accelerate indefinitely. He argued that, there is a natural rate of unemployment where the real wage rate is in long run equilibrium for employment rate to be below the natural rate, employers and potential employees must be willing to be hired. An employer will engage more employees only if there is an actual decrease in the real wage rate, whereas potential employees, will accept work only if there is an actual or perceived increase in the real wage rate. Hence, any unemployment rate below the natural rate must, in the long run, be a disequilibrium rate. According to Friedman (1977) workers are not likely to suffer from money illusion, as they will not ignore what happens to their real pay in the long run. An initial higher wage will force employers to raise prices in order to afford paying the higher wages, this will still lead to a higher wage demand, which in turn leads to higher prices.

Therefore, there is no end to the wage price spiral at any rate of unemployment below the natural rate.

Several attempts, especially (Stock and Watson (1999) and Williams and Adedeji (2004)) have been made to conduct systematic studies on the inflation, unemployment and economic growth. This chapter is devoted to the review of existing literature on past studies on inflation and unemployment and economic growth.

2.1 Conceptual Framework

The meaning of the basic concepts was reviewed couple with the types, effects and remedies of the two phenomena (unemployment and inflation) in Iraq.

2.2.1 The Concept of Inflation, Definition and Types

This is the persistent increase in the level of consumer prices or a persistent decline in the purchasing power of money, basically caused by an increase in available currency and credit beyond the proportion of available goods and services (Webster 2000).

According to Balami (2006), inflation is a situation of a rising general price level of broad spectrum of goods and services over a long period of time. It is measured as the rate of increase in the general price level over a specific period of time. To the neo-classical and their followers at the University of Chicago, inflation is fundamentally a monetary phenomenon. In the words of Friedman, inflation is always and everywhere a monetary phenomenon and can be produced only by a more rapid increase in the quantity of money than output.” According Hicks, ”inflation is a continuous rise in general price level.” Dernberg and McDougall (1976) are more explicit when they wrote that...the term inflation usually refers to a continuing rise in prices as measured by an index such as the consumer price index (CPI) or by implicit price deflator for gross national product.” Keynes and his followers emphasize the increase in aggregate demand as the source of demand-pull inflation. Inflation can be conceptualized as persistence rise in the general price level of broad spectrum of goods and services over a long period as a result of cost-push. To the monetarists inflation is defined as too much money chasing too few goods. Inflation can be measured using the CPI formula below

$$CPI = P_{t+1} - P_t / P_t \times 100 \dots \dots \dots (1)$$

Where P_{t+1} is current year price, P_t previous year price or base year price.

2.1.2 Types of Inflation

There are many kinds of inflation but the four main types are;

- Creeping inflation
- Walking Inflation
- Galloping Inflation and
- Hyper Inflation

2.1.3 Causes of Inflation

According to the classical and neoclassical economists, inflation is caused by increase in the volume or quantity of money in circulation assuming that velocity of circulation and output level is constant and given the equation of exchange $MV=PQ$. To the Keynesians inflation is caused by persistent increase in the demand for goods and service assuming that velocity of circulation and output level is not constant and that when quantity of money increases the first noticeable thing is increase in interest rate and not increase in price level. The monetarist position is in sharp contrast to the structuralist school, which sees financial factors as forces propagating inflation rather than causing it. According to structuralist school inflation can result from a number of special problems in developing countries, and not just from excessive money growth. Their explanation of inflation usually centers around “structural” problems such as supply bottlenecks or high dependency on imported intermediate goods. Inflation could also arise from the cost side. Costs could change through a supply shock, an increase in local earning power arising from a boom in export earnings, (for instance, Nigeria oil boom), or devaluation. Any of these could result in a push for higher nominal wages, which drive up production costs and increases final goods prices (Layi, 1999).

2.1.5 The Concept of Unemployment, Definition and Types

Unemployment is defined by the Bureau of Labor Statistics (BLS) as people who do not have a job, have actively looked for work in the past four weeks, and are currently available for work. Also, people who were temporarily laid off and are waiting to be called back to that job are included in the unemployment statistics.

Those who have not looked for work within the past four weeks are not only no

longer counted among the unemployed, they are also removed from the labor force by the BLS.

According to Balami (2006) unemployment is conceptualized as a situation wherein a worker is or workers are involuntarily out of work. This means that workers are willing and able to work but cannot find any work.

Unemployment has been defined by the classical economists as the excess supply of labour over the demand for labour which is caused by adjustment in real wage. The Classical or real-wage unemployment occurs when real wages for jobs are set above the market-clearing level, causing the number of job-seekers to exceed the number of vacancies.

Unemployment was defined by the International Labour Organization (2009) as a state of joblessness which occurs when people are without jobs and they have actively sought work within the past four weeks. The unemployment rate is a measure of the prevalence of unemployment and it is calculated as a percentage by dividing the number of unemployed individuals by the number of individuals currently in the labour force. In a 2011, Business Week Reported, “More than two hundred (200) million people globally are out of work, a record high, as almost two-thirds of advanced economies and half of developing economies are experiencing a slowdown in employment growth.

According to Aminu and Anono (2012) Unemployment can be conceptualized as the total number of people who are willing and able to work, and make themselves available for jobs at the prevailing wage but no work for them. This therefore, implies that unemployment is a state of joblessness in the country. Unemployment can be measured using the following formula

$$\text{Unemployment} = \frac{\text{number of unemployed people}}{\text{labour force}} \times 100$$
$$(\text{UR} = \frac{\text{UN}}{\text{L}} \times 100) \dots \dots \dots (2)$$

$$\text{Labour force} = \text{No. of employed} + \text{No. of unemployed}$$
$$(\text{L} = \text{EM} + \text{UN}) \dots \dots \dots (3)$$

2.1.8 Types of Unemployment

There are three main types of unemployment: structural, frictional and cyclical. The first two make up the natural unemployment rate, while the third rises when demand falls, usually during a recession.

2.1.9 The concept of Economic Growth

Increase in a country's productive capacity, as measured by comparing gross national product (GNP) in a year with the GNP in the previous year.

According to Balami (2006) Economic growth which is always proxied by GDP often conceptualized as increase in output of an economy's capacity to produce goods and services needed to improve the welfare of the country's citizens. Growth is seen as a steady process which involves raising the level of output of goods and services in the economy. Growth is meaningful when the rate of growth is much higher than population growth because it has to lead to improvement in human welfare. Therefore, growths is seen as a steady process of increasing the productive capacity of the economy and hence, of increasing national income, being characterized by higher rates of increase of per capita output and total factor productivity, especially labour productivity. According to Ogiogio (1995) emphasized that adequate funding of public sector recurrent budget makes for an effective and functional civil service, and hence, the effectiveness of implementation of development policies and programmes. Also Hemming (1991), also argued, even apparently less productive expenditure, security, for example, provides social and political stability that is necessary for growth, and reducing such spending could be counter-productive. The main conclusions that can, therefore, be derived from these studies are that, public expenditure contributes to growth, and that composition rather than the level which is important.

According to Wikipedia, the free encyclopedia (2013) economic growth is measured as a percentage change in the Gross Domestic Product (GDP) or Gross National Product (GNP). These two measures, which are calculated slightly differently, total the amounts paid for the goods and services that a country produced. As an example of measuring economic growth, a country that creates \$9,000,000,000 in goods and services in 2014 and then creates \$9,090,000,000 in 2015, has a nominal economic growth rate of 1% for 2015. Inflation or deflation can make it difficult to measure economic growth.

2.1.10 Concept of the Philips curve

The Phillips curve is a historical inverse relationship between rates of unemployment and corresponding rates of inflation that result in an economy. Stated simply, decreased

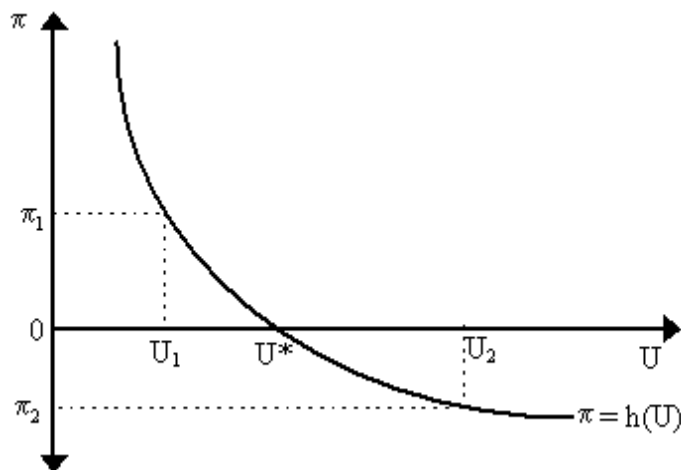
unemployment, (i.e., increased levels of employment) in an economy will correlate with higher rates of inflation.

In 1958, William Phillips published his seminal paper entitled “The Relationship between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom 1861 – 1957”. According to Phillips, there existed a strong negative association between unemployment and inflation in the country during the observation period. This trade-off relationship discovered by Phillips is now known as the “Phillips Curve”. “The Phillips curve represents the relationship between the rate of inflation and the unemployment rate. Although he had precursors, A. W. H. Phillips’s study of wage inflation and unemployment in the United Kingdom from 1861 to 1957 provided evidence of a consistent inverse relationship: when unemployment was high, wages increased slowly; when unemployment was low, wages rose rapidly. Phillips conjectured that the lower the unemployment rate, the tighter the labor market and, therefore, the faster firms must raise wages to attract scarce labor. At higher rates of unemployment, the pressure abated. Phillips’s “curve” represented the average relationship between unemployment and wage behavior over the business cycle. It showed the rate of wage inflation that would result if a particular level of unemployment persisted for some time” (Hoover, 2008). Most studies made use of the general price inflation rate as a proxy for wage inflation rate. Despite some criticisms of the basic tenets of the Phillips Curve, the hypothesis remains one of the most important foundations for macroeconomics. Since 1958 till the present time, numerous academic inquiries have been done on the relationship between unemployment and inflation in various countries. As Hart (2003, p.108) observed, “The Phillips curve still plays a prominent role in macroeconomic theory and associated empirical work”.

Some of the theories of the relationship between unemployment and inflation are also reviewed. The Milton Friedman Nobel memorial lecture (1976), the Phillips curve is categorized into four theories namely: the negative, the natural hypotheses, and the positive hypotheses. Keynes is left with the explanation of the Phillips curve and postulated a shift in Phillips curve.

Professional analysis of the relation between inflation and unemployment has gone

through two stages since the end of World War II and is now entering a third. The first stage was the acceptance of Philips hypothesis.



The simple Philips Curve (FIGURE 1)

Philips argued that there was a stable negative relation between the level of unemployment and the rate of change of wages. High levels of unemployment being accompanied by falling wages, while low levels of unemployment by rising wages. The wage change in turn was linked to price change by allowing for the secular increase in productivity and treating the excess of price over wage cost as given by a roughly constant mark-up factor.

Fig. 4 illustrates this hypothesis which Friedman followed the standard practice of relating unemployment directly to price change, short-circuiting the intermediate step through wages.

This relation was widely interpreted as a causal relation that offered a stable trade-off to policy makers. They could choose a low unemployment target; such as U_L at the cost of inflation. In that case they would have to accept an inflation rate of A . There would remain the problem of choosing the measure (monetary fiscal, perhaps other) that would produce the level of aggregate nominal demand required to achieve U_L , but if that were done, there need be no concern about maintaining that combination of unemployment and inflation. Alternatively, the policy makers could choose a low inflation rate or even deflation as their target. In that case they would have to reconcile themselves to higher unemployment U_O , for zero inflation, U_H , for deflation Friedman (1976).

Unfortunately for this hypothesis, in Iraq evidence failed to support it.

Empirical estimates of the Philips curve relation were unsatisfactory. More important, the inflation rate that appeared to be consistent with a specified level of unemployment did not remain fixed: among countries. Looking at the other way round, high rates of inflation that had earlier been associated with low levels of unemployment later change to high levels of unemployment. The phenomenon of simultaneous high inflation and high unemployment increasingly forced itself on public and professional notice, receiving the unlovely label of “stagflation”. Researchers are skeptical about the validity of a stable Philips curve. What mattered for employment was not wages in dollars but real wages—what the nominal wages would buy in the market.

Low unemployment would, indeed mean pressure for a higher real wage—but real wages could be higher even if nominal wages were lower, provided that prices were still lower. Similarly, high unemployment would, indeed, mean pressure for a lower real wages could be lower, even if nominal wages were higher, provided prices were still higher.

According to him there is no need to assume a stable Philips curve in order to explain the apparent tendency for an acceleration of inflation to reduce unemployment. That can be explained by the impact of unanticipated changes in nominal demand on markets characterized by (implicit or explicit) long-term commitments with respect to both capital and labour. Long-term labor commitments can be explained by the cost of acquiring information by employers about employees and by employees about alternative employment opportunities plus the specific human capital that makes an employee’s value to a particular employer grow over time and exceed his value to other potential employers Friedman (1976).

When the Neo-Keynesians decided to incorporate labor market dynamics into their IS-LM model, the empirical Phillips Curve provided the excuse and the troublesome money wage left hanging in Chapter 19 of Keynes's General Theory (1936) provided the incentive. The Phillips Curve relates money wage inflation to unemployment in the following general fashion:

$$(dw/dt)/w = h(U)$$

$$\text{Where } h' < 0$$

So that as unemployment increases, then wage inflation declines. Tying price movements one-for-one to wage movements, then this could be rewritten:

$$p = (dp/dt)/p = h(U)$$

So that price inflation was negatively correlated with unemployment. The Phillips Curve is hereby illustrated in Figure 4

The theoretical argument provided by Richard Lipsey (1960) was based largely on Neoclassical micro theory transferred to macroeconomics and formulated in the tradition of the "demand-pull" theories. Effectively, Lipsey argued that if labor markets for a particular industry were in disequilibrium, then the speed at which (nominal) wages adjust depends on the ratio of the difference between labor demand and supply to the supply of labor, i.e.

$$(dw/dt)/w = \frac{1}{2} [(L_d - L_s)/L_s]$$

Where $\frac{1}{2} \frac{1}{2} > 0$

So, thus, the larger the excess demand for labor in this industry, the faster the rate of adjustment of the money wage. As $(L_d - L_s)/L_s = -U$, then the rate of growth of money wages in this industry is negatively related to unemployment in this industry. If there is no productivity growth, then for profit-maximizing firms, the real wage should be constant, so that $(dw/dt)/w = (dp/dt)/p$ thus inflation, p , is negatively related to the unemployment rate - the Phillips Curve relationship, $p = h(U)$ (we can translate $\frac{1}{2} = -h$). The non-linearity of the Phillips Curve is justified by appeals to frictional unemployment and institutional difficulties at the extremes. However, what is not satisfactory in this explanation is how a level of inflation and unemployment can be sustained at positive amounts. The microeconomic theory, after all, suggests that eventually equilibrium will be reached and unemployment eliminated. Positive unemployment can possibly be justified on the basis of frictional issues (workers changing jobs, etc.), but positive inflation, as the equation above indicates, relies on a persistent excess demand for labor.

2.1.11 The Concept of Money supply

According Layi (1999) money supply means the amount of money which is available in an economy in sufficiently liquid and spendable form. What constitute the components of this money supply depends on what has been officially accepted by monetary

authorities of each country as the constituents of money supply for that country. Thus, each country's money supply definition may be unique. According to him the narrowest definition of money supply in modern time is currency plus demand deposit and this definition is known theoretically as M1.

$$M_1 = C + DD$$

Where C is currency held by the public and not in commercial or merchant banks or currency in circulation less notes and coins in the vault of commercial and merchant banks and DD is demand deposit or current account deposit of the banking system net of federal government demand deposit. According to Layi (1999) economist have argued that there are more financial assets that perform the functions of money or that are sufficiently liquid to be accommodated within the definition of a country's money supply. To him one of these assets is Time deposit. Although they are for specific terms or may be subject to notice on withdrawal, they are not, in practical terms, difficult to convert into cash and this leads to M2 that is a wider definition of money and the components of which are:

$$M_2 = C + DD + TD$$

Or

$$M_2 = M_1 + TD \text{ (since } M_1 = C + DD \text{)}$$

According to Layi (1999) C and DD as definition of money while TD = Time deposit in local currency. A much wider definition of money is the inclusion of savings deposit of commercial banks, mortgage banks, investment and property Development Corporation etc. which is known as M3 and made up of:

$M_3 = C + DD + TD + SD$. Where SD = Savings deposit. This study adopted M_2 definition of money supply and used it for its analysis.

Theoretically relationship between money supply and growth of output proxied by GDP or GNP was discussed by the equation of exchange as follows:- $MV = PQ$. From the exchange equation above, we would notice that PQ equals total expenditure and equals the GNP using expenditure approach to national income estimation (Layi, 1999). The equation could therefore, be re-written as follows: $MV = PQ = GNP$. According to him doubling money supply will simultaneously double the level of GNP. This implies that money supply and economic growth relate positively. That is, as money supply increases, the

growth of the economy increases. This study adopted this theoretical assertion.

In modern theory the general price level is determined by the forces of aggregate demand and aggregate supply. It aged tends to be greater than aggressive price level will move up and visa-versa. The theory may be stated suing the equation of exchange:

$$MV = PQ, M = PQ/V, P = MV/Q, Q = MV/P, V = PQ/M$$

Where

M = money supply, V = velocity of money, P = price level and Q = physical volume of goods and services.

At full employment equilibrium, increase in money supply will lead to increase level of output and this will increase employment.

Keynesian and Keynes criticized the quantity theory of money in the following way:

- i. Velocity of circulation is not constant because, it is influenced by price expectations. Expected higher price will increase velocity and lower price will reduce velocity
- ii. To them prices are not flexible (upward or downward) but always upwards.
- iii. When money supply changes the first noticeable things is changes in the interest rate, not change demand for goods and services. Excess demand is converted into demand for bonds and securities not for goods and services by household.
- iv. Transaction is not constant because of existence of business cycles in the economy
- v. People have more than one motive for holding money

2.2 Theoretical Literature

From the theoretical perspective, Fisher (1911) explained that any change in the quantity of money produces an exactly direct and proportional change in the price level. The quantity theory of money or equation of exchange was originated by the famous economist, Irving Fisher. However, Keynes (1936) strongly argued that, a change in the quantity of money may or may not affect prices. Actually, the changes in supply of money and prices are seen via their impact on the rate of interest, level of investment, output, employment and income. In fact, Keynes' theory provides causal mechanism by which a change in quantity of money influences interest rate, and interest rate induces investment while investment leads to a multiplier effect on income, output and employment. The multiplier effect may lead to a change in cost of production which in turn affects the price

level. However, the neo-Keynesian theoretical exposition combines both aggregate demand and aggregate supply. The neo-Keynesian school assumed a Keynesian doctrine on the short-run and a classical view in the long-run. The simplistic approach is to consider changes in public expenditures or the nominal money supply and assumes that expected inflation is Zero. However, aggregate demand increases with real money balances and decreases with the price level. The neo-Keynesian theory focuses on productivity, because declining productivity signals diminishing returns to scale and induces inflationary pressures, resulting mainly from over-heating of the economy and widening output gap. Moreover, Umo (2007) opined that when total demand increases more than the increase in the existing supply of output, demand pull inflation occurs. It is the stepped-up general demand which is pulling the general price level upwards. Besides, demand pull inflation is the excessive aggregate demand facilitated by excess supply of money. Fiscal and monetary policies are eminently suitable for dealing with this type of inflation. He identifies the following policies that directly or indirectly deal with cost push inflation which includes; enhancing the efficiency and social responsibility of big businesses and trade unions, wage price control, and indexing policy.

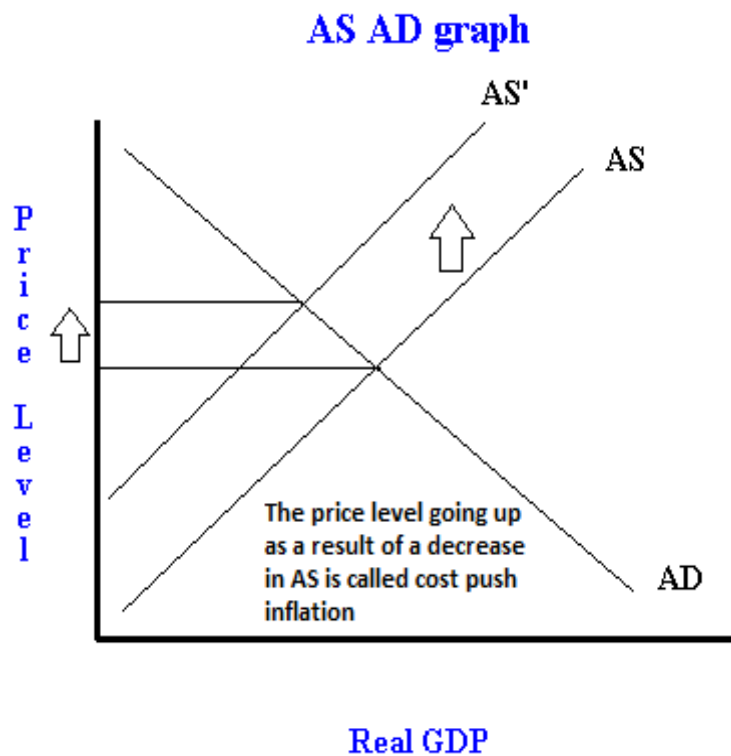
2.2.1 Theories of inflation

The most common theories of inflation according to Balami (2006) are cost-push inflation and demand-pull inflation.

➤ Cost-push inflation

According to Balami (2006) is a kind of inflation which is caused by a decline in the total output of a given economy as a result of persistent increase in the cost of production. This form of inflation is sometimes regarded as the supply side inflation. Cost-push inflation happens when SRAS shifts to the left (decreases) and intersects the AD curve to the left of where AD and LRAS cross. This will cause inflation in the short run, but prices will drop back down again in the long run as the labor market adjusts back to equilibrium (with wages dropping). It should however be noted that some classes ignore the long run, and only care about where AD and AS cross and in this case cost-push inflation is a permanent shift in the AS curve causing some amount of inflation. Cost push inflation can also occur when we experience rising prices due to higher costs of

production and higher costs of raw materials. Cost push inflation is determined by supply side factors (cost-push inflation is different to demand-pull inflation which occurs due to aggregate demand growing faster than aggregate supply). Cost-push inflation can lead to lower economic growth and often causes a fall in living standards, though it often proves to be temporary.



The Cost Push Inflation (FIGURE 2)

Cost-push inflation further occurs when businesses respond to rising costs, by increasing their prices to protect profit margins. There are many reasons why costs might rise. Some of these reasons are:

- ✓ Component costs: e.g. an increase in the prices of raw materials and components. This might be because of a rise in global commodity prices such as oil, gas copper and agricultural products used in food processing – a good recent example is the surge in the world price of wheat.

- ✓ A fall in the exchange rate – this can cause cost push inflation because it normally leads to an increase in the prices of imported products. For example during 2007-08 the

pound fell heavily against the Euro leading to a jump in the prices of imported materials from Euro Zone countries.

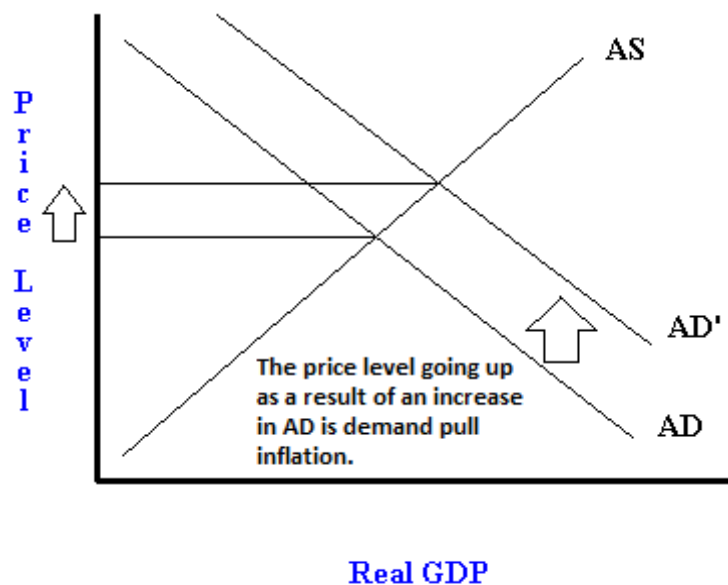
Cost-push inflation can be illustrated by an inward shift of the short run aggregate supply curve. The fall in SRAS causes a contraction of GDP together with a rise in the level of prices. One of the risks of cost-push inflation is that it can lead to stagflation.

Important note: Many of the causes of cost-push inflation come from external economic shocks – e.g. unexpected volatility in the prices of internationally traded commodities and large-scale movements in variables such as the exchange rate. A country can also import cost-push inflation from another country that is suffering from rising inflation of its own.

➤ **Demand-pull Inflation**

This is a kind of inflation which is as a result of a persistent increase in demand for goods and services. Aggregate demand is the summation of the demand for goods and services. If the demand for goods rises, it results in what is referred to as Demand-pull inflation according to Balami (2006). This as shown in the diagram, Demand-pull inflation happens when aggregate demand (AD) increases in an economy and intersects the short run aggregate supply curve (SRAS) to the right of where SRAS and long run aggregate supply (LRAS) cross. This causes some inflation to occur in the short run, and even more in the long run as the economy adjusts (and the labor market moves back to equilibrium). Demand-pull inflation can occur for a reason that causes AD to increase but the most common are expansionary fiscal and monetary policy, and positive expectations about the future (increased growth/income expectations).

AS AD graph



The Demand pull inflation (FIGURE 3)

Again, Demand pull inflation occurs when aggregate demand and output is growing at an unsustainable rate leading to increased pressure on scarce resources and a positive output gap. When there is excess demand in the economy, producers are able to raise prices and achieve bigger profit margins because they know that demand is running ahead of supply. Typically, demand-pull inflation becomes a threat when an economy has experienced a strong boom with GDP rising faster than the long run trend growth of potential GDP.

Some of the possible causes of demand pull inflation are;

- ✓ A depreciation of the exchange rate which makes exports more competitive in overseas markets leading to an injection of fresh demand into the circular flow and a rise in national and demand for factor resources – there may also be a positive multiplier effect on the level of demand and output arising from the initial boost to export sales.

- ✓ Higher demand from a government (fiscal) stimulus e.g. via a reduction in direct or indirect taxation or higher government spending and borrowing. If direct taxes are reduced, consumers will have more disposable income causing demand to rise.

- ✓ Higher government spending and increased borrowing feeds through directly into

extra demand in the circular flow.

✓ Monetary stimulus to the economy: A fall in interest rates may stimulate too much demand – for example in raising demand for loans or in causing rise in house price inflation.

✓ Faster economic growth in other countries – providing a boost to UK exports overseas.

Demand pull inflation is most likely to occur when an economy is becoming stretched and is said to be danger of over-heating.

2.2.2 Theories of Unemployment

According to Jhingan (2001) Economists distinguish between various types of and theories of unemployment; they include cyclical or Keynesian unemployment, frictional unemployment, structural unemployment and classical unemployment. Some additional types of unemployment that are occasionally mentioned are seasonal unemployment, hardcore unemployment, and hidden unemployment; The U.S. Bureau for Labour Statistics measures six types of unemployment. Though there were several definitions of voluntary and involuntary unemployment in the economics literature. According Todaro (1992) Voluntary unemployment was attributed to the individual's decisions. Involuntary unemployment exists because of the socio-economic environment (including the market structure, government intervention, and the level of aggregate demand) in which individuals operate. On the other hand, cyclical, structural and classical unemployment are largely involuntary in nature. However, the existence of structural unemployment may reflects choices made by the unemployed in the past, while classical (natural) unemployment may result from the legislative and economic choices made by labour unions or political parties.

According to Jhingan (2001) Frictional unemployment is the time period between jobs when a worker is searching for or transitioning from one job to another. It is sometimes called search unemployment and can be voluntary based on the circumstances of the unemployed individual. Frictional unemployment is always present in an economy, so the level of involuntary unemployment is properly the unemployment rate minus the rate of frictional unemployment, which means that increases or decreases in

unemployment are normally under-represented in the simple statistics.

According Adebayo (1992) Cyclical or Keynesian unemployment, also known as deficient-demand unemployment, occurs when there is not enough aggregate demand in the economy to provide jobs for everyone who wants to work.

Structural unemployment occurs when a labour market is unable to provide jobs for everyone who wants one because there is a mismatch between the skills of the unemployed workers and the skills needed for the available jobs. Structural unemployment is hard to separate empirically from frictional unemployment, except to say that it lasts longer.

Technological unemployment is due to the replacement of workers by machines, might be counted as structural. Alternatively, technological unemployment might refer to the way in which steady increases in labour productivity mean that fewer workers are needed to produce the same level of output every year.

He said that hidden or covered unemployment is the unemployment of potential workers that is not reflected in official unemployment statistics, due to the way the statistics are collected. In many countries only those who have no work but are actively looking for work (and qualifying for social security benefits) are counted as unemployed.

2.2.3 Growth Theories

Under the growth theories some theories of growth and growth models will be reviewed;

i) The Harrod-Domar Growth Model

In economic literature, this model is called capital only model. Harrod and Domar (1948) took over from Rostow, because Rostow had some unanswered questions. The model stated that saving is a certain proportion of national income and net investment is defined as the change in capital stock (K). The model further assumes that there is some direct relationship between the size of the capital stock, (K), and total GNP, (Y). This follows that any addition to the capital stock in the form of new investment will bring about corresponding increase in the flow of national output, GNP. This relationship is known in economics as the capital-output ratio. If the capital-output ratio is defined as k and assume further that the national savings ratio, s , is a fixed proportion of national

output (e.g. 6%) and that total new investment is determined by the level of total savings, we can construct the following simple model of economic growth Balami (2006).

Savings (S) is some proportion, s , of national income (Y) such that we have the simple equation

$$S = sY \dots\dots\dots (2.1)$$

Net investment (I) is defined as the change in the capital stock, K, and can be represented by ΔK such that

$$I = \Delta K \dots\dots\dots (2.2)$$

But because the total capital stock, K, bears a direct relationship to total national income or output, Y, as expressed by the capital-output ratio, k, it follows that $K/Y = k$ or $\Delta K / \Delta Y = k$, therefore

$$\Delta K = k\Delta Y \dots\dots\dots (2.3)$$

Finally, because net national savings, S, must equal net national investment, I, we can write this equality as

$$S = I \dots\dots\dots (2.4)$$

But from equation (1) we know that $S = sY$ and from equation (2) and (3) we also know that $I = \Delta K = k\Delta Y$ it therefore follows that we can write the „identity“ of savings equal to investment shown in equation (4) as

$$S = sY = k\Delta Y = \Delta K = I \dots\dots\dots (2.5)$$

Which can further be simplify as

$$sY = k\Delta Y \dots\dots\dots (2.6)$$

Dividing both sides of equation (2.6) first by Y and then by k, we obtain the following expression:

$$\Delta Y/Y = s/k \dots\dots\dots(2.7)$$

The left hand side of equation (7), $\Delta Y/Y$, represents the rate of change or rate of growth of GNP (i.e. it is the percentage change in GNP). Equation (2.7) happen to be the simplified version of the famous equation in Harrod-Domar theory of economic growth, states simply that the rate of growth of GNP ($\Delta Y/Y$) is determined jointly by the national savings ratio, s , and the national capital-output ratio, k . Therefore, in order to grow, economies must save and invest a certain proportion of their GNP. The more an economy

can save and invest, the faster it can grow.

ii) The Solow Growth Model

This is an economic growth model in which the growth of total GDP is explained by population increase, technical progress, and investment. In this model there is full employment, with an aggregate production showing constant returns to scale. In analyzing the process of economic growth Brian and Howard (2005), Solow (2002) combined the supply and demand sides of the economy together to generate economic growth. He argued that economic growth can best be understood from neo-classical point of view (supply side) which says $Q = f(AK^\alpha L^{1-\alpha})$. Hence, the Solow model can also be referred to as the neo-classical growth model. He assumed that savings is a linear function of income, that capital does not depreciate so that investment is simply the rate of increase of capital stock, that savings is equal to investment, and that labour grows at an exogenous constant proportion, the rate of growth or level of technology is exogenously given. Hence the Solow model can also be referred to as the neo-classical growth model.

iii) The Lewis Theory of Growth/Development

According to Todaro and Stephen (2011) one of the best-known early theoretical models of development that focused on the structural transformation of a primarily subsistence economy was that formulated by Nobel laureate W. Arthur Lewis in the mid-1950s and later modified, formalized, and extended by John Fei and Gustav Ranis in 1997. The Lewis two-sector model became the general theory of the development process in surplus-labour developing nations during most of the 1960s and early 1970s, and it is sometimes still applied, particularly to study the recent growth experience in China and labour markets in other developing countries.

In the Lewis model, the underdeveloped economy consists of two sectors: a traditional, overpopulated rural subsistence sector characterized by zero marginal labour productivity—a situation that permits Lewis to classify this as surplus labor in the sense that it can be withdrawn from the traditional agricultural sector without any loss of output—and a high-productivity modern urban industrial sector into which labour from the subsistence sector is gradually transferred. The primary focus of the model is on both the process of labour transfer and the growth of output and employment in the modern sectors. (The

modern sector could include modern agriculture, but we will call the sector “industrial” as shorthand). Both labour transfer and modern-sector employment growth are brought about by output expansion in that sector. The speed with which this expansion occurs is determined by the rate of industrial investment and capital accumulation in the modern sector. Such investment is made possible by the excess of modern-sector profits over wages on the assumption that capitalists reinvest all their profits. Finally, Lewis assumed that the level of wages in the urban industrial sector was constant, determined as a given premium over a fixed average subsistence level of wages in the traditional agricultural sector. At the constant urban wage, the supply curve of rural labour to the modern sector is considered to be perfectly elastic Todaro and Stephen (2011).

2.3 Review of Related Literature

There exists a vast body of literature on the Phillips Curve. Research studies on the topic began appearing as early as in the 1960s. Samuelson and Solow (1960) examined the relationship between unemployment and inflation in the context of the

United States economy and concluded that there had existed an inverse relationship between these two macroeconomic variables. A significant contribution to the research on the Phillips Curve was made by Solow (1970) and Gordon (1971) who confirmed the existence of a negative trade-off relationship between unemployment and inflation in the United States using macroeconomic data for both the pre-1970s and the post-1970s periods. The studies by Solow and Gordon have been known as the “Solow-Gordon affirmation” of the Phillips Curve.

Despite a solid theoretical foundation and the availability of numerous empirical studies that have confirmed the validity of the Phillips Curve, there exist criticisms and doubts regarding the soundness of the hypothesis. As Islam et al. (2003, p. 107) remarked, “Since its inception, the Phillips Curve hypothesis has been open to debates”. For example, such prominent economists as Friedman (1968) and Phelps (1967) refuted the existence of the trade-off relationship between unemployment and inflation. They both conceded that a negative relationship between unemployment and inflation could be in evidence but only in the short run. In the long run, unemployment rate would conform to a vertical pattern and the trade-off relationship between the two variables would cease to exist. A more

recent study by Cashell (2004) supported this argumentation. The researcher maintained that in the long run, unemployment tends to move towards an equilibrium level, which is dubbed as the natural rate of unemployment or the “non-accelerating inflation rate of unemployment” (NAIRU).

On the recent, economists have also considered the effects of fiscal policies on aggregate output. Attempts have been made to investigate the extent to which government activities affect economic growth. Some of these are the works of For instance, Ratner (1983), Aschauer (1989) and Munnell (1990) found that government investments were positively related to growth. Other studies such as Evans and Karas (1994), on the other hand, produced a mixed result.

Fakhri (2011) did a research study on inflation and economic growth in Azerbaijan. Motivated by the controversy of the substantial debate on whether inflation promotes or harms economic growth, the study examined the impact of inflation on economic. Time series data was used to examine the impact of inflation on economic growth. Correlation coefficient and co-integration technique were also applied to establish the relationship between inflation, GDP and Coefficient of elasticity to measure the degree of responsiveness of change in GDP to changes in general price levels. The results of his findings suggested that inflation has a negative impact on economic growth. The research conclusion revealed that there was no co-integration between inflation and economic growth during the period of study. No long-run relationship between inflation and economic growth in Tanzania.

Robert Lucas (1976), a prominent economist and a representative of the Chicago economic school, argued that the trade-off relationship between unemployment and inflation may exist only if the workers do not expect that the policy makers could create an artificial situation of high inflation combined with low unemployment. Otherwise, if the workers can foresee an impending high inflation they would demand a wage increase. In such a case, high unemployment and high inflation would co-exist, which contradicts the Phillips Curve hypothesis. This line of argumentation is known as the “Lucas critique” of the Phillips Curve.

Mohsin and Abdelhak (2001) conduct research on threshold effects in the relationship

between inflation and growth (a comparative study of industrial and developing countries) and found that the threshold is lower for industrialized countries than it is for developing countries. They also found negative and significant relationship between inflation and growth above the threshold level. They suggested low inflation for sustainable growth.

Ayesha and Rukhsana (2010) investigate the impact of inflation and economic growth on unemployment in Pakistan. They used Augmented Dickey Fuller test and Johansen-Juselius Maximum Likelihood techniques. They found that inflation significantly increased unemployment in the long term; economic growth had a significantly adverse impact on unemployment in the long run and short run respectively.

Yet, another thorough study on the Phillips Curve done by Lucas led to a loss of interest in the topic among the academicians. As Debelle and Vickery (1998,

p. 384) put it, “The Phillips Curve fell into a period of neglect in academic circles during the 1980s, while remaining an important tool for policy makers”. However, in the 1990s, there occurred a revival of interest in the Phillips Curve hypothesis, and it once again became “the subject of intensive debate (for example, the symposium in the *Journal of Economic Perspectives*)” (Debelle & Vickery, 1998, p. 384).

Amin (1998) examined the effects of public investment expenditures on growth of Cameroon’s economic activities. Using an aggregate production function, he discovered a positive relationship between the two, even though the relationship could not be statistically established.

Vikesh and Sabrina (2004), in their research identified that just like in many industrialized and developing countries, one of the most fundamental objectives of macroeconomic policies in Fiji is to sustain a high economic growth alongside low inflation. In their study, they reviewed several economic theories to ascertain consensus on the inflation-growth nexus. They explained how classical economics recall supply side theories, which emphasize the need for incentives to save and invest if the nation’s economy is to grow. The Keynesian economy theory also provided the AD-AS framework which proves to be a more comprehensive model for linking inflation to growth. The monetarism on the other hand re-emphasized the critical role of the monetary growth in determining inflation, while Neoclassical and Endogenous growth theories sought to

account for the effects of inflation on growth through its impact on investment and capital accumulation. They also reviewed some relevant literatures. Finally, their test revealed that a weak negative correlation existed between inflation and growth, while the change in output gap had a significant bearing. Thus the casualty between two variables ran one-way from growth to inflation.

King and Watson's (1994) in another study, examined the existence of the Phillips Curve in the context of the U.S. economy using the post-war macroeconomic data. The findings of the study provided empirical support to the existence of the trade-off relationship between unemployment and inflation in the United States. As King and Watson (1994) showed the existence of the inverse relationship between unemployment and inflation could be detected if the long-run and the short-run noises are eliminated from the data. A study by Hogan (1998) tested the Phillips Curve hypothesis using the U.S. macroeconomic data over the period 1960 – 1993. The findings of the study supported the existence of a significant and negative relationship between unemployment and inflation although the traditional Phillips Curve seemed to over-predict the rate of inflation.

Asoluka Njoku and Okezie A. Ihugba (2011) also examined the unemployment and Nigerian economic growth. Their study recommended that the agricultural sector as a medium of reducing unemployment in Nigeria should be harnessed and advised that the Government and all relevant stakeholders continue in their quest towards reducing unemployment, as well as give their support in ensuring that the agricultural sector is not downtrodden but embraced in this task.

Considering the important political and economic implications and the fact that the majority of the previous studies on the Phillips Curve have been done in the context of the developed economies and on an aggregate level or panel data, this study chooses Iraq as a case study to analyze the relationship between unemployment and inflation.

Inflation in Iraq

As reported by D. Accustomed Naji al-Hamdani 2013, in a study on Inflation in the Iraqi economy, inflation arises in most cases because of the imbalance and lack of balance between aggregate demand and aggregate supply in the national economy. When commodity supply deficit to meet the total demand of the consumers of goods and services prices rising commodity groups and causing inflation. The greater the gap widening between aggregate demand and aggregate supply accelerates the pace of the rise in inflation rates.

According to a report of Economic Affairs of the United Nations, the inflation rate in Iraq until 2006 amounted to 64.8%. According to the report, Iraq is the country most of inflation among the 22 Arab countries. The record price index consumer grew by 33.6% and 33.9%, 36% and 64.8% for the years 2003, 2004, 2005 and 2006 respectively. Rising inflation index in March 2006 to 53% compared to 2005 put the Iraqi economy in inflationary trends experienced in the economic blockade. Inflation has risen to great ranges reaching monthly rate of increase in the index of consumer prices in July of 2006, nearly 70% compared with the same year, 2005, and continued to rise in the month of August 2006 until the rate of 76.6% compared to the same month of last year.

3.1 Summary of Characteristics and Reasons of inflation

According to the report published by the Iraqi Ministry of Planning, the annual inflation index in Iraq has increased since April of 2011 until April of 2012 by 8.7%. The ministry justified the increase by rising food prices and non-alcoholic drinks by about 13% and housing prices rose 9.7% and vegetables at a rate of 13.3% and rents for residential buildings by 14%. The results of a selected sample prepared by the Central Bureau of Statistics on sales outlets in the provinces of Iraq, the index of consumer prices stood at 142.4% in the month of April 2012. Any rate rise from 1.1% to 8.7% compared with April last year, and the high prices of restaurants at a 6.9% rate. And education by 5.9% compared to April 2011.

The Iraqi economy because of its links to the multi-capitalist economy and absolute

openness to foreign markets has been affected and will be greatly influenced by international foreign trade variables and what is happening in the capitalist countries of recession and inflation and the high cost of financial and monetary crises. And contribute in particular the policy of economic liberalization that Iraq seeks to apply to incapacitate the monetary authorities in control the prices of the national currency across Iraqi dinar to strengthen its monetary value and competitiveness in the foreign exchange market.

The crisis experienced by the Iraqi economy is a complex crisis constitute a cause and a result of the crises of unemployment and services and in the failure of the productive sectors and skyrocketing prices. According to the Iraqi Ministry of Planning, the proportion of people living below the poverty line 23% and the number of poor people in Iraq exceeded 8 million, and the unemployment rate more than 20% until 2012.

3.2 Consequences of Inflation in Iraq

Inflation can have significant economic effects. It can, for instance, influence the distribution of national income and wealth. A low and stable rate of inflation is desirable both for the health of the economy and for individual welfare. There are many measures of inflation, each suited to a different purpose.

Inflation - a continuous upward movement in the general level of prices - can impose costs on individuals and the economy. Inflation reduces the purchasing power of income and wealth.

When price changes are large, unanticipated or volatile, inefficiencies can occur such as those associated with frequently changing list prices in shops or re-advertising of goods and services (inefficiencies known as 'menu costs'). Frequently changing rates of inflation can also distort the behaviour of consumers and businesses, who may find it more difficult to predict the effects of their saving and investment decisions.

Although inflation is defined as a rise in the general level of prices, not all prices change by the same proportion or in the same direction. For this reason, inflation can also affect the distribution of real income and wealth among individuals and households. A relatively steep increase in the prices of items that make up a large part of low income households expenditure, for example, can cause greater inequality in the distribution of real household income.

Some changes in relative prices can have positive effects as well as the negative effects discussed above, and many economists are of the view that zero inflation might be undesirable. Changes in relative prices can act as a signal during times of economic restructuring. This restructuring could be brought about by, say, changes in tastes and technology, and could in turn lead to resources being allocated more efficiently.

Ideally, an indicator of overall inflation would be comprehensive - it would cover price changes for all goods and services traded in the economy. But different measures of price change are suited to analyzing different economic phenomena. Because of the different possibilities for weighting together the prices of various goods and services, there is no single correct measure of inflation.

Inflation has soared since the 2003 invasion, sapping the living standards of Iraqis as they cope with bombs and sectarian killings which kill 100 every day. "The prices of everything has gone up but the salaries have stayed the same" (Nada, 2003).

Inflation rates have fluctuated over the years. Sometimes inflation runs high, and other times it is hardly noticeable. The short-term changes are not the real issue. The real issue is the effects of long-term inflation.

Over the long term, inflation erodes the purchasing power of your income and wealth. That means that even as you save and invest, your accumulated wealth buys less and less, just with the mere passage of time. And those who put off saving and investing will be even deeper in the hole.

Many governments including Iraq have a target for a low but positive rate of inflation. They believe that persistently high inflation can have damaging economic and social consequences. Some of these consequences include;

1. Income redistribution: One risk of higher inflation is that it has a regressive effect on lower-income families and older people in society. This happens when prices for food and domestic utilities such as water and heating rises at a rapid rate.

2. Falling real incomes: With millions of people facing a cut in their wages or at best a pay freeze, rising inflation leads to a fall in real incomes.

3. Negative real interest rates: If interest rates on savings accounts are lower than inflation, people who rely on interest from their savings will be poorer. Real interest rates

for millions of savers have been negative for at least four years.

4. Cost of borrowing: High inflation may also lead to higher interest rates for businesses and people needing loans and mortgages as financial markets protect themselves against rising prices and increase the cost of borrowing on short and longer-term debt. There is also pressure on the government to increase the value of the state pension and unemployment benefits and other welfare payments as the cost of living climbs higher.

5. Risks of wage inflation: High inflation can lead to an increase in pay claims as people look to protect their real incomes. This can lead to a rise in unit labour costs and lower profits for businesses

6. Business competitiveness: If one country has a much higher rate of inflation than others for a considerable period of time, this will make its exports less price competitive in world markets. Eventually this may show through in reduced export orders, lower profits and fewer jobs, and also in a worsening of a country's trade balance. A fall in exports can trigger negative multiplier and accelerator effects on national income and employment.

7. Business uncertainty: High and volatile inflation is not good for business confidence partly because they cannot be sure of what their costs and prices are likely to be. This uncertainty might lead to a lower level of capital investment spending.

3.3 Unemployment in Iraq

According to Tina Susman in an article on Unemployment bad and getting worse in Iraq, Unemployment and under-employment have plagued Iraq since the U.S. invasion of March 2003, which toppled Saddam Hussein's dictatorship but also led to sectarian warfare and chaos that closed most businesses and uprooted millions of Iraqis. Reviving the economy was one of the goals of the so-called "surge," which sent tens of thousands of extra U.S. forces into Iraq to quell violence in 2007. The idea was that a more peaceful environment would encourage economic revival. But many Iraqis say they can't get jobs with the Shiite-led government -- the country's biggest employer unless they are Shiites, friends with the right people, relatives of powerful government figures or aligned with the right political party. And most people are shunning the private sector because its wages and benefits are low by comparison, and because the Iraqi government's burgeoning

bureaucracy offers more opportunities, say Raad Omar, the head of the Iraqi-American Chamber of Commerce and Industry in Baghdad. "We've lost people who've actually applied for jobs with the government. Even though they're stupid jobs and they want to do something creative, they feel it's better pay and they want a pension," said Omar. "The private sector is not that attractive to many Iraqis. It's fragmented, and the private companies by and large don't really take care of their human resources. The private sector is the only way to absorb the unemployed, but it has a lousy reputation."

3.4 Summary of Characteristics and Reasons of unemployment

The long Iraq-Iran war has led to the worsening of the living conditions of the people in border areas and in the middle and south of Iraq. It has led to forced migration from the southern provinces, especially Basra and Maysan, to cities distant from war hit areas creating demographic problems in these areas and impoverishing the immigrating families.

When the economic siege was imposed on Iraq after its occupation of Kuwait in August 1990, the efficiency of state institutions were shaken and their performance very much deteriorated and weakened. State spending for social services decreased, poverty increased and the social conditions deteriorated. Feelings of insecurity and instability became dominant on the individual as well as the public levels. While the regime concentrated its efforts on protecting itself, citizens were transformed into refugees seeking food and medicine while deprived of their civic rights.

Years of siege have caused a decline of the per-capita-GDP to 1/10 of the level the country enjoyed in the early 1980s. While Iraq has scored highest among developing countries in terms of the share of per capita income in the GDP, the real monthly per capita income in 1993 became less than the income of unskilled agricultural laborers in India, considered to be one of the poorest countries of the world according to economic reports. Living standards of individuals and families were affected in and especially families with limited or middle income. According to the WHO, the income levels and living standards of two thirds of Iraq's population of Iraq and the income of families fell to one third of the 1988 levels.

With the relative economic improvement in the three years prior to the occupation,

after the 2003 War the situation again worsened with the deterioration of the security situation and the state's inability to perform its functions in protecting and enhancing the capacities of the poor. This is especially true with regard to displaced people, of whom women and children are the majority, who became socially detached, lost their money, their homes and other possessions in addition to losing their business, food security, and from their forced transformation into refugees in their own homeland.

According to the study prepared by the Central Organization for Statistics and Information Technology in cooperation with UNDP titled "Unsatisfied Basic Needs - Mapping and Living Standards in Iraq" in late 2006, 31% of households and 34% of individuals were suffering from deprivation. This ratio conceals wide disparities between rural and urban areas. On the provincial level, the study revealed the general poverty trend during the 1980s and 1990s affected by the impact of the Iraq-Iran War and the siege era. The rates of deprivation clearly indicate that the southern area is the most affected area, when compared to the other Iraqi provinces, with Samawa, Babil, Qadisiyyah, Dhi Qar, Diyala, Karbala, Wasit, Najaf and Misan successively being the most deprived provinces in Iraq. This confirms the continuation of the poverty trend and the deterioration of living standard in Iraq.

The unemployment rate throughout the Iraqi provinces reached more than 18%, according to the above mentioned study, and the average rate of unemployment among youth has reached 33.4%. In Baghdad it is 22%.

Solutions to unemployment = solutions to terrorism

The population increase, the government's abandonment of its commitment to employ new graduates, and the inability of the private sector to absorb the labor force have all led to the increase in the levels of unemployment estimated by some statistics in 2003 to have reached 60% of the total labor force. A new study indicates that, in the short run, privatization may have a negative impact on the labor market. A 2004 survey revealed that the level of unemployment among the 15-24 age group is approximately 43.8% (46% males, 37.2% females). Surveys also reveal the huge disparities between different provinces. Dhi Qar occupies the first rank in the level of unemployment, with more than 46%. The lowest levels were in Karbala, with 14% in the 2003, and in Basra, with 10.5%

in 2004.

Unemployment is one of the most serious problems in today's Iraq. This is not only because unemployment means the loss of human labor resulting in economic loss but it also results in dangerous social problems, especially among youth. Increase in unemployment means the inability to have an income which in turn leads to low standards of living and to an increase in the number of those living under the poverty line. Additionally, unemployment provides the fertile grounds for crime, fundamentalism and violence.

Efforts to reduce poverty should be directed to structural causes of unemployment and to finding solutions to the lack of job opportunities. Importance should be given to diversify the Iraqi economy, giving priority to labor intensive sectors. Social and economic policies should target low income groups, the creation of better economic opportunities in poor rural areas, the enhancement of social care and the encouragement of employment opportunities. The government should also take the initiative to design and implement training and educational strategies capable to respond to the market requirements in order to improve the quality of human resources. This endeavor should be taken with the active participation of the private sector and civil society organizations.

3.5 Consequences of Unemployment in Iraq

The consequences of unemployment for the individual are financially and often emotionally destructive. The consequences for the economy can also be destructive if unemployment rises above 5-6%. When many people are unemployed, the economy loses one of its key drivers of growth -- consumer spending. Quite simply, workers have less money to spend until they find another job. If high national unemployment continues, it can deepen a recession or even cause a depression. That's because less consumer spending from unemployed workers reduces business revenue, which forces companies to cut more payroll to reduce their costs. This can become a downward spiral very quickly.

One of the consequences of the Great Recession is that workers have been unemployed for a very long time. These long-term unemployed have been out of work, and looking, for more than six months.

If they have been out of work even longer, their job skills may no longer match the

requirements of the new jobs being offered. This is called structural unemployment. Many of them are 55 or older. They may not be able to get a good job again, despite laws prohibiting age discrimination. They may get part-time or low-paying entry jobs to make ends meet, then become unemployed again until they can take down early Social Security benefits at age 62. For this reason, many economists think the recession permanently increased the natural rate of unemployment.

In Iraq, historically, economic expansions were the constant companions of war. Indeed, a controversy in science of economics is that “Marxists claim that war is necessary for full employment?” a concrete response to this we are yet to find. In World War II, for example, defense outlays rose by almost 10 percent of total GDP before Pearl Harbor, and this spending boosted the economy out of the doldrums of the Great Depression. Similar but smaller military buildups accompanied the economic expansions in the Korean and Vietnam Wars.

3.6 Economic Growth in Iraq

The Iraqi economy is evolving from one controlled almost entirely by the government to one that is more free-market and private-sector oriented. Although the oil sector and the government still dominate the Iraqi economy, broad-based economic growth driven by a strong private sector is vital to creating jobs, alleviating poverty and promoting stability. In 1980, after the oil crisis of the mid-1970s led to higher oil prices, Iraq’s GDP per capita was higher than any other country in the region (except Israel and the Gulf states), at US\$3,453, according to the World Bank. But this number plummeted in the 1990s, during the Iran-Iraq war and years of sanctions, hitting a low of \$455 in 1997. After rising slightly in 2000, it dipped again, to \$742 in 2000. By 2011, it had returned to \$3,501, though these figures are not adjusted for inflation.

Iraq is now the second-largest producer of crude oil and has the fifth-largest proven crude oil reserves in the world. With an expected annual growth of 9.4 percent through 2016, Iraq has the region’s fastest growing economy, according to the government. Rising oil prices brought in revenues of \$94 billion in 2012 and are projected to bring in more than \$100 billion in 2013, according to the Middle East Economic Survey. The International Monetary Fund projects Iraq’s GDP will grow by nine percent in 2013.

3.7 Summary of Characteristics and Reasons of Economic Growth

Year-on-year, Iraq's recent economic growth ("real GDP" adjusted for inflation) has been more modest than nominal GDP growth, though still healthy. The economy retracted by 28.3 percent in 2003, according to Business Monitor International, but it rebounded by 39.6 percent the year after. Between 2005 and 2011, the economy grew by an average of 6.5 percent per year, even during the worst years of violence. Still, Bassam Yousif, a professor of economics at Indiana State University, describes Iraq's economic growth in the last decade as "anemic" given its weak starting point - an economy depressed by sanctions and a government restricted in trade, unable to spend any money domestically - and the sudden influx of cash when it was able to resume oil exports.

3.8 Consequences of Economic Growth in Iraq

An increase in output will improve living standards of people Iraq. Access to more goods and services can improve their living conditions and increase their life expectancy. In the view of economic growth in Iraq, people will be more likely to consume luxury products, have better health care and go for better education than in poor economies. Higher output and incomes thereby increases the Iraqi government tax revenue, making it easier for the government to finance measures to reduce poverty, increase health care provision and raise educational standards, without having to raise tax rates. Poverty in the economy of Iraq can be reduced in a number of ways. Some of the extra tax revenue raised can be used to increase benefits for the poor, to improve schools in poor areas and provide training to the unemployed. As the economy grows, its political and economic standing and influence will also increase in output can improve living standards of people. Access to more goods and services can improve their living conditions and increase their life expectancy. In richer economies, people are likely to consume luxury products, have better health care, go for better education than in poor economies. In very poor countries, economic growth is essential to ensure that people have access to basic necessities. Higher output and incomes also increase government tax revenue, making it easier for governments to finance measures to reduce poverty, increase health care provision and raise educational standards, without having to raise tax rates. Poverty can be reduced in a

number of ways. Some of the extra tax revenue raised can be used to increase benefits for the poor, to improve schools in poor areas and provide training to the unemployed. As an economy grows, its political and economic standing and influence usually increases.

EMPIRICAL ANALYSIS

Unemployment and inflation are two intricately linked economic concepts. Over the years there have been a number of economists trying to interpret the relationship between growth, inflation and unemployment. There are two possible explanations of this relationship – one in the short term and another in the long term. In the short term there is an inverse correlation between the three. As per this relation, when unemployment is low and inflation on the high side, economic growth is expected to be high. The relationship between unemployment and inflation was first of all studied by Phillips (1958). He found an inverse relationship between unemployment and inflation in UK. In the short term the Phillips curve could be a declining curve. The Phillips curve in the long term is separate from the Phillips curve in the short term. It has been observed in the literature that in the longrun unemployment and inflation are not related.

The Okun's (1962) law suggests that in the US, the ratio between and a shift in output is the law through which GDP shift from the trend is enlarged by approximately 3percent if unemployment rate grows by 1percent above its natural rate level (McConnel and Brue, 1996). This ratio is better known as Okun's law. In his earlier researches he concluded that this ratio was approximately 3 to 1, but after some later analyses the ratio of 2 or 2.5 to 1 was accepted as the representative one. Okun's law is a reduced version of the Phillips regularity, more precisely, of the segment pertaining to the research of the relation between unemployment and output. Okun's law has been used for specific projections of economic growth. When there are no vacancies for those willing to work, potential output is irrevocably lost. Unrealized output is measured by shift from the long-term tendency of GDP growth and it is called „GDP gap“. When GDP follows trend line, economy trends can be projected and then there is natural unemployment rate. The higher the unemployment rate, the greater the shift of GDP from its trend Popovic and Popovic, (2009). The Okun's law and the Phillips postulate are the basis for the analysis of the effect of unemployment and inflation on growth as used in this thesis.

4.1 Regression analysis

This Thesis used multiple regression analysis where the rate of growth (ECGR) serves as the dependent variable, while unemployment rates (UN), inflation rates (INF), serve as the explanatory variables.

4.2 Expected result of the study

It is expected in this study that unemployment is negatively related with economic growth. However, inflation is expected to be positively related to economic growth.

4.3 Research Design

Research design acts as a roadmap through which the research will be conducted. This study is to examine whether there is a relationship between inflation and unemployment on economic growth and also examine whether there is a tradeoff between inflation and unemployment by the Philip- based curve analysis in the economy of Iraq.

4.4 Model Specification

To empirically establish the relationship between inflation and unemployment and economic growth in Iraq, the study will employ the New Keynesian Philips curve model. This model has received most attention in recent years and is recognized as a dynamic extension of the static new Keynesian model. Following Mankiw (2001), the model is derived using three basic relationships. The first concerns the desired price of firms that would maximize profit at a point in time. This is specified below;

$$p_t^* = p_t - \alpha(y_t - y_e) \dots\dots\dots (1)$$

The equation above explains that, the desired price of a firm *t p is influenced by the general price level and the deviation of unemployment from its natural rate indicated by the cyclical gap

$$(y_t - y_e) \dots\dots\dots (2)$$

It follows from the above that a firm’s desired relative price rises during economic

boom and falls when an economy experience recession.

To derive the second relationship, it is assumed that firms hardly change their desired prices since price adjustment is sporadic. In view of this, a firm can change its price at a point in time; firm adjust its price to be equal to the average desired prices. The adjustment price equation is given below;

$$x_t = \lambda \sum_{j=0}^{\infty} (1 - \lambda)^j E_t P_{t+j}^* \dots\dots\dots (3)$$

Where $1-\lambda$ is the rate of price adjustment and also explains the degree to which the weights decline. Equation (2) states that current adjustment price is an average of current general and next period's desired price.

The final equation in the model is the equation for the overall price level. This is shown below;

$$P_t = \lambda \sum_{j=0}^{\infty} (1 - \lambda)^j x_{t-j} \dots\dots\dots (4)$$

According to equation (3), current price is determined by the weighted average of current adjustment prices of firms and the price level that persist in the past. Since determines the speed at which the weight decline, the equation above postulates that as the speed of price adjustment in price increases faster, the significant does previous pricing affect current price level in an economy.

The new Keynesian Philips curve is then specified solving equation (3) and (4) simultaneously. This gives the Philips curve equation below;

$$\pi_t = E_t \pi_{t+1} - [a\lambda^2 / (1-\lambda)](y_t - y_e) + \mu_t \dots\dots\dots (5)$$

Assuming individuals' expectation of future inflation is dependent on current inflation, then it follows that current inflation level is individual's previous level of inflation. In view of this, equation (4) can be rewritten as

$$\pi_t = E_{t-1} \pi_t + \phi(y_t - y_e) + \mu_t \dots\dots\dots (6)$$

Where;

$$\phi = -(\alpha\lambda^2 / (1-\lambda)); \pi_t = p_t - p_{t-1}$$

Is the inflation rate and

$$E_{t-1}\pi = \pi_{t-1}$$

Where y is the actual growth rate in the economy and e_y represents the potential output growth.

Equation (4) will further aid my study in identifying the current inflation rate should my study be influenced by other parameters that will reflect real rigidities.

Finally, the model for the study is:

$$\text{GDP} = f(\text{Unemployment, Inflation}) \dots \dots \dots (7)$$

$$\text{GDP}_t = \alpha_0 + \alpha_1 \text{UNEM} + \alpha_2 \text{INF} + U \dots \dots \dots (8)$$

Where,

GDP_t = Gross Domestic product at time t

UNEMP_t = Unemployment at time t

INF_t = Inflation at time t

4.5 Econometric Technique

However, the study adopts the Vector Auto regressive (VAR) Approach. The VAR model can be specified as follows:

$$\text{GDP}_t = \alpha_1 + \beta_1 \text{GDP}_{t-1} + \lambda_1 \text{UNP}_{t-1} + \pi_1 \text{INF}_{t-1} + \delta_1 \text{M2}_{t-1} + \gamma_1 \text{INT}_{t-1} + \mu \dots \dots \dots (9)$$

$$\text{UNP}_t = \alpha_2 + \beta_2 \text{GDP}_{t-1} + \lambda_2 \text{UNP}_{t-1} + \pi_2 \text{INF}_{t-1} + \delta_2 \text{M2}_{t-1} + \gamma_2 \text{INT}_{t-1} + \varepsilon \dots \dots \dots (10)$$

$$\begin{aligned} \text{INF}_t = & \alpha_3 + \beta_3 \text{GDP}_{t-1} + \lambda_3 \text{UNP}_{t-1} + \pi_3 \text{INF}_{t-1} + \delta_3 \text{M2}_{t-1} \\ & + \gamma_3 \text{INT}_{t-1} + v \dots \dots \dots (11) \end{aligned}$$

$$\begin{aligned} \text{M2}_t = & \alpha_4 + \beta_4 \text{GDP}_{t-1} + \lambda_4 \text{UNP}_{t-1} + \pi_4 \text{INF}_{t-1} + \delta_4 \text{M2}_{t-1} \\ & + \gamma_4 \text{INT}_{t-1} + \xi \dots \dots \dots (12) \end{aligned}$$

$$\begin{aligned} \text{INT}_t = & \alpha_5 + \beta_5 \text{GDP}_{t-1} + \lambda_5 \text{UNP}_{t-1} + \pi_5 \text{INF}_{t-1} + \delta_5 \text{M2}_{t-1} \\ & + \gamma_5 \text{INT}_{t-1} + U \dots \dots \dots (13) \end{aligned}$$

4.6 Other Econometric Tests include:

4.6.1 Unit root test since we dealing with time series data

4.6.2 Root of polynomial characteristic test

4.6.3 Block exogeneity test

4.6.4 VAR lag selection

4.6.5 Impulse response

4.6.6 Variance decomposition

DATA ANALYSIS AND INTERPRETATION OF RESULTS

5.1 Methodology of the Study

This chapter deals with formulation of models that captures the relationship among the variables of interest. This is followed with analysis of data and interpretation of major findings for policy implications. The study employs Vector Autoregressive (VAR) Model Approach using annual time series data spanning from 1990-2014 obtained for the following variables: inflation rate, money supply, Gross Domestic Product (GDP), Unemployment, a percentage of total of labour force and interest rate. The data for the study is obtained from Central Bank of Iraq (CBI) Statistical Bulletin of Iraq, 2015 and World Data Bank (World Economic Indicators).

5.2 Model Specification

The study employs a Vector Autoregressive (VAR) models to examine output variability and inflation instrument variability. In the specification of the model, in line with the works of Mordi (2008) and Valle (2002), the VAR models are specified as follows:

$$\begin{aligned}
 \text{LINF}_t &= \alpha_1 + \beta_1 \text{LINF}_{t-1} + \delta_1 \text{LM2}_{t-1} + \text{J1} \text{LINT}_{t-1} + \lambda_1 \text{LGDP}_{t-1} \\
 &\quad + \rho_1 \text{LUNP}_{t-1} + \varepsilon_1 \dots\dots\dots 1 \\
 \text{LUNP}_t &= \alpha_5 + \beta_5 \text{LINF}_{t-1} + \delta_5 \text{LM2}_{t-1} + \text{J5} \text{LINT}_{t-1} + \lambda_5 \text{LGDP}_{t-1} + \rho_5 \text{LUNP}_{t-1} \\
 &\quad + \varepsilon_5 \dots\dots\dots 2 \\
 \text{LGDP}_t &= \alpha_4 + \beta_4 \text{LINF}_{t-1} + \delta_4 \text{LM2}_{t-1} + \text{J4} \text{LINT}_{t-1} + \lambda_4 \text{LGDP}_{t-1} \\
 &\quad + \rho_4 \text{LUNP}_{t-1} + \varepsilon_4 \dots\dots\dots 3 \\
 \text{LM2}_t &= \alpha_2 + \beta_2 \text{LINF}_{t-1} + \delta_2 \text{LM2}_{t-1} + \text{J2} \text{LINT}_{t-1} + \lambda_2 \text{LGDP}_{t-1} \\
 &\quad + \rho_2 \text{LUNP}_{t-1} + \varepsilon_2 \dots\dots\dots 4 \\
 \text{LINT}_t &= \alpha_3 + \beta_3 \text{LNF}_{t-1} + \delta_3 \text{LM2}_{t-1} + \text{J3} \text{LINT}_{t-1} + \lambda_3 \text{LGDP}_{t-1} \\
 &\quad + \rho_3 \text{LUNP}_{t-1} + \varepsilon_3 \dots\dots\dots 5
 \end{aligned}$$

Where LINF is the log of inflation rate, LM2 is the log of broad money supply, LINT is the log of interest rate, LGDP is the log of gross domestic product, and LUNP is the log of unemployment.

5.3 Econometric Tests, Data Analysis and Interpretation of Results

5.3.1 Ordering of Variables

The selection of the variables is done to build multivariate models which can be used to target inflation and as a forecasting instruments.

One of the basic issues to address when using VAR is the ordering of the variables. In ordering our variables, it is assumed that monetary policy variables M2 and INT would transmit into price and GDP through inflation rate while unemployment is the most exogenous variable in the model. For the selection of lag length, a lag length of one is selected based on Schwarz information criteria because it takes into consideration the parsimoniousness of the model and has stringer theoretical backing (Serrato, 2006).

5.3.2 Unit Root ADF

The result of this test in Table 1 when LINF, LUNP, LGDP, LINT and LM2 are endogenous variables while the constant is the exogenous variable shows that no root lies outside the unit circle.

All the variables are stationery at level which satisfies the condition for VAR. The results are shown in table 1.

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Table 1- ADF Test Results

Variables	Level	Conclusion	Order of Integration
Log GDP	-3.930889 (-3.544284)	Stationery at Level	I(0)
Log Inflation	-6.124646 (-4.243644)	Stationery at Level	I(0)
Log Unemployment	-6.084445 (-2.976263)	Stationery at Level	I(0)
Log Interest Rate	-4.784475 (-3.580623)	Stationery at Level	I(0)
Log M2	-4.394611 (-3.580623)	Stationery at Level	I(0)

5.3.3 Block Exogeneity Test

Block exogeneity tests are to determine how these variables enter the model. It has as its null hypothesis that the lags of a set of variables do not enter the equation of the other variables, and, thus, it is exogenous to the model.

The block exogeneity test result in table 1 indicates that none of the variables at lag one should enter the equation of LINF as an exogenous variable at 5 percent significant level. The values of their various probabilities are greater than the 5 percent significant level thereby accepting the null hypothesis. There is no indication of LM2, LUNP, LGDP or LINT granger cause LINF. This opposes monetary policy theory.

The block exogeneity test of unemployment equation indicates that none of the variables at lag one should enter the equation of LUNP as an exogenous variable at 5 percent significant level except LGDP. The values of their various probabilities are greater than the 5 percent significant level thereby accepting the null hypothesis.

Table 2: VAR Granger Causality/Block Exogeneity Wald Tests

Sample: 1990 2014

Included observations: 23

Dependent variable: INF			
Excluded	Chi-sq	Df	Prob.
UNP	0.009574	1	0.9221
GDP	1.965670	1	0.1609
M2	1.720323	1	0.1897
INT	0.422158	1	0.5159
All	3.868945	4	0.4240

Dependent variable: UNP			
Excluded	Chi-sq	Df	Prob.
INF	0.167556	1	0.6823
GDP	3.934843	1	0.0473
M2	2.225179	1	0.1358
INT	2.105163	1	0.1468
All	7.828192	4	0.0981

Dependent variable: GDP			
Excluded	Chi-sq	Df	Prob.
INF	0.004448	1	0.9468
UNP	5.102852	1	0.0239
M2	0.829519	1	0.3624
INT	0.402745	1	0.5257
All	5.207120	4	0.2667

Dependent variable: M2			
Excluded	Chi-sq	Df	Prob.
INF	0.051608	1	0.8203
UNP	2.697277	1	0.1005
GDP	0.662585	1	0.4156
INT	1.201999	1	0.2729
All	6.093118	4	0.1923

Dependent variable: INT

Excluded	Chi-sq	Df	Prob.
INF	0.337361	1	0.5614
UNP	0.147217	1	0.7012
GDP	0.203542	1	0.6519
M2	0.791334	1	0.3737
All	1.513316	4	0.8243

While the probability value of GDP is less than the 5 percent significant level ($0.0473 < 0.05$) implying that GDP Granger cause unemployment. This is in line with the famous OKUN's law which states the negative relationship between unemployment and output/GDP.

The block exogeneity test of LGDP equation indicates that none of the variables at lag one should enter the equation of LGDP as an exogenous variable at 5 percent significant level except LUNP. The values of their various probabilities are greater than the 5 percent significant level thereby accepting the null hypothesis. However, the probability value of LUNP is less than the 5 percent significant level ($0.0239 < 0.05$) implying that LUNP Granger cause LGDP. This is in line with the famous OKUN's law which states the negative relationship between unemployment and output/GDP.

The block exogeneity test of LINT and LM2 equations indicate that none of the variables at lag one should enter the equation of LINT and LM2 as an exogenous variable at 5 percent significant level except LGDP. The values of their various probabilities are greater than the 5 percent significant level thereby accepting the null hypothesis.

5.3.4 VAR Lag Order Criteria

To determine the optimum lag length, we begin with a lag of twenty but finally selected an optimum lag of one. We employed the sequential modified LR test, the final prediction error (FPE) test, Akaike information criterion (AIC) test, Schwarz information criterion (SIC) test and Hannan Quinn (HQ) information criterion at 5 percent level of significance to carry out the selection. All the test results in Table 3 indicate a lag order of one.

Table 3:VAR Lag Order Selection Criteria

Endogenous variables: INF UNP GDP M2 INT

Exogenous variables: C

Sample: 1990 2014

Included observations: 23

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-415.9632	NA	5.44e+09	36.60550	36.95235	36.66758
1	-377.9644	56.17216*	1.87e+09*	35.47517*	36.86625*	35.84766*

* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

5.3.5 Unrestricted VAR Results

The results of the VAR analysis in table at lag one indicate that the variables are dynamically interacted. Starting with the equation of inflation (equation 1). A 1% increase in the previous values of inflation, unemployment, GDP, money supply and interest lead to a 0.567% increase, 0.468% increase, 0.054% decrease, 5 .643% decrease and 8.195% decrease in current inflation respectively. The plausibility of the results lie with the negative relationship between unemployment and inflation, a phenomenon known as the Phillips curve. The result is consistent with the famous Phillips curve.

Followed by the equation of unemployment (equation 2). A 1% increase in the previous values of inflation, unemployment, GDP, money supply and interest lead to a 0.002% decrease, 0.589% decrease, 1.304% decrease, 0.187% decrease and 0.535% decrease in current unemployment respectively. Here again the relationship between unemployment and inflation is negative obeying the Phillips curve. The result also shows that previous unemployment also contributes to current unemployment.

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Table 4: Vector Autoregression Estimates

Sample (adjusted): 1992 2014
 Included observations: 23 after adjustments
 Standard errors in () & t-statistics in []

	INF	UNP	GDP	M ₂	INT
INF(-1)	0.567825 (0.18033) [3.14887]	-0.002160 (0.00528) [-0.40934]	-0.002012 (0.03016) [-0.06669]	0.001723 (0.00759) [0.22717]	0.001611 (0.00277) [0.58083]
UNP(-1)	-0.589142 (6.02107) [-0.09785]	0.468929 (0.17622) [2.66100]	2.275095 (1.00715) [2.25895]	-0.416020 (0.25331) [-1.64234]	-0.035526 (0.09259) [-0.38369]
GDP(-1)	1.304798 (0.93065) [1.40202]	-0.054031 (0.02724) [-1.98364]	-0.185551 (0.15567) [-1.19194]	-0.031870 (0.03915) [-0.81399]	0.006457 (0.01431) [0.45116]
M ₂ (-1)	-5.643869 (4.30301) [-1.31161]	-0.187863 (0.12594) [-1.49170]	0.655548 (0.71977) [0.91078]	0.635132 (0.18103) [3.50844]	-0.058864 (0.06617) [-0.88957]
INT(-1)	-8.195837 (12.6141) [-0.64974]	-0.535656 (0.36918) [-1.45092]	1.339030 (2.10997) [0.63462]	0.581816 (0.53068) [1.09636]	0.601425 (0.19398) [3.10049]
C	286.8048 (290.837) [0.98614]	22.85916 (8.51211) [2.68549]	-67.10819 (48.6485) [-1.37945]	9.647009 (12.2357) [0.78843]	7.776608 (4.47244) [1.73878]
R-squared	0.494061	0.550325	0.277151	0.565084	0.428858
Adj. R-squared	0.345256	0.418068	0.064548	0.437168	0.260875
Sum sq. resids	165256.0	141.5573	4623.771	292.4916	39.07937
S.E. equation	98.59483	2.885637	16.49201	4.147938	1.516175
F-statistic	3.320180	4.161018	1.303610	4.417606	2.552982
Log likelihood	-134.7528	-53.53350	-93.62551	-61.87941	-38.73174
Akaike AIC	12.23937	5.176826	8.663088	5.902558	3.889717
Schwarz SC	12.53559	5.473042	8.959304	6.198774	4.185932
Mean dependent	60.05228	18.52174	10.05680	26.58084	14.35542
S.D. dependent	121.8480	3.782731	17.05152	5.528951	1.763560
Determinant resid covariance (dof adj.)		5.86E+08			
Determinant resid covariance		1.29E+08			
Log likelihood		-377.9644			
Akaike information criterion		35.47517			
Schwarz criterion		36.95625			

On the equation of GDP (equation 3), a 1% increase in the previous values of inflation, unemployment, GDP, money supply and interest lead to a 0.002% decrease,

2.275% increase, 0.185% decrease, 0.655% increase and 0.133% increase in current GDP respectively. Here, GDP and money are positively related.

The equation of money supply (equation 4) shows that a 1% increase in the previous values of inflation, unemployment, GDP, money supply and interest lead to a 0.001% increase, 0.416% decrease, 0.031% decrease, 0.635% increase and 0.581% increase in current money supply respectively. The result is consistent with monetary policy given that the relationship between money supply and inflation. A situation known as demand pull inflation or too much money pursuing too few goods and the result is inflation.

The equation of interest rate (equation 5) shows that a 1% increase in the previous values of inflation, unemployment, GDP, money supply and interest lead to a 0.001% increase, 0.035% decrease, 0.006% increase, 0.058% decrease and 0.601% increase in current interest rate respectively.

The overall goodness of fit shows that 49.4% variation in inflation is caused by the variations in the previous values of inflation inertia, unemployment, GDP, money supply and interest rate. While 55.0% variation in unemployment is caused by the joint variation in the previous values of inflation inertia, unemployment, GDP, money supply and interest rate. The equation of GDP indicates that 27.7% variation in GDP is caused by the joint variation in the previous values of inflation inertia, unemployment, GDP, money supply and interest rate. While 56.5% variation in money supply is caused by the joint variation in the previous values of inflation inertia, unemployment, GDP, money supply and interest rate. And 42.8% variation in interest rate is caused by the joint variation in the previous values of inflation inertia, unemployment, GDP, money supply and interest rate.

5.3.6 Impulse Response

This section analyses the dynamic property of the model using impulse response functions. Figure 1 reveals the response of inflation to a one unit shock to unemployment.

As unemployment increases, inflation decreases initially, increases and later decreases. This phenomenon depicts the non-accelerated inflation rate of unemployment (NAIRU) postulated by Milton Friedman who said “the Phillips curve is to the best of my knowledge a short run phenomenon where as in the long run, it does not exist”.

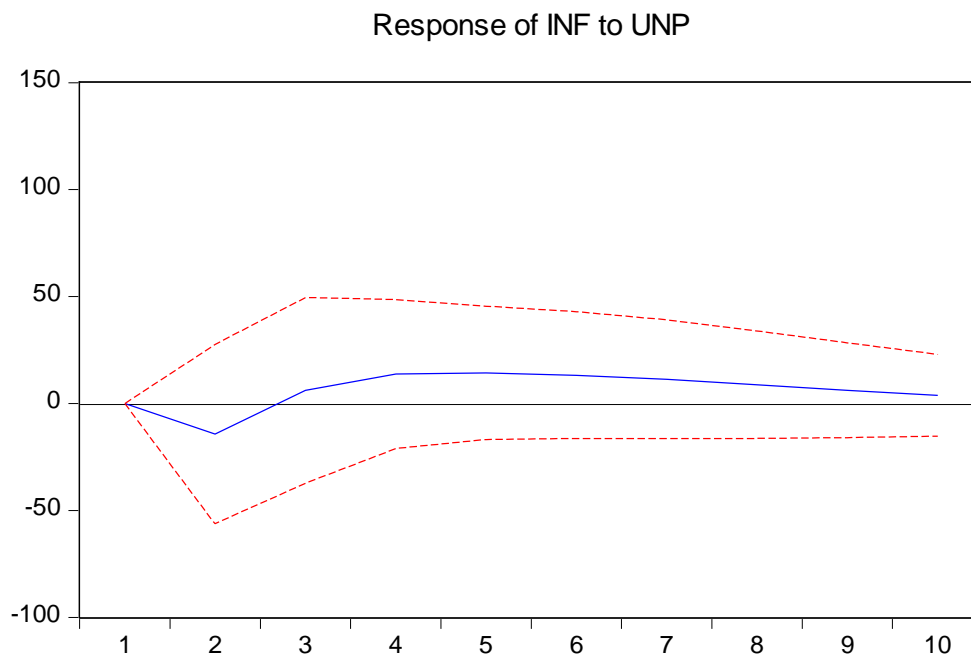


FIGURE 5: Response of Inflation to Unemployment

While figure 2 reveals the response of unemployment to a one unit shock to inflation.

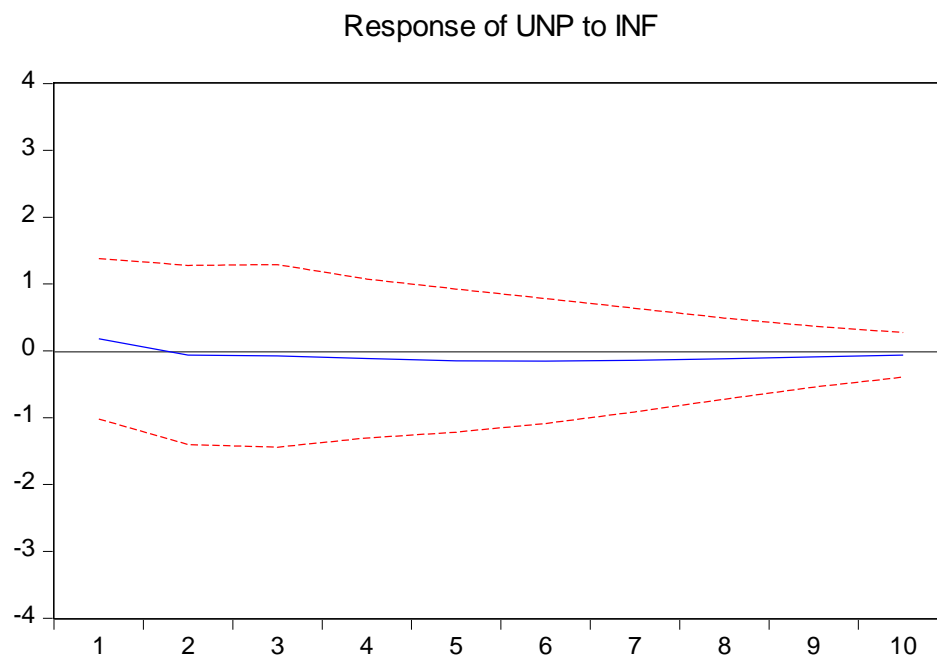


FIGURE 6: Response of Unemployment to inflation

As inflation increases, unemployment decreases and stabilizes through-out.

The graph shows that a positive shock to inflation decreases unemployment throughout.

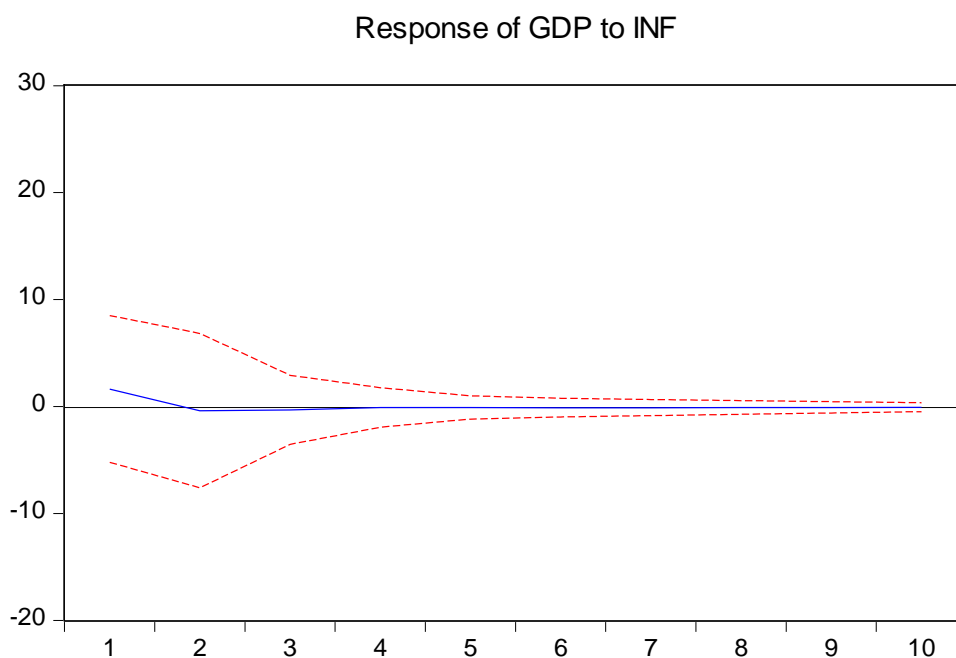


Figure 4: Response of GDP to inflation

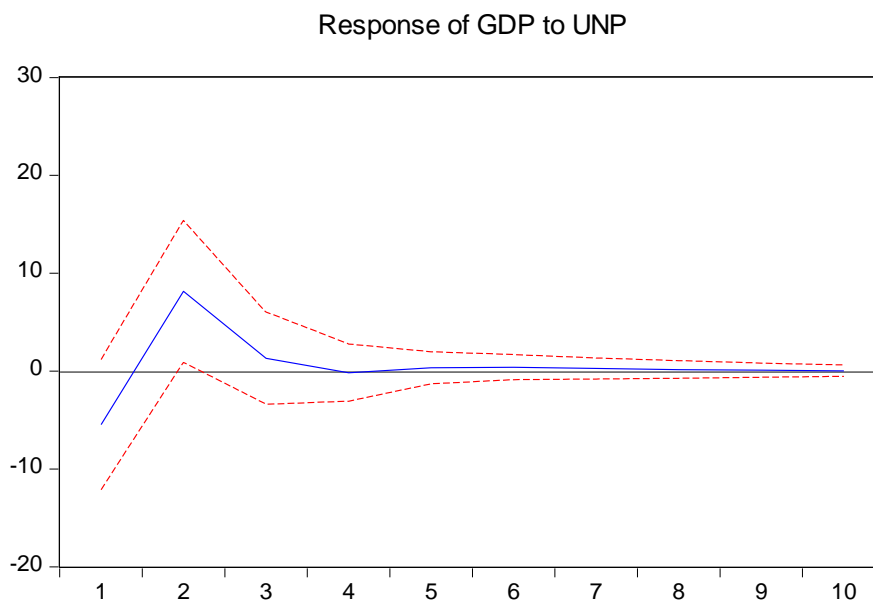


Figure 5: Response of GDP to inflation

4.3.7 Variance Decomposition

This section has to do with assessing the relative contribution of the variables to the fluctuation in inflation, unemployment, GDP, money supply and interest rate. This is done by decomposing the forecast variance of the inflation rate and unemployment over different horizons. The statistics in Table 5 and 6 indicate the percentage contribution of

innovations in each of the variables to the variance decomposition of inflation and unemployment.

Table 5: Variance Decomposition of Inflation

d	S.E.	INF	UNP	GDP	M2	INT
1	98.59483	100.0000	0.000000	0.000000	0.000000	0.000000
2	120.0677	91.61580	1.417609	3.248314	2.809428	0.908854
3	127.6780	88.00204	1.481462	3.789007	4.527088	2.200400
4	132.1491	84.02485	2.466584	3.640559	5.673039	4.194966
5	135.5348	80.30149	3.453885	3.470588	6.234187	6.539855
6	138.0903	77.41265	4.244284	3.343382	6.344754	8.654926
7	139.8769	75.44774	4.787708	3.263590	6.264218	10.23674
8	141.0020	74.26198	5.096958	3.221343	6.167845	11.25188
9	141.6333	73.62848	5.238715	3.202605	6.122467	11.80774
10	141.9480	73.33103	5.285854	3.196043	6.130195	12.05688

Variance decomposition to inflation shows that shocks to inflation inertia are important source of variation in inflation accounting for 73.33 percent shocks in prices after 10 periods, while interest rate shocks explained 12.05 percent. Unemployment and money supply accounted for just 5.28 and 6.13 percent respectively. This is in line with the Philips curve paradigm that unemployment shocks affect forecast of future inflation. The result is also in line with monetary assertion that money supply causes inflation when it is not supported by growth in output. Not much can be said of interest rate which is inconsistent with the use of monetary aggregates as intermediate monetary targets. It is also not in line with the monetary precepts which states that the expansion of bank lending and hence of the money supply leads to an increase in expenditure that in turn puts further pressure on prices in an open-ended process that epitomized the inherent instability of credit.

Variance decomposition of unemployment reveals that apart from itself which accounted for 69.04 percent, interest rate and money supply are major sources of fluctuation in unemployment accounting for 21.35 and 5.30 percent respectively. This is also in line with the monetary policy paradigm and economic theory of interest rate, money supply and growth. Not much can be attributed to inflation and GDP.

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Table 6: Variance Decomposition of Unemployment

d	S.E.	INF	UNP	GDP	M2	INT
1	2.885637	0.386761	99.61324	0.000000	0.000000	0.000000
2	3.471217	0.300094	87.64135	4.414347	2.999387	4.644817
3	3.708089	0.305604	78.79951	3.928759	5.184408	11.78172
4	3.864574	0.370595	74.26254	3.620537	5.250796	16.49553
5	3.966000	0.491894	71.84356	3.481549	5.003492	19.17951
6	4.022574	0.624942	70.45700	3.429916	4.888757	20.59938
7	4.050311	0.737161	69.71036	3.411431	4.925899	21.21515
8	4.062734	0.816218	69.33376	3.406658	5.050999	21.39237
9	4.068299	0.862964	69.14620	3.405264	5.192840	21.39273
10	4.071451	0.885382	69.04452	3.403010	5.307125	21.35996

Table 7: Variance Decomposition of GDP

Period	S.E.	INF	UNP	GDP	M2
1	16.49201	0.984326	11.04377	87.97190	0.000000
2	18.88696	0.793244	27.01106	69.81321	1.402055
3	19.01571	0.811325	27.11897	69.53816	1.526774
4	19.04859	0.811352	27.03309	69.30533	1.675289
5	19.06422	0.812575	27.01905	69.19341	1.691145
6	19.07623	0.815453	27.02803	69.10798	1.690433
7	19.08322	0.818703	27.02647	69.05887	1.689214
8	19.08680	0.821501	27.02298	69.03369	1.689838
9	19.08848	0.823566	27.02023	69.02195	1.692344
10	19.08922	0.824865	27.01839	69.01680	1.695505

Variance decomposition of GDP reveals that apart from itself which accounted for 69.01 percent, unemployment and money supply are major sources of fluctuation in GDP accounting for 27.01 and 1.69 percent respectively. This is also in line with the monetary policy paradigm and economic theory of interest rate, money supply and growth. Not much can be attributed to inflation.

SUMMARY CONCLUSION AND RECOMMENDATION

6.1 SUMMARY

There are several reasons why governments might want to achieve low inflation, perhaps the most compelling being the potential for faster output growth. Indeed, of the various factors that might affect growth, perhaps none is as readily changed in the short run as the inflation rate. Few would doubt the negative growth effects of high inflation—say above 40 percent per year—but there has been much less consensus on the effect of less severe inflation. Yet from a policy perspective it is the moderate or intermediate inflation range—perhaps 5 to 30 percent per year—that is of greatest interest.

The results presented here suggest a negative relationship between Unemployment and Inflation and its impact on growth in the economy of Iraq which is statistically and economically significant. The relationship is non-linear, in two senses:

First, at very low inflation rates, the relationship is positive; second, at all other inflation rates, the apparent marginal effect of inflation on growth becomes less important as higher inflation rates are considered. Failure to take account of both these non-linearities can seriously bias results toward finding only a slight marginal effect, giving the misleading impression that inflation must become quite high before its cumulative effect becomes important.

The study additionally tried to find the impact of inflation and unemployment on economic growth and also, test for evidence of Philips curve in Iraq using the New Keynesian Philips curve model, analysis from the VAR approach. For the selection of lag length, a lag length of one is selected based on Schwarz information criteria because it takes into consideration the parsimoniousness of the model and has stringer theoretical backing (Serrato, 2006). Under the Roots of characteristic Polynomial Test, results shows that no root lies outside the unit circle and hence the VAR satisfies the stability condition.

In sum, the entire test results of the VAR analysis in table at lag one indicates that the variables are dynamically interacted. Starting with the equation of inflation (equation 1), a

1% increase in the previous values of inflation, unemployment, GDP, money supply and interest lead to a 0.567% increase, 0.468% increase, 0.054% decrease, 5.643% decrease and 8.195% decrease in current inflation respectively. The plausibility of the results lies with the negative relationship between unemployment and inflation, a phenomenon known as the Phillips curve. The result is consistent with the famous Phillips curve.

Followed by the equation of unemployment (equation 2), a 1% increase in the previous values of inflation, unemployment, GDP, money supply and interest lead to a 0.002% decrease, 0.589% decrease, 1.304% decrease, 0.187% decrease and 0.535% decrease in current unemployment respectively. Here again the relationship between unemployment and inflation is negative obeying the Phillips curve. The result also shows that previous unemployment also contributes to current unemployment.

Using the impulse response to measure unemployment, it is realized that as unemployment increases, inflation decreases initially, increases and later decreases. This phenomenon depicts the non-accelerated inflation rate of unemployment (NAIRU) postulated by Milton Friedman who said “the Phillips curve is to the best of my knowledge a short run phenomenon where as in the long run, it does not exist”.

The result shows clearly that there is a sure impact of inflation and unemployment on economic growth in the economy of Iraq.

The coefficient of unemployment was statistically significant and consistent with the theoretical expectation. The coefficient inflation rates though found consistent with theoretical expectations of this Thesis but was statistically insignificant in determining economic growth rates in Iraq.

6.2 CONCLUSION

With regards and emphasis on the above data analysis and summary, this Thesis concludes that the nature of inflation in the country was cost-push attributed to the method of technology adopted and the level of unemployment in the country. This will make it possible for inflation rates if regressed along to behave abnormally to growth rates of output in Iraq. A historical analysis of monetary policy in Iraq within this framework suggests that monetary conditions might have been less accommodative and, hence, inflation in Iraq might have been lower and less volatile than what was observed in recent past had Iraq followed prescriptions based on a rule consistent with price stability. In

conclusion therefore, fight against unemployment and inflation in Iraq is not going to be easy or a short run affair, this was because what brought about high unemployment rates also brought about reduction in the growth rates of output in the country and what brought about high inflation rates also brought about improvement in the growth rates of output in Iraq. This Thesis concludes by saying that combating the challenges of the rising inflation and unemployment level in Iraq is not a small task for policy makers and economic managers in Iraq. The consequences of a growing inflation and unemployment phenomenon are so damning that Iraq cannot afford them. Such implications are glaring in the economy of Iraq where many negative developments were traceable to the non-availability of jobs for the teeming population of energetic youths with a frequent rise in general price level coupled with frequent violence and wars. Therefore, the need to aptly address this ugly development becomes paramount.

6.3 RECOMMENDATIONS

Based on the findings made in the course of this study the following recommendations are made:

➤ This Thesis therefore, recommended that government and its relevant authorities should provide conducive investment environment by removing the structural rigidities that exist in the economy to create jobs. Government should endeavor to provide stable supply of power, good roads for transportation of goods and people, functional legal system, security of lives and property, infrastructural facilities etc. All these would boost employment by making goods and services readily available to meet the ever increasing demand in order to prevent inflation and subsequently lead to industrial expansion and improvement in growth rates of the economy which would provide employment opportunities for the people.

➤ Restoring security demands of effective economic policies can help greatly in creating jobs, lift living standards and ease the poverty swelling the ranks of the insurgency.

➤ This Thesis recommends the need to formulate policies to ensure relative price stability which may likely improve the welfare of Iraqis.

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