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Bachelor Thesis

The impact of imported inflation on business and trade- a case study of Ghana

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Declaration

I hereby acknowledge that I have worked on this Bachelor thesis titled

"The impact of imported inflation on business and trade- a case study of Ghana"

by myself and all used resources are included in the bibliography and supplements section.

In Prague, 19.03.2010 ……

Anim Daniel Odame

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Lastly, my heartfelt appreciation goes to the head of the International relations office, PhDr. Vlastimil Cerny CSc. M.A and the entire economics department and all my lecturers for their contributions towards my studies.

Dedication

This thesis is wholeheartedly dedicated to the Almighty God for His preservation, provision, sustenance, guidance, protection and knowledge.

Bachelor Thesis

The impact of imported inflation on business and trade- a case study of Ghana

Bakalářská práce

Dopad importovaná inflace na podnikání a obchod-případová studie z Ghany

Dopad importovaná inflace na podnikání a obchod-případová studie z Ghany

Souhrn:

Ghana pokračuje růst v jeho politické a ekonomické systémy. Ekonomika Ghany se postupně stává stabilní. Nicméně byla inflace překážkou zasahovat do činnosti průmyslu a rozvoj Ghana na svobodě. Krátce po koloniální nadvládě, tento "démon" má bránit Ghana ekonomický růst doposud. (Glover-Meni, 2008)

Tato studie se snaží podívat na dopad inflace na podniky a obchody v Ghaně. Užitečná doporučení, která jsou rovněž pomoci dát zemi ve formě.

Prostřednictvím komplexní přehled literatury, tato práce poukazuje na některé zásadní témata, jako je inflace, a importovaná inflace. Musím říci, že velká pozornost byla věnována inflace obecně než dovážené inflace. Nicméně, inflace je inflace, ať už dovážené inflace, nebo jen inflace-vše vede ke zvýšení celkové cenové hladiny zboží a služeb.

Teoretická část dává jasné definice zkoumaného předmětu, a některé související pojmy.

Druhá část se soustředí na ekonomiku v Ghaně. Zde otázky týkající se kolísání inflace, úrokové sazby a hrubý domácí produkt (HDP), v Ghaně, které jsou ilustrovány s grafy spolehlivé údaje, které byly zcela vyčerpány. Rovněž strategie Ghana použít, aby inflaci pod kontrolou, je předmětem tohoto dokumentu.

Je to moje naděje, že toto psaní mu bude nepostradatelným přínosem pro všechny čtenáře a národ republiky v Ghaně.

Klíčová slova:

Inflace, importovaná inflace, úrokové sazby, hrubý domácí produkt (HDP)

The impact of imported inflation on business and trade- a case study of Ghana

Summary:

Ghana continues to grow in its political and economic systems. The economy of Ghana is gradually becoming stable. However, inflation has been an obstacle interfering with the activities of industries and the development of Ghana at large. Shortly after colonial rule, this "demon" has hinder Ghana's economic growth to date. (Glover-Meni, 2008)

This study endeavors to look at the impact of inflation on businesses and trades in Ghana. It also provides useful recommendations to help put the country in shape.

Through a comprehensive literature review, this thesis points out some of the vital topics on inflation and such as imported inflation. I should say that much attention has been given to inflation in general than imported inflation. The reason is that, inflation is inflation whether imported inflation or just inflation– all leads to increase of the general price level of goods and services.

The theoretical section gives clear definitions to the subject under study and some related terms.

The second part is centered on Ghana's economy. Here issues relating to the fluctuations in inflation, interest rate and Gross Domestic Product (GDP) in Ghana are illustrated with graphs with reliable data have been exhausted completely. Also the strategies Ghana use to put inflation under control is discussed under this section.

It's my hope that this writing will be an indispensable asset to all readers and the nation of the Republic of Ghana as a whole.

Key words:

Inflation, Imported inflation, Interest rate, Gross Domestic Product (GDP)

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Table of acronyms and abbreviations

GDP	Gross Domestic Product
VALCO	Volta Aluminium Company
ERP	Economic Recovery Programme
NPP	New Patriotic Party
NDC	New Democratic party
HIPC	Highly Indebted Poor Country
IDA	International Development Association
OLS	Ordinary Least Squares
CPI	Consumer Price Index
GSS	Ghana Statistical Service
PPI	Producer Price Index
SRAS	Short Run Aggregate Supply
LRAS	Long Run Aggregate Supply
IMF	International Monetary Fund
BoG	Bank of Ghana
MPC	Monetary policy committee
T- Bills	Treasury bill
VAT	Value Added Tax
AD	AggregateDemand

1. Introduction

1.1 Historic Background

Ghana as any other developing country has gone through several stages of economic growth. Ghana continues to grow in its economic and political systems. It has one of the highest Gross Domestic Product (GDP) per capita in Africa. Ghana has roughly twice the per capita output of the poorer countries in West Africa. This is due to the fact that the country is well endowed with many and rich natural resources. Cocoa, Gold, and timber production are major sources of foreign exchange. The economy continues to depend on subsistence agriculture, which accounts for 35% of GDP and employs 60% of the work force.[1]

However, Ghana has faced many financial crises and continues to face it. This can be attributed to mismanagement of resources and bad leadership. [2]Before Ghana attained independence from the British in 1957, it was estimated that Ghana had nearly $ 481 million in foreign reserves. The first prime minister (also the first president), Dr. Kwame Nkrumah constructed many infrastructure and developed many public investments including the Akosombo dam and the VALCO (Africa's largest aluminium smelter in Ghana) with this funds. Within 13 years (by mid 1960's), all the foreign reserves had disappeared such that it was practically impossible for the country to repay its foreign debt. (Rasmussen and Tetteh, 2007)

The next government, headed by General Acheampong tried to reconstruct the economy but it couldn't because Acheampong's government inherited foreign debt totaling to $ 1 billion from the Nkrumah's government. This coupled with oil price increased (1973) and massive drought (1975-1977) in the northern part of Ghana worsen the problem. Thereafter, mismanagement and corruption drove the country to a terrible stage with inflation recorded to be more than 100% in 1977. Inflation remains a major internal problem till today. The efforts of the following governments couldn't yield that much.

From 2000, the New Patriotic Party (NPP) government headed by J.A Kuffour in collaboration with some international agencies including the International Monetary

[1] Family of the world, http://www.familiesoftheworld.com/teacherguide/ghanaguide.pdf, [cit. Mar. 27, 2010]

[2] Giaba, http://www.giaba.org/media/M_evalu/GHANA%20-MER%20-English-1%5B1%5D.pdf, [cit. Mar. 29, 2010]

Fund (IMF) and the Bank Group's, International Development Association (IDA) seek debt relief under the Highly Indebted Poor Country (HIPC) program in 2002. In the HIPC Initiative, the international creditors agreed to erase the debts of the Ghana over time so that the huge resources that would have gone into debt servicing are channeled into poverty reduction. Also as a result, many major international creditors have reduced the debt burden on Ghana. This initiative has helped the country to control some economic issues including inflation.

The high inflation rates in Ghana has discouraged many investors and also led to the collapse of many small business and trades. Basically, inflation leads to increase the interest rate. When there is high inflation, businesses and small trades find it difficult to borrow money from banks due to the high interest rate attached to it. This problem is causing many businesses to collapse as they can't borrow money to invest in their businesses. Moreover, high inflation sometimes prevent banks from lending loans to its customers as in the case between the year 2000 and 2006 when inflation rose to 40% in Ghana. (Rasmussen and Tetteh, 2007) In summary, inflation has an impact on individuals and the entire nation at large.

When inflation increases, price of raw materials (goods) increases. This, in effect discourages demand for goods and services. Businesses are not able to buy raw materials because of the increase of price of goods. This will also lead to less production and thus decreasing GDP.

Moreover, when there is high inflation, the goods in our country becomes more expensive than the goods in other countries. As such, foreign countries turn to import goods from other countries rather than our country. We should know that the country get foreign exchange as a result of other countries buying goods from our country. Again, transaction of imports and exports is done with currency. When inflation increases, the country loss the money it will get from foreign exchange because our goods become expensive to other countries so foreign countries buy goods from elsewhere and eventually this affect the foreign exchange rate of our country.

1.2 Objective and Methodology

This paper discloses the relationship between inflation and some major macroeconomics factors such as interest rate and GDP in Ghana. In many countries, including Ghana, inflation is used to control interest rate. This paper will endeavor to show how inflation is used to control interest rate. Moreover, this study will also examine the influence of inflation on interest rate and GDP in Ghana.

By the use of the microfit software ordinary least squares estimations (OLS) was used to show the relationship between inflation (X3), interest rate(X4) and GDP (X5). Using real data, the results show the relationship between the dependent variable which is inflation (X3) and the interest rate (X4) and GDP (X5). The results are shown in the appendix section.

1.3 Hypothesis

Shortly after independence, never in the history of Ghana has inflation hit a single digit. The best inflation rate ever recorded in the history of Ghana was in 1991 when inflation fell to 10.26%. Inflation rate has ever remained a double digit from 1983 to date. The highest inflation rate ever recorded in Ghana was in 1983 when inflation rose to 122.8%. In developed countries, inflation is always less that 5% at most. Inflation in USA as recorded in January, 2009 was 0.03%. (McConnell and Brue, 2002) In view of this, more light should be thrown on the impact of inflation on business and trade. Also, economic ministers and the heads of state of Ghana at large should be educated more on this inflation impact.

Again, as many firms take loans from banks to run their business, there should know the relation between inflation and interest rate. This will help them to make good strategic decisions. Also, as many companies and the nation as a whole import raw material from foreign countries, they should know the influence or relationship between imported inflation and exchange rate.

2. Literature review/overview

2.1 Meaning of inflation and imported inflation

Inflation can be defined as the general increase of prices of goods and services in an economy. Alternatively, inflation is a decrease in the value of money. An economy without money, using only barter, could have no inflation. The opposite of inflation is deflation, a decrease in the general level of prices or a rise in the value of money. It should be understood here that inflation doesn't mean all price of goods and services would increase. Inflation can cause some prices of goods and services to increase alright whiles some prices can remain relatively constant or even decrease. An example can be traced in the 1970s and early 1980s in the United States, when there was high inflation, the prices of video recorders, digital watch and personal computers declined. Inflation reduces the purchasing power of money. In the sense that, the amount of money that could buy a certain quantity of goods when there is high inflation can buy more goods when there is low inflation. Inflation reduces the value of a currency. Inflation can have effects on the economy. The effect can be positive or negative. Negative effects of inflation include a decrease in the real value of money and other monetary items over time and the uncertainty about future inflation may discourage investment and saving. Positive effects include a reduction of economic recession and debt relief by reducing the real level of debt. (McConnell and Brue, 2002)

Imported inflation is a kind of inflation which happens as a result of high price of imported goods. [3]When a country, say country A trades with another country, say country B and the currency of country B appreciates in relation to country A. This means that from country A's point of view goods from country B is expensive. But country A needs the goods from country B for its production. So country A buys the expensive goods from country B leading to an increase in the cost of production in country A. An increase in cost of production will also lead to the increase in the prices of goods and hence imported inflation.

[3] Wikianswers, http://wiki.answers.com/Q/What_is_imported_inflation, [cit. Nov. 18, 2009]

2.2 Measurement of Inflation

There are several ways by which inflation can be measured. One way is by using the Consumer Price Index (CPI). The government uses this index to report inflation rates each month and each year. The CPI is a report of the price of a "market basket" of some consumer goods and services that are assumed to be purchased by a typical urban consumer. In Ghana, the Ghana statistical service (GSS) calculates this index. The GSS updates the market basket periodically so that it reflects the most recent patterns of consumer purchases and capture the inflation (high prices) that consumers are currently experiencing. (Case and Fair, 2002)

CPI can be calculated mathematically as

$$\text{CPI} = \frac{\text{price of the most recent market basket in a particular year}}{\text{Price of the same market basket in the starting year}} \times 100$$

A numerical example makes this procedure clear. Suppose a representative market basket of weekly expenditures of teenagers is three hamburgers, eight colas, and one gallon of gasoline. (Of course this is much too small a basket to be realistic, but this example illustrates the procedure.) [4]With the prices of year 1 shown in the table below, the cost of the market basket is $5.00. In year 2 two prices have risen and one has declined. Yet one can say that on the whole the price level has risen because the cost of the market basket has risen to $5.50. This is an increase of 10% (50/550 = 10%). From year 2 to year 3 prices change again, and the cost of the market basket goes up by another $.50. In year 3 the price level is 20% higher than it was in year 1 ([600 - 500]/500 = 20%), and 9.1% higher than in year 2 ([600 - 550]/550 = 9.1%).

Computing the Price Index

	Amount	Price yr 1	Price yr 2	Price yr 3
Hamburgers	3	0.75	0.70	0.90
Colas	8cans	0.25	0.30	0.30
Gasoline	1 gallon	0.75	1.00	0.90
Cost of the		5.00	5.50	6.00

[4] The Ingrimayne, http://ingrimayne.com/econ/Measuring/Inflation1.html, [cit. Dec. 12, 2009]

market basket				
Price index		100	110	120

Source: http://ingrimayne.com

To compute the price index, the cost of the market basket in any period is divided by the cost of the market basket in the base period, and the result is multiplied by 100. In the table above, year 1 is the base year. The price index for year 3 is:

Price Index = (P_3/P_b) x 100 = (6.00/5.00) x100 = 120.00

The price index tries to give in one number a general picture of what is happening to a great many numbers. As the example shows, some prices may actually be declining while the price index is rising. These prices were not ignored by the price index; rather their contribution was less important to the overall result than the contribution of items whose prices rose.

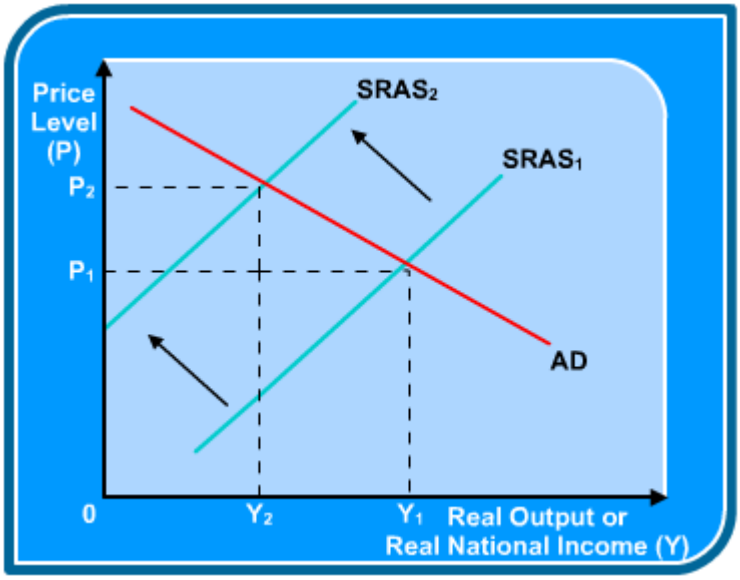
Another way of measuring inflation is the Producer Price Index (PPI). PPI provides monthly statistical report. In the United States it is calculated by the Bureau of Labor Statistics (BLS) during the second full week of the month. The PPI tracks changes in prices of components used to create finished goods in industries such as agriculture, electricity, natural gas, forestry, fisheries, manufacturing, and mining. An index is also produced excluding energy and food prices, which are typically the most volatile elements of PPI. Prices for PPI are broken down into three categories: crude materials, inter-mediate goods, and finished goods. Price increases in finished goods indicate a likely increase in inflation relatively soon. Price increases in crude and intermediate goods indicate future inflationary pressure. (McConnell and Brue, 2002)

Both CPI and PPI show the same or similar inflation rates!

2.3 Types of inflation

There are basically 2 main types of inflation. These are the cost-push inflation and the demand pull inflation.

Cost push inflation: is a type of inflation that occurs when the cost of using any of the four factors of production (labor, capital, land or entrepreneurship) increases. In general high cost of production means the economy cannot continue to supply the same production at the same price level. If buyers want the goods, they must pay high prices for it. Hence the cost of production "pushes" the price of the goods high. (Maitah, 2009)

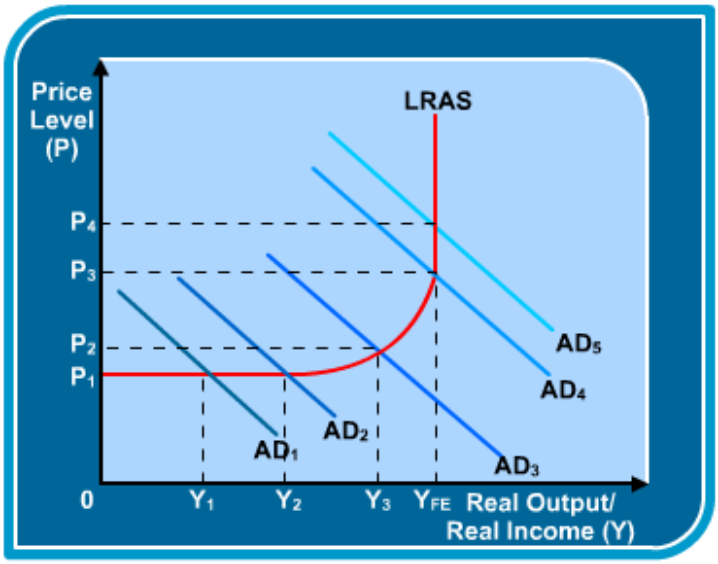


Source: http://www.s-cool.co.uk

[5]Short run aggregate supply (SRAS) curves have been used, but the analysis could be applied to LRAS curves. Quite simply, an increase in the costs of an economy will shift the SRAS curve to the left (from $SRAS_1$ to $SRAS_2$) causing the price level to rise to P_2 and the level of real output to fall to Y_2.

Demand pull inflation: is the type of inflation which results when the four macroeconomic sectors (household, business, government and foreign sector) collectively try to purchase more that what the economy is capable of producing. In general, increasing aggregate demand means buyers want more production than what the economy is able to produce. As a result, the demand increases the price of the goods and thus the demand "pulls" the price high. ((Maitah, 2009))

[5]S-cool, http://www.s-cool.co.uk/alevel/economics/inflation-and-monetary-policy/what-are-the-causes-of-inflation.html, [cit. Mar. 29, 2010]



Source: http://www.s-cool.co.uk

[6]Further increases in government spending would start to be inflationary. A shift in the AD curve from AD_2 to AD_3 will increase real output (from Y_2 to Y_3) but the price level will also rise (from P_1 to P_2). The result is similar if AD rises to AD_4. At this stage, the economy is approaching the full employment level of real output, so some industries still have some spare capacity but others will be at full capacity, resulting in price rises in some industries, and so a rise in the average price level when AD rises.

A further increase in AD when the economy is at full employment (AD level AD_4) will simply result in a price rise with no increase in the level of real output. (Burda. and Wyplosz, 2005)

2.4 Redistribution effects of inflation

When we first think of inflation we assume that it will affect all people equally. After all if everyone is using the same money wouldn't everyone be affected equally? The fact is that everyone isn't affected equally. Although inflation leads to increase in price of goods and services, we should know that inflation can benefit some people or rather inflation has some advantages. For example, not all prices increase when there is inflation. This advantage among others is some of the benefits of inflation. In this scenario, inflation redistributes real income from some people to others. Therefore,

[6] S- cool, http://www.s-cool.co.uk/alevel/economics/inflation-and-monetary-policy/what-are-the-causes-of-inflation.html, [cit. Mar. 29, 2010]

some people get hurt and others benefit from inflation. Before we discuss this in details let's look at these two terminologies. **Nominal income** is the income received as wages, profits, interests or rents while **real income** is a measure of the amount of goods that can be our purchased with nominal income. In other words, real income can be defined as the purchasing power of nominal income.

2.4.1 Disadvantage people during inflation

Unexpected inflation hurts fixed income recipients, savers and creditors. It redistributes real income away from them and toward other.

Fixed-Income Receivers: Landlords who receive payments in installments will be hurt by inflation as inflation will decrease the value of their money over time. Similarly, People who live on fixed incomes see a decline in the purchasing power of their money (real income) during inflation. The same amount of money that they could use to buy goods in some years back cannot buy the same quantity of goods today because of high inflation. Likewise, minimum wage workers who also receive fixed income will be hurt. Their wages may not keep up with inflation and will be hurt by inflation.

Creditors One of the biggest losers due to inflation is those willing to loan money. An extreme example would be during the hyper-inflation of 1923 in Germany. If you had loaned a friend enough money to buy a car in early 1923 and he had repaid it at the end of 1923 you might have been able to buy a box of matches with it. So it is easy to see that the borrower got a car and he was able to repay it with pocket change. The lender of course was the big loser.

Savers People who save their money get hurt by unanticipated inflation. As prices rises the purchasing power of saved money declines. For example, a household may put $1000 on treasury bills in a commercial at 8 percent interest. But if inflation at the time the money is received is 16 percent, the purchasing power of that $1000 will fall to $920. Although the saver will receive $1080, the real value of the money will be $ 920. (McConnell and Brue, 2002)

2.4.2 Advantage people during inflation?

Debtors and flexible- income receivers on the other hand are not affected by inflation. They are actually helped by inflation. Inflation redistributes real income toward them and away from others.

Debtors: When debtors borrow money from money leaders, they actually borrow valuable money. The amount of money plus interest they must repay is normally fixed. So over time, the value of the money they must repay becomes less when inflation rises. (So they are low value money than if the value of the money wasn't inflated away.) This is called repaying with "cheaper money".

Flexible income receivers: Individuals who receive flexible income are unaffected by inflation or even benefit from inflation especially individuals who get their income from social security. Social security payments are indexed to the CPI. Hence, the benefits automatically increase when CPI increases and thus preventing erosion of benefits from inflation. (McConnell and Brue, 2002)

2.4.3 Anticipated inflation

If people/businesses can make accurate predictions of inflation, they can take steps to protect themselves from its effects.

Let us now consider a situation where everyone knows what the inflation rate will be between this year and next. Suppose, for example that you are lending $100 for one year and you expect that the inflation rate over the next year will be 10 percent. You have to charge 10 percent interest just to cover the loss in real value of the principal during the year---the $100 you will receive on repayment at the end of the year will buy only $90 worth of goods. You also want to receive real interest on the loan so you can charge say, 5 percent more meaning that you will have to charge an actual interest rate of 15 percent---5 percent real interest and 10 percent to cover expected inflation.[7]

The person borrowing the $100 from you will be willing to pay interest at 15 percent per year because 10 of the 15 percentage points will be compensated for by the expected reduction in the amount of real goods that will have to be paid back to discharge the loan. This assumes, of course, that the borrower also expects the inflation rate to be 10

[7] Economics utoronto, http://www.economics.utoronto.ca/jfloyd/modules/ainf.html, [cit. Mar. 29, 2010]

percent per year and is willing to borrow from you at a real interest rate of 5 percent per year. (Mankiw, 1990)

If the inflation rate turns out to be higher than expected, the realized real interest rate will be below the contracted real interest rate and there will be a redistribution of wealth from you to the borrower. If the inflation rate turns out to be lower than expected, the ex post real interest rate will be above the ex ante real rate and you will gain at the borrower's expense. If the actual and expected inflation rates turn out to be the same, there will be no wealth redistribution effect. Only the portion of inflation or deflation that is unanticipated leads to transfers of wealth between debtors and creditors---the rest is accounted for in the rate of interest specified in the loan contract.

Again, if people can make accurate predictions of inflation, households may also be able to switch savings into deposit accounts offering a higher nominal rate of interest or into other financial assets such as housing or equities where capital gains over a period of time might outstrip general price inflation.

2.5 Inflation and interest rate

The interest rate is the extra amount of money paid to a creditor in addition to the loan received over a specific time period. The central government (central bank) uses the interest rate to control money supply and, consequently, the inflation rate. There is a link between inflation and the money supply in an economy. When the central bank increases the money supply, in order to keep up businesses, prices rise, thus causing inflation. When interest rates are low, banks are able to lend more, resulting in an increased supply of money into the economy.

In short, high inflation leads to high interest rate. When interest rates are high, it becomes more expensive to borrow money and savings become attractive. Interest comes in to play because when inflation occurs, lenders want more money to be able to keep up with inflation. Because of this, lenders raise their interest prices to gain more money which is enough to take care of the high prices and also make some profit.

In this sense it becomes eventually difficult for investors and businesses to borrow money. This problem has lead to the collapse of many small and even large businesses.

In order to explain the relationship between inflation and interest rate, the types of interest rate should be defined. **Nominal interest rate, i**, is that which has not been

adjusted for inflation while **real interest rate, r,** is that which has been adjusted for inflation. The **actual interest rate, π** is that which is not know until it occurs.

$$\mathbf{r = i - \pi}$$

The Fischer equation shows the relationship between nominal interest rate and inflation.

$$\mathbf{i = r + \pi}$$

From the equation, is can be seen that **i** is directly proportional to **π**. Thus, an increase in π will lead to an increase in **i**. This is called the Fischer effect. We have to understand that the Fischer effect doesn't mean inflation is equal to the nominal interest rate. On the contrary, the Fischer effect relates that changes in the nominal interest rate is equal to changes in the inflation rate given a constant value of the real interest rate.

Many investors and businesses are interested in the future. They want to know what the inflation will be in the near future in order to know whether they should invest or not. Hence, the future inflation is really important for investors when making decisions. In view to this, it is important to introduce on kind of inflation referred to as expected inflation, **πe**. For instance, if you lend money to a friend at a time, say **t** at a nominal interest rate of 15% in the payback period **t+1**. What matters most here is the quantity of goods you can purchase with the payback money in the period, t+1. Therefore, in making decisions you have should know what the future inflation will be so that you can charge the right interest rate at period, t. This shows why it is important to control inflation. Actually, keeping inflation constant over time makes future decisions less uncertain. When inflation is kept constant over time, investors can make good decisions as they will make little or no mistakes in predicting the future inflation rate.

The Fischer effect shows the relationship between nominal interest rate and expected interest rate.[8]

$$\mathbf{i = r + \pi e}$$

2.6 Inflation and Gross Domestic Product (GDP)

The growth of an economy can be determined by a measure of its Gross Domestic Product which is simply put as GDP. Before we look at the actual subject, let us exhaust what is GDP. Gross domestic product can be defined in a number of ways. But for the purpose of this study only one will be discussed. GDP can be defined as the

[8] (Maitah, 2009)

total market value of all the final goods and services produced in the economy in a given period of time, usually one year.

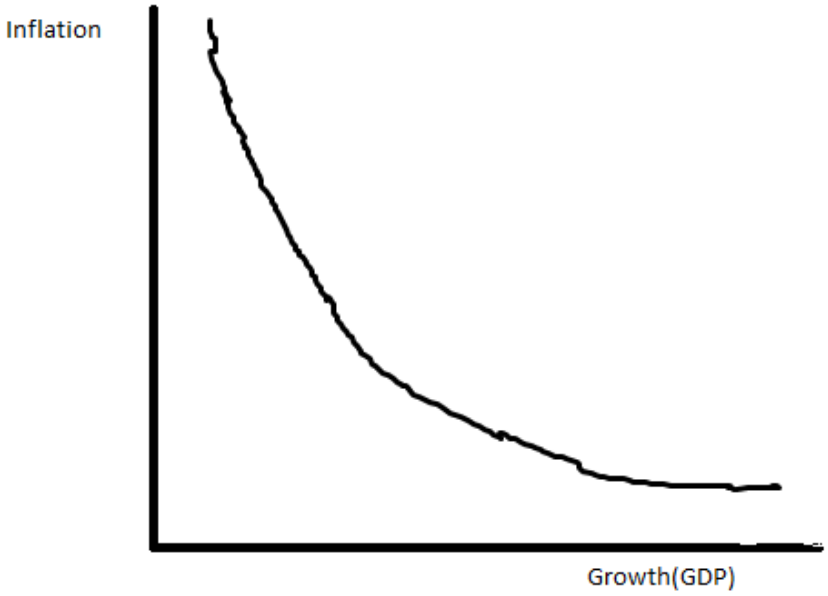
From the definition, GDP considers all the goods and services produced in an economy each year. The larger the GDP, the larger the goods and services that was produce in the year. The market value gives a good estimate of the price of goods and services used in calculating the GDP. Nevertheless, GDP considers only final value of goods and services. Production of goods normally goes through many stages using intermediate goods. Most companies require intermediate goods produced from other companies for its production. Consider a bakery which produces bread. This bakery firm will need flour from a different company, sugar from a different company, eggs from a different company etc. In the calculation of GDP, only the final value of the goods produced which is the bread is needed. GDP doesn't take into accounts the intermediate goods which in this case are the flour, eggs, sugar etc. This is because the price of the intermediate goods is already included in the GDP. Therefore, calculating it again will lead to an error referred to as double counting. Finally, the time period in the definition GDP has to be highlighted. GDP measures the production of goods produced in a specific period of time which is usually one year.

There are basically three methods of measuring GDP i.e. the production approach, the income approach and the expenditures approach.

Production approach: It can also be referred as the value added approach. The basic idea of the value-added approach is to calculate the value of production at each stage. This avoids the double counting of goods that are used as intermediate inputs. Practically this is done by calculating Value added = revenue - cost of intermediate inputs at each stage of production. So in the production of say juice drink example, the value added by the juice drink firm in the price of juice drink maybe cost of ice, cost of fruit, cost of vitamin powder, cost of yogurt. The ice manufacturer's value added = revenue from selling ice to the juice drink firm – cost of water – cost of electricity. The fruit manufacturer's value added = revenue earned by selling fruit to the juice drink– cost of fertilizer – cost of seeds etc. It is important to realize that payments to labor and capital, i.e. salaries and rental cost of machines are not subtracted from revenue. Labor and capital are what contribute to value added. (Mankiw, 1990)

The income approach: The income approach to measuring GDP adds up payments by firms to households, called factor payments, to arrive at national income (NI), or total income earned by citizens and businesses of a country.

The expenditures approach: For the expenditure approach, gross domestic product is equal to the sum of four expenditure categories: consumption (C), investment (I), government expenditure (G) and net exports (X-M).



It should be understood that it's the production of the companies in an economy that determines whether the value of GDP will go high or low. As we learned from the definition, GDP measures the total production of all the goods produced in an economy. As companies are able to produce more, GDP goes high. When inflation is low, investors and business are able to invest more money into their companies because prices of goods become cheap. Moreover, the low interest rate also makes borrowing very attractive and as such businesses are able to borrow more money for their production. Also, because of the low uncertainty during inflation investors are able to plan well and invest into the future. These reasons make increases production and as such increases GDP.

On the contrary, high inflation rates leads to less production. Due to the high interest rates, businesses are not able to borrow money to increase their production. Again, the cost of production increases accordingly. Companies are not able not purchase the same raw materials they use to buy with same amount of money as inflation erodes the

purchasing power of money. These factors coupled with the high uncertainty in the future discourage investment and thus a decrease in production. (Mankiw, 1990)

Now let's look at the relationship between inflation and the two types of GDP- real GDP and nominal GDP. Real GDP is a measure of output produced by an economy valued in the prices of the base year so it allows you to compare the actual amount of output over time. Nominal GDP is just the cash value of a countries production during a particular time period.

Inflation in the long-run has no relationship with real GDP. Real GPD, in the long-run does not depend on inflation.

In the short-run, however, it does. When inflation is higher than individuals and firms expect, firms perceive their prices to be higher than normal, so they hire more workers, increasing real GDP. Nominal GDP goes up even more now because inflation causes the value of money to be worthless. This implies everything becomes more costly and on top of that more is being produced because firms assume their products have increased in price relative to other prices.

2.7 Effects of inflation on output

Inflation can have effect on real output and thus have effect on the economy. The effect of inflation can be determined by the cause of inflation thus cost-push inflation or demand demand-pull inflation.

2.7.1 Cost-Push inflation and real output

Cost-Push inflation as defined earlier is as a result of increase in input (cost of production) and thus leading to an increase in the price of the goods. The cost of production might rise due to one or more of the following reasons (i) increases in wages and salaries (the biggest cost of production economy wide); (ii) increases in the cost of raw materials; (iii) increases in the price of imported goods (either as finished goods, semi-finished manufactures or raw materials) due to a fall in the value of the £ or price rises in the country of origin; (iv) increases in indirect taxes (or reductions in government subsidies).[9]

[9] (McConnell and Brue, 2002)

When the prices of goods go up, the demand for those goods goes down or falls. This means that the goods become expensive and thus people are not able to purchase these goods. Less or no demand for goods leads to low production. No or less demand of goods decreases production because companies cannot make profit from producing goods which have no demand. As a result of low production, companies have to reduce the number of workers leading to increase in unemployment.

2.7.2 Demand-Pull inflation and real output

Demand-Pull inflation as defined above is as a result of an increase in demand for goods and services such that the economy cannot produce to meet the demand and thus causing the prices of goods to rise. Demand-pull inflation is often described by many sources as "too much money chasing too few goods,"

From the diagram for demand-push inflation, it shows that increases in the level of demand in an economy cause inflation. The rising level of demand is 'pulling' the price level up, hence the name 'demand-pull' inflation. (Maitah, 2009)

Demand-pull inflation explains why certain items or services rise in price even when they appear to be in plentiful supply. A booming economy is an economy in which factories are hiring more workers. In such an economy, the high number of workers produces more products. However, these additional employees are also earning more money and want to spend that money on products they may not have able to afford while unemployed or underemployed. Because the demand for these products rises but the supply cannot be increased fast enough to meet it, the price of the products often rises. Even though the supply of a product may be as high as ever, the increased demand for it by a larger pool of workers creates demand-pull inflation. Fortunately for consumers, the effects of demand-pull inflation are generally short-term. Once demand for popular goods goes down after a holiday season, for example, the company has time to restore the supply and the price for those goods generally comes down. If the unemployment rate should rise, then demand for a product may fall because fewer consumers can now afford to buy the goods. During times of demand-pull inflation, aggregate supply is rarely low, just unable to keep pace with aggregate demand caused by more spending by employed workers. The best example of this happening in the UK

economy was the consumer boom of the late 80s. Excessive demand in the economy forced the inflation rate up to 10%.[10]

2.7.3 Hyperinflation

Hyperinflation is an extremely rapid or out of control inflation. There is no precise numerical definition to hyperinflation. Hyperinflation is a situation where the price increases are so out of control that the concept of inflation is meaningless. Its impact on real out and employment is usually devastating. When inflation begins to escalate, consumers assume that it will raise more. In order not to fall victims to the anticipated high prices to goods, consumers tend to spend more money to the beat the expected inflation. Businesses also do likewise buy purchasing more inputs or machinery. Workers demand more wages to boost the purchasing power of their money. All these actions increase the prices to rise and the extreme is hyperinflation.

Hyperinflations are caused by extremely rapid growth in the supply of "paper" money. They occur when the monetary and fiscal authorities of a nation regularly issue large quantities of money to pay for a large stream of government expenditures. In effect, inflation is a form of taxation in which the government gains at the expense of those who hold money while its value is declining. Hyperinflations are very large taxation schemes.

When there is hyperinflation, companies do not know what to charge for their products and consumers also don't know what to pay for the goods they want. Creditors avoid debtors as they will pay back with 'cheap money'. In the extreme, money become worthless and ceases to become the medium for exchange. The economy may turn to a state of barter. (Henry, 2005)

There has been a number hyperinflation in history. In 1922, the price level rose to 5470% in German. By October 1923, the price for posting a normal letter in German was 200,000 marks. Sometimes customers at restaurants had to pay twice the price listed on the menu when they order. The price on the menu could change several times in the course of a lunch. In 1947, fishermen and farmers in Japan used scales to weigh currency and change rather than bothering to count it. Currently in Africa, there is

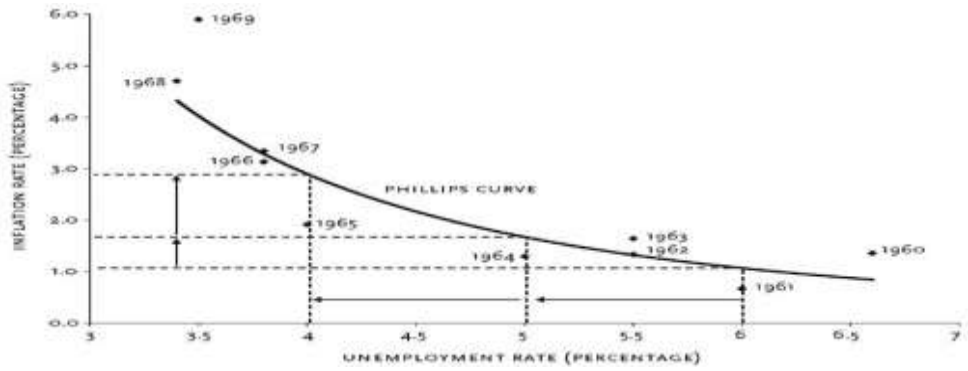
[10] Economicshelp, http://econ.economicshelp.org/2008_10_01_archive.html, [cit. Mar. 29, 2010]

severe hyperinflation in Zimbabwe. Inflation rate in Zimbabwe as of July, 2008 was 231,150,888.87%. On January 16, 2009, Zimbabwe announced plans to issue banknotes of $10 trillion, $20 trillion, $50 trillion, and $100 trillion. At the time of the announcement, the latter was valued at around 30 US dollars, but that value was expected to evaporate swiftly. By July 4, 2008, a bottle of beer cost $100 billion Zimbabwean dollars but an hour later, the price had gone up to $150 billion[11].

2.8 The Phillips curve

The Phillips curve shows the relationship between inflation and unemployment. It was introduced in 1958, by a New Zealand economist, A. W. Phillips. The Phillips curve shows that inflation is inversely proportional to unemployment. In simple terms, low in inflation result in high unemployment and the vice versa is also true. It actually shows a tradeoff between unemployment and inflation of an economy. It is based on the Keynesians theory which states that an economy can either suffer from inflation or unemployment but can never suffer from both simultaneously. (Maitah, 2009)

When there is a sudden (high price level) inflation, many people try to find new jobs to boost the purchasing power (value) of their money. This decision of workers accounts for the short term tradeoff between inflation and unemployment. As they spend more time to find good jobs to compensate the reduced money, they thereby lengthen the duration they thus increase the unemployment rate. The vice versa is also true for disinflation. The graph below shows the Phillips Curve, 1961–1969.



Source: Bureau of Labor Statistics.
Note: Inflation based on the Consumer Price Index

[11] Timesonline, http://www.timesonline.co.uk/tol/news/world/africa/article4258492.ece, [cit. Mar. 29, 2010]

3. Economy of Ghana

Most government efforts to restore the productivity of the Ghanaian economy have been directed toward boosting the country's exports. These policies, however, have had numerous consequences. Following the initiation of the Economic Recovery Program (ERP) in 1983 and the devastating drought of 1983, Ghana's GDP has registered steady growth, most of it can be attributed to the export sector, including cocoa and minerals and, to some extent, timber processing.[12]

Ghana's economy has seen improvements in fiscal discipline and current account balance on the back of renewed commitment by the (new) government to restore macroeconomic stability. Nevertheless, prices for the goods that most Ghanaians purchase have been rising faster than the wages they receive for their work.

3.1 Inflation in Ghana (Detailed definition of the problem)

ERP policies during the 1980s resulted in increased in external debts as well as in relatively high inflation rates. Most ERP projects were funded by foreign loans, notably from the IMF. At the same time, the government repeatedly devalued the country's currency to raise producer prices for exports and to encourage production, but devaluation also led to price rises (inflation) on all other goods as well. ERP attempts to promote production have, at least in the short term, resulted in higher debts and inflation. (Akosa, 2008)

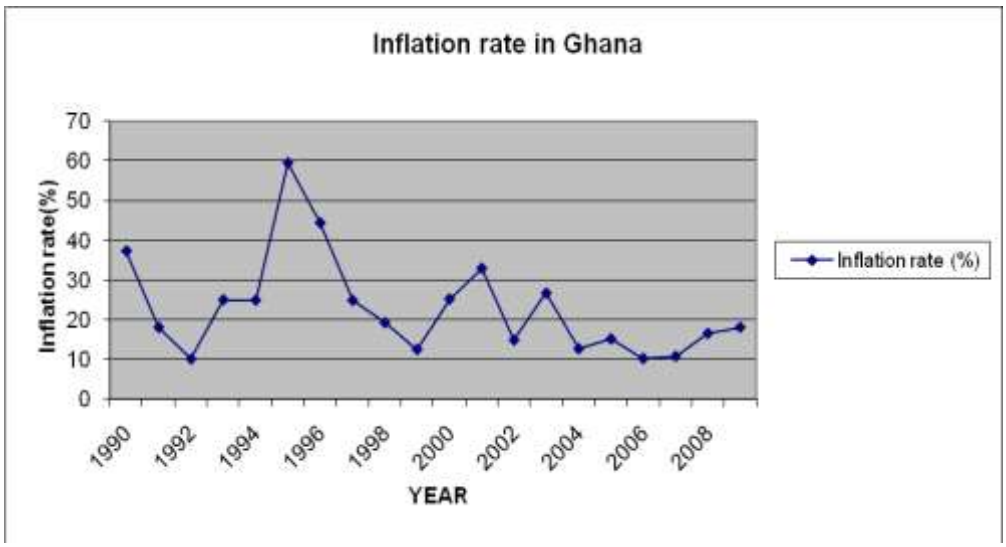
Inflation is defined as the general increase in price level of goods and services. Like most countries, inflation in Ghana is measured by the consumer price index (CPI). Inflationary pressure is continually subdued by controlling of government expenditure and tight monetary control. Over the years, Ghana has experience many fluctuations in inflation rates. The table shows the inflations in Ghana from 1990 to date.

Year	**Inflation rate (%)**
1990	37.259
1991	18.031

[12]Modern Ghana, http://www.modernghana.com/GhanaHome/ghana/economy.asp?menu_id=6&sub_menu_id=13&menu_id2=0&s=b, [cit. Mar. 29, 2010]

1992	10.056
1993	24.96
1994	24.87
1995	59.462
1996	44.357
1997	24.838
1998	19.215
1999	12.446
2000	25.151
2001	32.906
2002	14.815
2003	26.677
2004	12.629
2005	15.113
2006	10.151
2007	10.733
2008	16.522
2009	18.040

Source: Ghana statistical service



From the graph, Ghana's inflation rates have showed many fluctuations. In the early 1990s, the government was unable to reduce high inflation significantly. The inflation rate went down from 37% in 1990 to 10% in 1992. Surprisingly, the inflation rate thereafter went up gradually to 59% in 1995. This rate is one of the high inflation rates ever recorded in the history of Ghana. However, this rate cannot be link to the inflation rate of the early 1980s when inflation hit 123 percent because of drought, inflation in the following six years averaged almost 30 percent. Recovery in agricultural output in 1984 and 1985 helped to shrink inflation rates. Inflation rates were put under control after 1998 to date. By 2007, the country's inflation rate registered 10 percent.

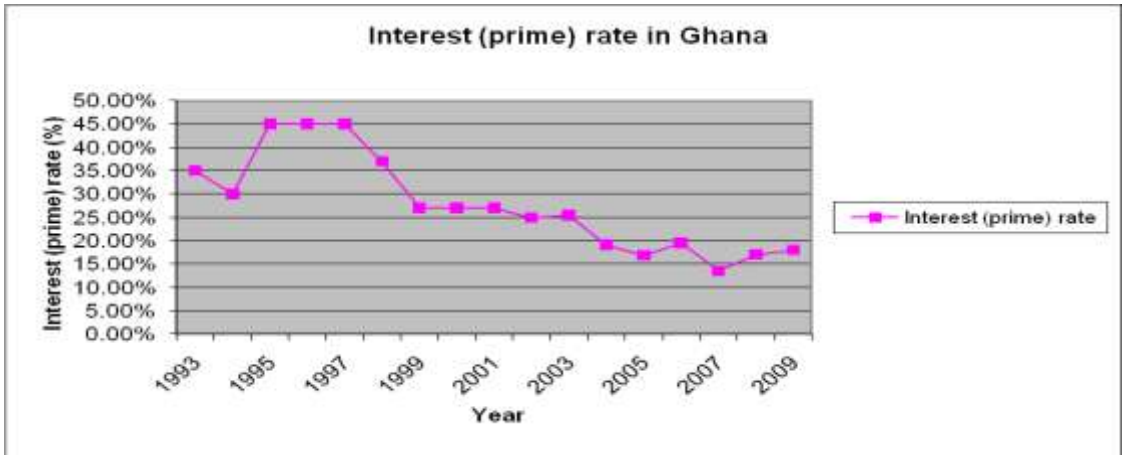
3.2 Interest rate in Ghana

Interest rates influence spending and saving in the economy and the prices we pay for goods and services. Low inflation helps to maintain a stable economy and the value of our money. Interest rates charged on loans by microcredit institutions are increasingly coming under scrutiny, leading lenders to examine the rationale behind the rates they charge. Most institutions seek to set an interest rate which covers their costs while being competitive with other credit providers. Some obviously try to keep rates to a minimum in order to provide a low-cost service to their clients. There has, however, been little rigorous attempt to evaluate how demand is affected by changes in the interest rate offered. Knowing how important interest rates differentials are to clients in selecting

one microcredit provider over another will clearly be of great interest to lenders themselves. The larger question, though, is the extent to which lower rates could increase aggregate demand by encouraging new borrowers into the industry.

Year	Interest (prime) rate
1993	35.00%
1994	30.00%
1995	45.00%
1996	45.00%
1997	45.00%
1998	37.00%
1999	27.00%
2000	27.00%
2001	27.00%
2002	24.92%
2003	25.42%
2004	19.13%
2005	16.83%
2006	19.50%
2007	13.50%
2008	17.0%
2009	18.0%

Source: Ghana statistical service



The above time series and its corresponding graph shows that Ghana has experience very high interest rate in the future. This can be seen clearly between 1993 and 1998. However, from the beginning of the 21st century, interest rate has been put under control. In 2007, interest rate went down to 13.50%. This rate, if not the best, is one of the best interest rates that have ever been recovered in the history of Ghana.

3.3 Gross Domestic Product (GDP) in Ghana

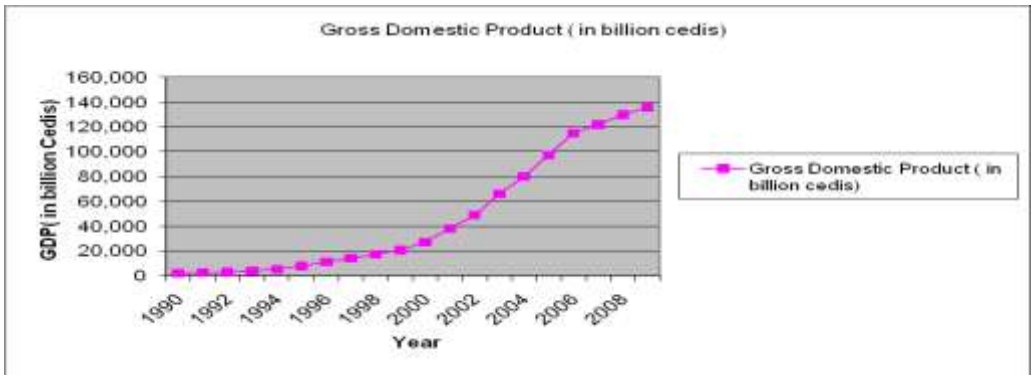
GDP can be defined as the total market value of all the final goods and services produced in an economy at a specified period of time usually one year. (Maitah, 2009)

It measures the economic performance of a country. The growth of an economy can be determined by a measure of the GDP and also GDP is used for measuring the standard of living of an economy.

Year	**Gross Domestic Product (in billion cedis)**
1990	2,031
1991	2,574
1992	3,008
1993	3,872
1994	5,205
1995	7,752

1996	11,339
1997	14,113
1998	17,295
1999	20,579
2000	27,152
2001	38,070
2002	48,862
2003	66,157
2004	79,887
2005	97,260
2006	114,903
2007	121,912
2008	129,592
2009	135,582

Source: Ghana statistical service



The graph above shows the trend of GDP in Ghana. The graph illustrates that GDP in Ghana has continually been increasing each year in Ghana. However, in the early 90's, there was a little increase in the GDP growth. Nevertheless, there has been a huge increase in the growth of GDP since the beginning of the 21st century to day. Ghana's worst years were 1982 and 1983, when the country was hit with the worst drought in fifty years, bush fires that destroyed crops, and the lowest cocoa prices of the postwar period. (Osei, 2001)

4. Measures to control inflation in Ghana

There are several measures which can be taken to control inflation in Ghana. For the reason of this study we shall categorized them under the following broad topics: Monetary policy, Fiscal policy and Realistic measures.

Clearly, inflation in Ghana is caused by both fiscal and monetary issues. In the past, Ghana's balance of payments position has been in severe difficulties due to inappropriate trade, fiscal and monetary policies. Excessive money supply is one of the greatest causes of inflation in Ghana. For instance between 1996 and 1997 inflation was at 25% and 8% respectively, meaning the then P/NDC government adopted some prudent economic management tools to tame the inflation. But it couldn't succeed to maintain it for long when the rate jumped to 40% at some point, again reflecting fiscal mismanagement.

4.1 Monetary policy in Ghana

By definition, monetary policy is the measure focused on controlling money supply and circulation of money in the country. Basically, monetary policies cover the monetary aspect of an economy. It tries to stabilize the economy by dealing with the economies imbalances.

In Ghana, the monetary policy committee (MPC) is responsible for all matters concerning monetary issues including inflation among others. The monetary policy is geared towards reinforcing the declining trend in inflation with a view to achieving a single digit rate. The committee meets from time to time to represent their report to the public normally through press release. On the basis of the discussions and the prospects for a continuation of the disinflation process and improvements in economic activity and output growth, the Monetary Policy Committee decided to reduce its Policy Rate by 200 basis points from 18 percent to 16 percent. [13]The committee reported in a press release that the rate of inflation which stood at 18 percent in October 2009 declined to 16.9 percent in November and then to 15.9 percent in December 2009. In January 2010, the Ghana Statistical Service reported a further decline in the inflation rate to 14.8

[13]Bank of Ghana, http://www.bog.gov.gh/index1.php?linkid=328&archiveid=1460&page=1&adate=19%20February%202010, [cit. Mar. 29, 2010]

percent. Of the 3.5 percent decline in inflation recorded since October 2009, 18 percent is attributed to food price changes while the remaining 82 percent is due to changes in non-food prices. Developments through the last quarter of 2009 and early 2010 suggest improved economic fundamentals driven by diminishing inflationary pressures, exchange rate stability, a pick-up in economic activity and an improvement in business and consumer confidence. The economy is responding to the policy initiatives of the government which has brought improved business confidence and will help to maintain inflationary expectations. The outlook is for steady disinflation towards the target range of 7.5 -11.5 percent for 2010. (Statesman, 2009)

In July, 2007, Ghana had a re-denomination exercise of the Ghanaian cedi. The new cedi has 4 zeroes slashed from the previous one. This means that if the closing balance in your account was six million cedis (¢4,000,000.00) as at 30th June, 2007, from the 1st of July, 2007 your balance would be GH¢400.00. This is not by magic. The redenomination exercise has come as a result of the good monetary policies of the Central Bank.

4.1.1 Bank rate policy

When there is inflation, the bank rate is increased. This controls the supply of money. Ghana's new Central Bank governor, Kwesi Amissah-Arthur cut its benchmark lending rate for only the second time in three years since 2006, if inflation continues to slow. Amissah-Arthur who started work recently promised major policy reversals and urged the government to aim for a faster economic growth rate.

Ghanaian commercial-bank lending rates are currently about 30 percent, above the African average, economists say. According to central bank data, the ratio of non-performing loans to gross loans rose to 14.9 percent in December 2009, from 7.7 percent in December 2008.[14]

"We are not happy about the bank's lending to the private sector at 30-plus percent," Kwabena Duffuor, Finance minister, Ghana

Inflation targeting failed due to the failure by the central bank to achieve its targets in 2007 and 2008 despite raising the prime rate to 18.5% from 12.5% in 2006.

[14] Business week, http://www.businessweek.com/news/2010-02-19/ghanaian-central-bank-cuts-prime-lending-rate-to-16-update1-.html, [cit. Mar. 29, 2010]

"If inflation targeting has failed to achieve the result of bringing inflation down to single digits, then we should look at other instruments," Amissah-Arthur, Governor of Bank of Ghana.

4.1.2 Open market operations

During inflation, the central bank sells government securities and price bonds in the open market in order to contract the supply of money. By buying or selling bonds, bills, and other financial instruments in the open market, a central bank can expand or contract the amount of reserves in the banking system and can ultimately influence the country's money supply. When the central bank sells such instruments it absorbs money from the system. Conversely, when it buys it injects money into the system. This method of trading in the market to control the money supply is called open market operations.

Ghana's money market is continually being shaped by the ongoing reform of the financial sector. With the shift to an increasing reliance on open market operations as the primary monetary control technique, the conduct of monetary policy becomes increasingly dependent in an active primary and secondary money market. Difficulties in achieving money supply targets and persistently high rates of inflation suggest the need for more effective monetary policy instruments. In Ghana the money market consist of the following instruments:

- Treasury Bills
- Bank of Ghana Bills
- Negotiable Certificates of Deposit
- Commercial Paper
- Bankers Acceptances

The market is dominated by Treasury Bills maturing between 30 to 180 days. Treasury Bills are instruments employed to finance government expenditure whilst the Bank of Ghana instruments are employed as control mechanisms for money supply within the economy.[15]

[15] Sem Financial, http://www.semfinancial.com/publications/Financial%20Markets%20and%20Institutions.pdf, [cit. Mar. 29, 2010]

4.1.3 Variable reserve ratio

In order to control inflation, the central bank increases the reservation. The Bank of Ghana is allowed to set various reserve and liquid asset requirements. A higher ratio was specified fro the end year period because of the higher crop-financing demand for credit. In 1977, the bank increases the reserve by introducing a system which made it mandatory for each commercial bank to maintain the average cash reserve ratio it had voluntarily maintained over the previous twelve months. When this failed to remove excess liquidity, the bank demonetized the cedi in March 1978. The reserve requirements are not effective constraints on banks' lending, since their aggregate reserve holdings are always above the required ratios.[16]

4.1.4 Credit rationing

When there is inflationary pressure, the state bank adopts the policy of credit rationing. Credit control in Ghana was first instituted in 1964. The aim of this establishment was to direct credit to the industrial and agricultural sectors. The tools used by the Bank of Ghana to control money supply are interest rates, reserve requirements, credit ceilings and mandatory lending ratios. Money and credit control are the main functions of the Bank of Ghana. Each year, the Research division of the bank prepares Monetary and Credit Plan which describes the main trends in monetary and credit developments.

The bank of Ghana provides ceilings for all sectors of the economy in line with the country's stipulated development objectives. The 1964 regulation required that banking institutions' should seek its approval before granting huge loans to sectors other than agriculture and industry. These have been revised over the years.

Unfortunately, the credit ceilings did not channel funds to the intended sectors. Commercial banks continued to lend money to the commerce and trade sectors of the economy. Most banks are averse to the high risk agricultural sector. There was therefore no credit ceiling lending to the agricultural sector. Consequently in 1982, the bank of Ghana made it mandatory that at least 20 % of total bank credit should be to the

[16] PAGE S., Monetary Policy in Developing Countries, London, England 2001

agricultural sector. Industries were not left out. A small share of bank credit was given to industries. Banks were allowed to expand credit to the manufacturing sector by 150 %. Even though the government was not willing to encourage credits to commerce, the Banks encouraged lending to the import trade sector, by allowing banks to expand their credits to that sector by 600%.

4.1.5 Cash reserve ratio

In order to control inflation, the central bank increases the reservation. The Bank of Ghana is allowed to set various reserve and liquid asset requirements. A higher ratio was specified fro the end year period because of the higher crop-financing demand for credit. In 1977, the bank increases the reserve by introducing a system which made it mandatory foe each commercial bank to maintain the average cash reserve ratio it had voluntarily maintained over the previous twelve months. When this failed to remove excess liquidity, the bank demonetized the cedi in March 1978. The reserve requirements are not effective constraints on banks' lending, since their aggregate reserve holdings are always above the required ratios.

4.2 Fiscal policy in Ghana

Fiscal policies refer to the set of strategies the government uses to collect revenue and expenditure. These strategies play a critical role in determining both the level and the pattern of economic activity. They have effect on growth prospects as well as income distribution. Fiscal policy looks into matters concerning the means by which public resources are mobilized, and the extent to which they are increased, affects the incomes of different sections of the society and the ability of the government to spend. Good fiscal policy can ensure high level of activities and employment in the economy. In short fiscal policy measures public borrowing, public expenditures and public revenues.
[17]Ghana's economic growth rose to a two- decade high of 7.3% in 2008. This reflected in an expansion of the fiscal policies combined with an increase performance of private activity based on strong credit expansion and strong agricultural yields. Starting from 2011, oil production is expected to increase growth and fiscal revenues, creating

[17] International monetary fund, http://www.imf.org/external/np/sec/pn/2009/pn0986.htm, [cit. Nov. 25, 2009]

new challenges for macroeconomic management. Ghana's high inflation rates are sometimes attributed to weakened fiscal policies. The fiscal policy authorities try to restore macroeconomic stability by seeking to achieve fiscal sustainability.

4.2.1 Public borrowing

During inflation, the government has to increase the public borrowing likewise during deflation; the government has to decrease in public borrowing. Recently, the government of Ghana decided to cut down the high domestic borrowing by 25.1%, a level that will free up more money for lending to the private sector. Evidence from the Bank of Ghana has showed that money available for credit to the private sector is being borrowed by the government at high interest rates. This in effect will require that private sectors would need additional loan covenants and collaterals to get loans from commercial banks.

"It is often said that for every cedi[18] the Government borrows, the private sector has one cedi less. But more important, the effect of excessive borrowing is to raise the cost of money," Governor Amissah-Arthur, Bank of Ghana.

To stabilize inflation credit should be made available to businesses for productive activities to improve efficiency and reduce operating costs in order to stay competitive.

4.2.2 Public expenditures

Inflation is also controlled by decreasing the public expenditures by the government. Public wages is considered to be the highest public expenditure. [19]Ghana's economy is under some 13.3 per cent budget deficit, due to expenditures on public wages. Increasing public wages will increase inflation. There is no point in increasing salaries when those salary increases are just eaten up by inflation.

The tax system is important to provide funding for the necessary public expenditures. In Ghana, public sector spending is an important component of the poverty reduction strategy. At the same time the economic stability or recovery requires that public expenditures should be controlled to prevent an increase in inflation. Hence, public

[18] Cedi- unit currency of Ghana

[19] Ghanaweb, http://discussions.ghanaweb.com/viewtopic.php?p=1369574&sid=0c370ac5cf204aa1eb2009fc2b15b259, [cit, Feb. 9, 2010]

expenditure programmes which are used to reduce poverty must include a strategy on how finances will be generated to fund the programme.

4.2.3 Public revenues

In order to control inflation, there should be an increase in public revenues by the government. The main source of public revenue in Ghana is from domestic sources, largely from taxation. The internal revenue service is responsible for this job in Ghana. Non-tax revenue and grants form only a small portion of the revenue. In terms of the composition of tax revenue, indirect taxes (mainly Value Added Tax (VAT) and trade taxes) constitute about 70%. Revenue from direct taxes has risen over the last decade but this has not exceeded 30% of tax revenue. In Ghana, it is estimated that solid minerals account for about 33 % of total exports, 11 percent of government revenue, 5 % of GDP and 7 % of corporate tax earnings.[20]

Recently, Ghana has discovered oil in its region. Within the Gulf of Guinea region, Ghana did not attract much attention until Kosmos Energy in June 2007 announced the discovery of oil. This discovery will bring much revenue to the country. The expectation is that Ghana will soon join the group of the world's oil-rich countries and obtain revenue from the industry to boost its economy. The subsequent discoveries in four different offshore blocks suggest that Ghana might possess up to 2 billion barrels of oil reserves. Ghana's share of the anticipated revenues could reach or exceed $1 billion per year.

REVENUE AND GRANTS	**100 (%)**	**1603**
Tax revenue	70.3	1127
Non-tax revenue	20.5	329
Grants	9.2	147
Expenditures	**100 (%)**	**1852**
General public services	10.3	204
Defense	4.9	96
Public order and safety	3.8	75
Education	22.0	435
Health	7.0	138

[20] ISODEC, http://www.isodec.org.gh/Papers/overviewofpublications.PDF, [cit. Jan. 10, 2010]

Social security	7.1	140
Housing and community amenities	2.8	55
Economic affairs and services	15.9	315
Other expenditures	3.4	68
Interest payments	16.6	327

Source: http://www.nationsencyclopedia.com

4.3 Realistic measures in Ghana

This refers to an increase in the supply of goods and services. When the supply of goods and services is increased, the prices will come down.

4.3.1 Increase the supply of goods and services

"The causative factors of inflation in Ghana consist of shortage of supplies of locally produced and imported goods and services; drought and famine; increase in money supply; high prices of imports; wage hikes; instability of exchange rates; increased crude oil prices; and government deficit financing" (Statesman, 2009), Newspaper in Ghana.

4.3.2 Population planning

Control on population by adopting different measures of family planning will reduce the demand and finally prices will be controlled. The population of Ghana is estimated to be 22 million. Ghana currently has a labor force of 10.8 million. Although many adult Ghanaians have at least some knowledge of family planning, data from the 1980s suggest almost no change in attitudes and practices from the 1960s.[21] For example, most Ghanaian women still prefer large families and probably see their childbearing abilities as a form of social and economic security. Child mortality in Africa is high however families ensure that some children will survive. It is, therefore, not surprising that Ghana's population continues to grow rapidly even up to date.

[21] Mongabay, http://www.mongabay.com/reference/country_studies/ghana/all.html, [cit. Mar. 9, 2010]

4.3.3 Price control policy

The government should adopt strict price control policy against the profiteers and hoarders. Currently, Ghana operates as a free market economy. In this case the government is not allowed by law to determine prices of goods and services. This problem coupled with low education on the redenomination process is likely to move inflation up. And when it happens would destroy the effort of government to reduce and sustain inflation at a single digit level.

Since nobody checks prices of goods, shopkeepers can decide to increase the price of product to obtain more profit, since there no price controls system in Ghana.

"Under the current free market economy, government attempt to introduce price control would set back Ghana's economic development" (Adu Koranteng**,** Business Week, 2007)

4.3.4 Economic planning

Effective economic planning is necessary to control the inflation in a country. Ghana has manage to put things in order to control prices and improved on the balance of payment. The banks are working seriously towards ensuring price stability by lowering inflation which will eventually secure the value of the cedi and reduce any form of financial hardships in Ghana. The economy of Ghana is currently experiencing tremendous reduction in inflation and interest rates and a general price stability that will help businesses to plan, grow and create more jobs. The future of Ghana seems to be bright. The dream of Ghana to obtain a single inflation digit is coming true. God bless Ghana!

5. Proposals/Recommendations

Inflation cannot be controlled by taking a single step measure. If monetary and fiscal policies are wisely coordinated, it can greatly help in controlling the continuous process of rising prices. The main anti inflationary measures for both short and long terms is by controlling money supply; the money supply should be kept at reasonable limits.

The budget deficit should be kept at a low level as well. The deficit should be met by disciplined policy of demand management. Emphasis should be put on the production sectors. The government should pay special attention to the production of cocoa, timber, the minerals (gold, manganese, bauxite, and diamond), rubber, etc. Also, more attention should be given to the current discovered crude oil.

Last but not the least; the government should have a strict watch on the prices of essential commodities in the country. It should take immediate steps in changing the import and export duties and maintain the availability of goods at reasonable prices.

6. Conclusion

The main aim of this study is to establish the main determinants of (imported) inflation in Ghana. Based on the regression results, it is clear that the growth rate of real GDP and interest rates are some of the main determinants of inflation in Ghana- both in the short-run and the long-run.

Inflation is one of Ghana's major macroeconomic problems since the late 1960s, though the magnitude of this problem continues to fluctuate overtime. Immediately after independence, the rates of inflation were low and in the single digit bracketed, averaging below 10% in the period (1957 – 1972). Although the rates were low, they were increasing gradually over-time. This period (1957–1972) marks one of the active involvements of Ghana in economic activity of the country. Almost all the industrial set-up and the infrastructure of Ghana were financed by the state. (Ghana Statistical services, 2009).

[22]Ghana like many other countries imports a wide variety of goods and services from other counties and the rapid inflation in these countries can be an undermining force that may hinder Ghana's development. For example, among the imported goods are capital goods, which may be utilize to initiate and expand production of Ghana's domestic competing industries, to mechanize agricultural production, construct infrastructure and in general to aid the building of a relatively broad industrial base. A continue rise in the prices of goods could cause an unfavorable movements in Ghana's terms of trade and affect an impairment of welfare or could bring about a reduction of imports essential for development, presenting an impediment to the growth of the economy and perhaps induce domestic inflation if a general import reduction creates an excess demand on the Ghanaian markets and precipitating an upward pressure on price. Such broad implications of inflationary conditions in the United States make an analysis of the price sensitivity of the U.S imports of Ghana over this time period an interesting and worthwhile exercise. (Statesman, 2009)

Ghana continues to grow in its political and financial systems. The economy of Ghana is gradually becoming stable. This will draw more investors to invest in Ghana thus many other investors over time will realize that the riskiness in investing in Ghana is

[22] Spring link, http://www.springerlink.com/content/x6471q097619346u/, [cit. Feb. 14, 2010]

less than the returns. Ghanaians should be aware that the Asian crisis can happen in Ghana as well. Many investors invested large amount of money in Asian countries mostly China and Japan because they can earn higher dividends than if they should invest in their home country. This made the Asian currency appreciated, as the demand for the Asian currencies at a time, was higher than the dollar and led to the Asian crises.[23] Most of the money was invested in stock markets and in productive activities. (The exact factors that set off the crisis are not mentioned, as there is some debate on it.) We should recognize that different countries suffer differently.

It should be known that as the inflation rate falls; interest rate should actively fall alongside. Apart from encouraging productive activities in Ghana, measures should be put in place to check inflation this will prevent Ghana from falling prey to their investors. The central bank should take the lead and cut its rates. It can adjust its Treasury bill rate to the inflation rate. Thus, as inflation falls, the interest rate on T-bills also falls. This will tend to drag all lending and interest rates in the country as most of the banks actively invest in T-bills and government bonds.

Following the discussions above, it should be noted that inflation is about increases in money supply, it obviously cannot be beneficial for economic growth. On the contrary, an increase in inflation results in the destruction of economy's fundamentals and leads to economic impoverishment.

Finally, this study urges the government to actively pursue the policy of managing inflation but should also gradually lower the interest rate to reflect the lower inflation in the country.

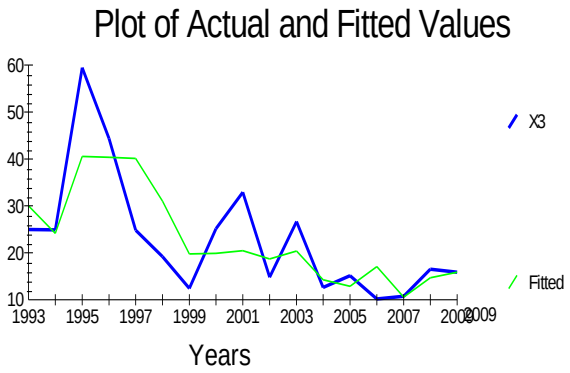
[23] Business pundit, http://www.businesspundit.com/10-of-the-worlds-most-dramatic-financial-crises-and-their-lessons/, [cit. Jan. 4, 2010]

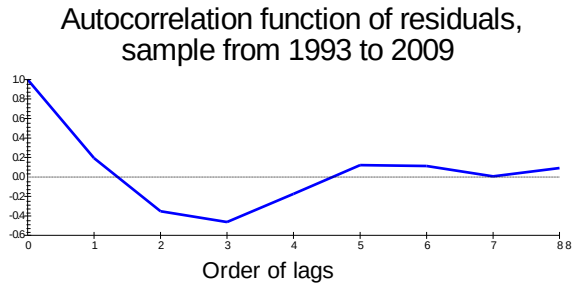
6.1 Calculations

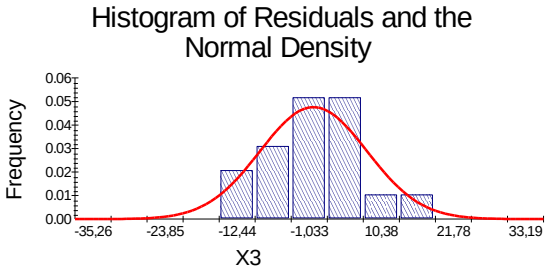
The first part of the table gives estimates of the regressors, coefficients, the R-Squared and the standard error of the regression. The second part contains a variety of residual diagnostic statistics. The significance of each individual regressor in explaining the variance of the dependent variable can be tested using the reported t-ratios for the coefficient of the regressors, or by checking the probability value reported in the square brackets. For example, the t-ratio of the coefficient of the X1 variable is equal to -0.28229, with a probability value of 0.782, implying that this variable is significant only at the 78.2 percent level. The DW- statistic value (1.5906) was close to 2 would normally be interpreted as confirmation of no autocorrelation. (M. Sherlock, 2001)

```
                        Ordinary Least Squares Estimation
*******************************************************************************
 Dependent variable is X3
 17 observations used for estimation from 1993 to 2009
*******************************************************************************
 Regressor              Coefficient       Standard Error         T-Ratio[Prob]
 X1                        -.51078            1.8094            -.28229[.782]
 X2                        -8.6995           19.3254            -.45016[.660]
 X4                         1.1112            .43299             2.5663[.023]
 X5                        .097917            .18469             .53017[.605]
*******************************************************************************
 R-Squared                    .58097   R-Bar-Squared                   .48427
 S.E. of Regression          9.2995   F-stat.    F(  3,  13)    6.0081[.008]
 Mean of Dependent Variable  22.9850   S.D. of Dependent Variable     12.9494
 Residual Sum of Squares      1124.3   Equation Log-likelihood       -59.7511
 Akaike Info. Criterion     -63.7511   Schwarz Bayesian Criterion    -65.4175
 DW-statistic                 1.5906
*******************************************************************************


                              Diagnostic Tests
*******************************************************************************
*    Test Statistics  *        LM Version        *         F Version          *
*******************************************************************************
*                     *                          *                            *
* A:Serial Correlation*CHSQ(   1)=   .74428[.388]*F(   1,  12)=   .54943[.473]*
*                     *                          *                            *
* B:Functional Form   *CHSQ(   1)=   .62378[.430]*F(   1,  12)=   .45709[.512]*
*                     *                          *                            *
* C:Normality         *CHSQ(   2)=   .33640[.845]*       Not applicable       *
*                     *                          *                            *
* D:Heteroscedasticity*CHSQ(   1)=   7.9895[.005]*F(   1,  15)=  13.3003[.002]*
*******************************************************************************
   A:Lagrange multiplier test of residual serial correlation
   B:Ramsey's RESET test using the square of the fitted values
   C:Based on a test of skewness and kurtosis of residuals
   D:Based on the regression of squared residuals on squared fitted values
```


Plot of Actual and Fitted Values
60
50
40
30
20
10
1993
1995
1997
1999
2001
2003
2005
2007
2009
X3
Fitted
Years


Autocorrelation function of residuals,
sample from 1993 to 2009
1.0
0.8
0.6
0.4
0.2
0.0
-0.2
-0.4
-0.6
0
1
2
3
4
5
6
7
8
8
Order of lags



From the results above, the value 1.1112 is a regression coefficient and tells us the percentage change in the dependent variable (inflation, X3) from a 1% increase in the independent variable. The magnitude of both t and p statistics confirm that it is statistically significant at the 5% significance level. This can be interpreted as meaning that a statistically significant relationship exists. The positive value is indicative of clustering. In addition, an R squared value of 0.58097 suggests that 58% of the variation interest rate (X4) can be explained by inflation. The other independent term, GDP is statistically insignificant hence it can be ignored. (M. Sherlock, 2001)

In clear terms, the results show that the correlation between the dependent variable (inflation) and the interest rate (independent) is strong. By reason of this module, it can be concluded that inflation in Ghana is strongly influenced by the interest rate. However the correlation between the inflation and GDP (independent variable) is not strong. Hence, the result is rejected for the GDP. A different method can be used for this estimation or further test can be done to adjust the deviation. The deviation can be attributed to the large difference between GDP values from year to year. Also, only 17 observations were used in this module and must have lead to the deviation.

6.2 Appendix

The microfit software was also used to show the relationship between

a. Inflation and interest rate

b. Inflation and GDP

Below are the results of these relationships and some related graphs. The explanation of these results can be interconnected to the explanation given in the methodology where the all the three major variables (X1, X2, X3) were used.

Inflation(X3) and interest rate(X4)

Ordinary Least Squares Estimation

Dependent variable is X3
17 observations used for estimation from 1993 to 2009

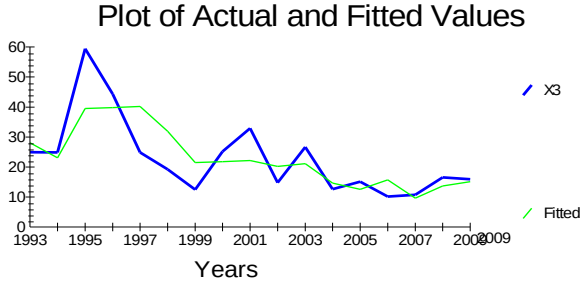
Regressor	Coefficient	Standard Error	T-Ratio[Prob]
X1	.32760	.85650	.38249[.708]
X2	-9.8239	18.7090	-.52509[.608]
X4	1.0748	.41639	2.5812[.022]

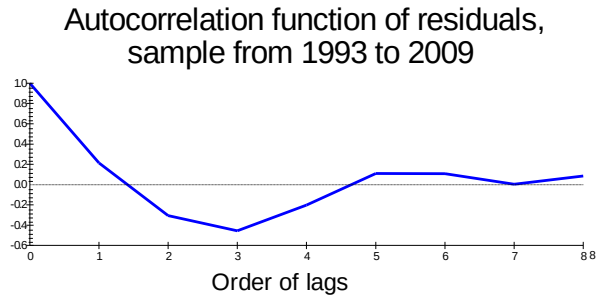
R-Squared	.57191	R-Bar-Squared	.51076
S.E. of Regression	9.0576	F-stat. F(2, 14)	9.3518[.003]
Mean of Dependent Variable	22.9850	S.D. of Dependent Variable	12.9494
Residual Sum of Squares	1148.6	Equation Log-likelihood	-59.9329
Akaike Info. Criterion	-62.9329	Schwarz Bayesian Criterion	-64.1827
DW-statistic	1.5630		

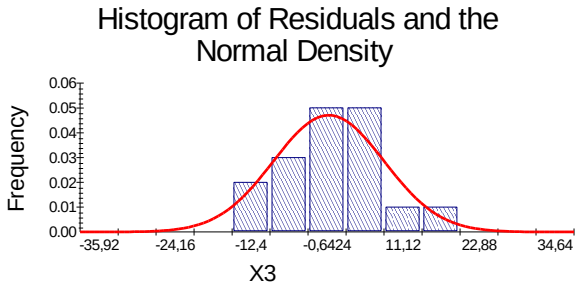
Diagnostic Tests

Test Statistics *	LM Version *	F Version *
A:Serial Correlation	CHSQ(1)= .90851[.341]	F(1, 13)= .73397[.407]
B:Functional Form	CHSQ(1)= .37166[.542]	F(1, 13)= .29056[.599]
C:Normality	CHSQ(2)= .34835[.840]	Not applicable
D:Heteroscedasticity	CHSQ(1)= 8.5891[.003]	F(1, 15)= 15.3179[.001]

A:Lagrange multiplier test of residual serial correlation
B:Ramsey's RESET test using the square of the fitted values
C:Based on a test of skewness and kurtosis of residuals
D:Based on the regression of squared residuals on squared fitted values







Inflation (X3) and GDP (X5)

Ordinary Least Squares Estimation

****

Dependent variable is X3
17 observations used for estimation from 1993 to 2009

****

Regressor	Coefficient	Standard Error	T-Ratio[Prob]
X1	-1.7659	2.0605	-.85704[.406]
X2	37.6195	8.1703	4.6044[.000]
X5	.022784	.21569	.10564[.917]

****

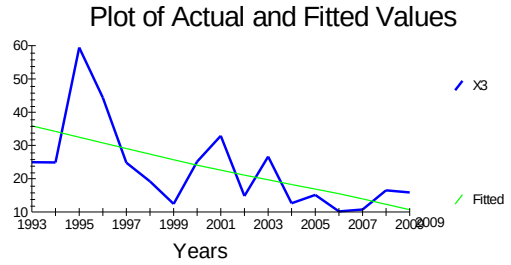
R-Squared .36869 R-Bar-Squared .27850
S.E. of Regression 10.9994 F-stat. F(2, 14) 4.0880[.040]
Mean of Dependent Variable 22.9850 S.D. of Dependent Variable 12.9494
Residual Sum of Squares 1693.8 Equation Log-likelihood -63.2350
Akaike Info. Criterion -66.2350 Schwarz Bayesian Criterion -67.4848
DW-statistic 1.6806

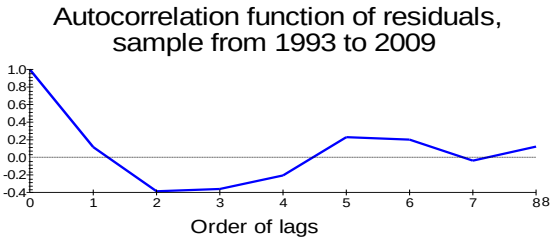
****

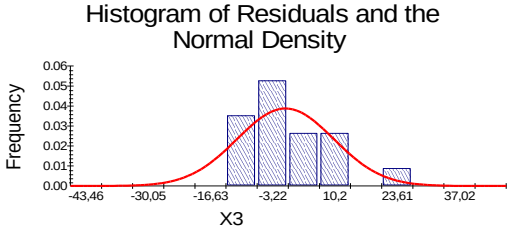
Diagnostic Tests

```
*****************************************************************************
*    Test Statistics  *       LM Version        *        F Version          *
*****************************************************************************
*                     *                         *                           *
* A:Serial Correlation*CHSQ(   1)=   .23402[.629]*F(   1,  13)=   .18145[.677]*
*                     *                         *                           *
* B:Functional Form   *CHSQ(   1)=   .13480[.714]*F(   1,  13)=   .10390[.752]*
*                     *                         *                           *
* C:Normality         *CHSQ(   2)=  3.6521[.161]*      Not applicable       *
*                     *                         *                           *
* D:Heteroscedasticity*CHSQ(   1)=  4.2217[.040]*F(   1,  15)=  4.9557[.042]*
*****************************************************************************
```

A:Lagrange multiplier test of residual serial correlation
B:Ramsey's RESET test using the square of the fitted values
C:Based on a test of skewness and kurtosis of residuals
D:Based on the regression of squared residuals on squared fitted values







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