MONETARY ANALYSIS TO INFLATION: THE CASE OF INDONESIA DURING THE PERIODS 1991-2010

THESIS

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Monetary Analysis to Inflation: The Case of Indonesia during the Periods 1991- 2010

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ABSTRACT

This study developed Monetary Analysis to Inflation: The Case of Indonesia during the Periods 1991- 2010 . The writer classify the variables into two group where the inflation as dependent variable and nominal money supply in term of narrow money (M1), real output, interest rate, international trade volume, as independent variables. In this research uses secondary data to see the influence inflation, nominal money supply, real output interest rate, international trade volume of Indonesia from 1991 - 2010. This research uses OLS (Ordinary Least Square). The estmation results Variable of real output and interest rate affecting the inflation significantly and negatively, the volume of international trade and nominal money supply (M1) affecting the inflation positively and significantly.

Keywords: Monetary Analysis, Inflation, Interest Rate, Nominal Money Supply (M1), The international Trade Volume, Real Output.

This thesis has been presented before the examiners in the Thesis Examination and successfully passed the Thesis Examination on Augustus 11, 2011.

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بسم الله الرحمن الرحيم

I dedicate this thesis to my beloved parrents.

Vellani Yolanda

PREFACE

All praise to be on Allah SWT Lord of the world. The Writer would like to Alhamdulillah therefore my thesis entitled: "Monetary Analysis to Inflation: The Case of Indonesia during the Periods 1991- 2010" has finally been accomplished.

This thesis is proposed as a partial requirement to acquire Bachelor Degree at Economics Department of Economics Faculty of Andalas University. The reasons lying behind the chosen of this thesis because Inflation is an economic phenomenon that always interesting to be discussed especially dealing with broad impact on macroeconomic aggregates such as economic growth, external balance, competitiveness, interest rate and income distribution. Inflation also instrumental in influencing the mobilization of funds through formal financial institutions.

During the process of writing this thesis, the author also face various constraints. All of these obstacles can be overcome thanks to the help and guidance from various parties. On this occasion, the authors gratefully acknowledge the help and guidance, from:

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10. My beloved friend , seniors and also juniors from Economics Department of International Programs and all from the Economic Faculty of Andalas University.

The Writer realizes that this thesis still far from perfection. It needs to be improved for that reason; the Writer would gladly welcome constructive critics and suggestions for perfections. Hopefully this thesis can be helpful and give benefits to anyone who reads it, especially to academicians and students.

Padang, August 2011

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Vellani Yolanda

LIST OF CONTENTS

LIST OF TABLE

Page

List of Figure

CHAPTER I

INTRODUCTION

1.1.Background Research

Inflation is an economic phenomenon that always interesting to be discussed especially dealing with broad impact on macroeconomic aggregates such as economic growth, external balance, competitiveness, interest rate and income distribution. Inflation also instrumental in influencing the mobilization of funds through formal financial institutions.

Generally inflation is defined as an increasing of general price level continuously and persistently in an economy. " *inflation caused by many factors such as the increasing of private consumption, excess liquidity in market place triggered the consumption even speculation, also include to lack of distribution of goods"*(Reinaldi, Aldi: 2004). Inflation is also a process of declining in domestic currency values continuously.

AP Lerner stated that inflation occurred in a situation where there is excess demand of goods in the economy aggregately. Excess demand for goods can be defined as excessive spending levels to final commodity compared with the maximum output level that can be earned in long terms, with particular sources of production.

The price level is an opportunity cost of society in holding a financial asset. The higher the price level changes, the higher opportunity cost for holding financial asset. This means that people will get benefits if hold the real asset rather

than holding financial asset if the price level remains high. If the overseas financial asset included as one option of the asset, so the difference between domestic and international inflation may cause the value of the rupiah against foreign currencies would be overvalued and turn lead eliminate the competitiveness of Indonesian commodities.

For the mobilization domestic funds purpose, the difference in of the inflation rate will lead to expectations of devaluation and capital outflow. Inflation is a connecting variable between interest rate and effective exchange rate, which is an important variable in determine the growth of production sector. The increase in the price level (inflation) rate may cause (Reinaldi, Aldi: 2004):

1. Inflation worsening the income distribution, for those with fixed income there will be decrement of their real income, while the owners of capital and property keep getting richer because the of their wealth is increasing.
2. Inflation causes the reduction in domestic saving. The reducing of real income encourages the community to take their savings to fulfill their needs and it will affect the decrement of domestic savings.
3. Inflation causing deficit of the trade balance and increasing foreign debt. Because increasing of domestic price level causing the price of imported goods relatively cheaper, so increasing in demand of imported goods worsens the trade balance.
4. Inflation causes instability political. The uncertainty of the economy due to inflation chaos the employment contracts and wages, and increases unemployment rate its endanger the security and political stability in the country.

The growth rate of inflation must be controlled, because it raise considerable affecting the economy. According to Tajul Khalwaty (2000) the effects of inflation are:

1. Inflation impacting broadly on various sectors of life, so that should be observed, especially by practitioners of economics and business.
2. High inflation have aggregate effect of the macro economy as well as external factors impacting the industry world wide also to the micro sector of the economy which is the internal factor to the business world.
3. Export oriented industries will be less competitive in global market even in the national market due to high inflation. The cost of factor production will be more expensive causing high cost of economy. It will increase burden for some countries that adopted open economy system.
4. The declining of production of export oriented market and domestic oriented will increase the rate of unemployment that dangerous for the stabilization for economy of a country.
5. High rate of inflation weakening the purchasing power of domestic production, especially it will reduce public trust in terms of the value of the future currency.
6. High rate of inflation will fertilize the corruption, manipulation and collusion among government and conglomerate that decline the trust of society.
7. High rate of inflation will encourage national investor to invest abroad (hot money) and even employers will relocate its industry abroad where its economy more stable. If it was happen, the national economy will

continue to heat up and disintegrate. Industry increasingly uncompetitive and unable to attract foreign investor to invest.

Since the late of 1980s, the average inflation per year in Indonesia almost high but it wasn't reach up to more than 10%. During the periode 1991- 1995 inflation rate ranged from 9.8% in 1993, 9.3% in 1994 and 8.6% in 1995. Indonesia's government able to maintain the economy at that time, and the successfull of the REPELITA programs of the new order era.

Political crisis and monetary crisis that hit in 1997-1998 messed up Indonesian economic extremely. Inflation rate at 1998 reached 77.6%, increased prices pressures from the supply side as a result of sharp depreciation of the Rupiah.

The financial crisis in 2008 led to surges in inflation rate in Indonesia, the higher the inflation pressure duet to high global commodity prices. Increasing in fuel prices pushed inflation reached 12.14% at September 2008. But inflation eased in the late of 2008 because of declining commodity prices and decreasing prices fuel subsidies. In 2009 Indonesian economy still threatened by the effect of the global crisis, but Indonesia could passed it so much more better than the expectation. This was the best achievement in over 10 years. For 2010 inflation rate is 6.20% because the expectation from previous year, and the improvement of the economics performance of Indonesia.

So the importances of inflation, the knowledge about the causes of inflation are very important for the government in determining policy. Based on above problems, the author is encouraged to further the thesis with title:

"Monetary Analysis to Inflation: The Case of Indonesia during The periods 1991- 2010"

1.2.Research Question

Based on the above description of the background problem can be formulated as follows:

1. What are the effects of inflation to interest rate, international trade volume, and real output in Indonesia during the periods 1991- 2010?
2. What are the monetary analysis to inflation on affecting other variables of macroeconomics in Indonesia during the periode 1991- 2010?
3. What are the appropriate policy formation to control the inflation rate?

1.3.Objectives Research

Based on the formulation of the problems which has been described previously, the purposes of this study are:

1. To analyze the effect of each factors: nominal money supply, real output interest rate, international trade volume, with in money demand for transaction framework on inflation in Indonesia during 1991- 2010.
2. To see the tendency of monetary analysis on affecting other variables of macroeconomics in Indonesia during the periode 1991- 2010.

3. To analyze the inflation of the Indonesia in order to set the policy formulation.

1.4.Benefits of Research

The result is expected to provide benefits:

1. As input for the government and other stakeholders as decision makers in order to make appropriate policy in the economy.
2. For additional information, literature and comparison for future research.
3. For the writer is to train analyze a problem based on science and knowledge gained during studies at Andalas University.
4. To fulfill requirements of Bachelor of Economics in Economic Faculty, Andalas University.

1.5.Limitation of Study

This Research on monetary analysis to inflation: the case of indonesia during last 20 years. The writer classify the variables into two group where the inflation as dependent variable and nominal money supply in term of narrow money (M1), real output, interest rate, international trade volume, as independent variables. In this research uses secondary data to see the influence inflation, nominal money supply, real output interest rate, international trade volume of Indonesia from 1991 - 2010. The uses of secondary data because the research conducted at the macro level include the object. These data are reprocessed by the writer in accordance with the needs of the models used. This research uses OLS (Ordinary Least Square).

1.6.Writing Systematic

The organization of this thesis consists of 6 chapters. The following brief content of the chapters are as follow:

Chapter I : *Introduction*

An introductory chapter that provides background on issues concerning the selection of research title, problem question, research objectives, research advantages, and writing systematic.

Chapter II : *Theoretical Framework and Literature Review*

The literature review chapter that describes basic theory, concepts related to money demand for transaction, inflation and the factors that influence of it. The theories obtained will be the basis for discussion and writing to make conclusions about the title that the author chosen.

Chapter III : *Research methodology*

Is a chapter describing the research methods and operational definitions of research variables, types and sources of data, data collection methods and data analysis methods.

Chapter IV: *Overview to Indonesia's inflation condition*

In this chapter described some overview to Indonesia's inflation during last 10 years.

Chapter V: *Analysis and Discussion*

It is a chapter outlining the results and discussion of the research object description, data analysis, and discussion.

Chapter VI: *Conclusions and Implications*

It is a closing chapter that describes the conclusions of the analysis carried out and the implications that arise from the conclusion as an answer to the question of the problem.

CHAPTER II

THEORETICAL FRAMEWORKS AND LITERATURE REVIEW

2.1. Theoritical Framework

2.1.1. The Inflation

Some economist has given limitations on the definition of inflation, such as:

AP Lerner states that inflation is a circumstance where the existences of the excess demand of goods overally. Excess demand for these goods can be defined as excessive spending level to final commodity compared to maximum output level that able to achieve in long term, with particular sources of productions. Other definition stated by Paul.A.Samuelson that inflation as a situation where the general price level increases, both goods and services. Venieris and Sebold defined inflation as "a sustained tendency for the generally the level of price to increase over time". In the economy, prices tend to rise over time. Thus price increase is called inflation (Mankiw, 2006:193). According to Samuelson (2004: 118) inflation is a rise in general price level, wholesale price index and GNP deflator.

Kamerschen states that "inflation represents a persistent rise in the average level of prices which is not matched by a proportionate increase in the level of the equality of goods and services consumed". (David R.Kamerschen, 1984: 362)

Some insight that should be underlined in the definiton included the following aspects:

a. Tendency. The tendency price to rise, means that within a certain periode of time possible declining in prices continues to show a tendency to increase.
b. Sustained. The price increase does not only happen at certain time or one time only, but continously over a periode of time.
c. General price level. Is when the price level is the level of prices of goods in general, so not only the price of one good.

There are many price indexs that can be used to calculate the inflation rate, such as :

1. Consumer Price Index (CPI)

   Measure the price of a selection of goods and services for a typical consumer.
2. Commodity Price Index

   Measure the price of a selection of commodities with. It is a weighted index (in other words, some commodities are more important than others in determining price changes).
3. Cost of Living Index (COLI)

   Measure the cost to maintain a constant standard of living. In other words, what would it cost you from year to year to live exactly the same.
4. Producer Price Index (PPI)

Measure the price for all goods and services at the wholesale level. It is like the consumer price index but it is measuring the prices the producers have to pay.

5. GDP Deflator

   Measures the prices of all goods and services (GDP).

There are several ways to characterize the inflation, on each certain base classification which may explain the cause and origin on inflation. On the other hand, the causes of inflation in an economy based on the views of many experts also cause differences in perception so that which is true of course very relative and depends on the conditions of economy of a country.

Based on the causes of inflation, it is can be classified into:

1. Demand inflation that is inflation because the increament of demand of of goods and services.
2. Cost inflation that is inflation because the increament of the cost of production.

The cause of inflation can be categorized as follows:

1. Demand pull inflation

   Demand pull inflation is inflation that caused by increasing in demand causing inflation gap.

2. Wage cost-push inflation

   Wage cost-push in inflation that caused by rising labor cost or price of goods.

3. Import cost-push inflation

   Import cost-push inflation is inflation that caused by rising in import prices, it causing the domestic price increases.

4. Expectional inflation

   Expectional inflation is inflation that caused by rising and wages due to the expectation and Assumption that inflation will continue.

5. Inertial inflation

   Inertial inflation is inflation that caused by the determinants of wages and prices refer to the competitors and carefully in determining wages and prices.

Inflation based on the rate of inflation can be classified as:

a. Creeping inflation

   Creeping inflation is concessional inflation that is the rate less than 10% per year.

b. Galloping inflation

   Galloping inflation is inflation marked with increasing in price quite high, usually by double or triple digits.

c. Hyper inflation

   Hyper inflation is inflation that really out of control, it is greater than 100% a year.

Inflation based on its original arrival can be classified as:

1. Domestic inflation

   Domestic inflation is inflation that comes from domestic it self.

2. Imported inflation

Imported inflation is inflation that comes from abroad.

Inflation may affect income distribution, the allocation of production and output. The effect on income distribution called equity effect, the effect on allocation of production factors called efficiency effect and the effect on output called output effect (Nopirin, 1987: 32-34) :

- The Equity Effect

The effect on income is uneven, there are harmed but those that benefit from inflation. Someone who earns income still be harmed by the inflation. As well as those who accumulate wealth in the form of cash will face losses duet o inflation, conversely, those who get benefit by the absence of the inflation are those who earn income by the percentage increase greater than inflation, or those who has wealth not in money the form of money where its value rose by a larger percentage than the rate of inflation.

- The Efficiency Effect

Inflation may also change the pattern of allocation of production factors. These changes can occur through a rise in demand for various goods which then lead to changes in the production of some specific items. In the presence of inflation, demand for certain goods rose a larger than other goods, which then pushes up production of the goods.

- The Output Effect

Inflation may lead to an increase in production. It is because a increase of price usually precede in wages so that employer's profit goes up. Increase in benefits will encourage increase in production. In a condition of high inflation the real value of money felt dramatically, people tend to choose barte transactions which usually leads to a decline in production of goods.

In the literature of inflation, generally can be said that inflation can be caused by interference from the demand side and can be influenced by monetary policy usually called core inflation and inflation caused by disruption of the supply side and are beyond monetary authority is called noises inflation. It is responsible of the Central Bank of Indonesia to success the core of inflation.

2.1.2. The Theory of Inflation

2.1.2.1. The Quantity of Money Theory

At first this theory is not meant to explain why a person or society to save the cash money, but rather on the role of money.

Critics of the theory argue that money velocity is not stable and, in the short-run, prices are sticky, so the direct relationship between money supply and price level does not hold. The theory said "Money can lose its value through excessive abundance, if so much silver is coined as to heighten people's demand for silver bullion. For in this way, the coinage's estimation vanishes when it cannot buy as much silver as the money itself contains [...]. The solution is to mint no more coinage until it recovers its par value".

Irving fisher desribed the theory as follows:

In its modern form, the quantity theory builds upon the following definitional relationship

$$M \cdot V_T = \sum_i (p_i \cdot q_i) = \mathbf{p}^{\mathrm{T}} \mathbf{q} \tag{2.1}$$

Where:

M = The total amount of money in circulation on average in an economy during the period, a year.

VT = The transactions velocity of money, that is the average frequency across all transactions with which a unit of money is spent. This reflects availability of financial institutions, economic variables, and choices made as to how fast people turn over their money.

Pi and Qi = The price and quantity of the i-th transaction.

P = Column vector of the p_i, and the superscript $^{\mathrm{T}}$ isthe transpose operator.

P = A column vector of the q_i.

Mainstream economics accepts a simplification, the equation of exchange:

$$M \cdot V_T = P_T \cdot T \tag{2.2}$$

Where:

P_T = *The price level associated with transactions for the economy during* the period

T = Index of the real value of aggregate transactions.

The previous equation presents the difficulty that the associated data are not available for all transactions. With the development of national income and

product accounts, emphasis shifted to national-income or final-product transactions, rather than gross transactions. Economists may therefore work with the form

$$M \cdot V = P \cdot Q \tag{2.3}$$

Where:

V = The velocity of money in final expenditures.

Q = An index of the real value of final expenditures.

The cause of inflation can be explained by using the equation of theory quantity of money that developed by Irving Fisher. According to Irving Fisher, MV = PT, where the MV represents total expenditure of money for goods and services and PT represents total of receipts from the sale of goods and services. M is the money supply, V is the velocity of Money circulation within a certain periode, P is the average price level, and T is the total transactions that occur within a certain period. The most important assumption in this theory is that V and M are independent, which means the velocity changes are not influenced by changes in the amount of money in circulation.

Marshall then looked at Irving Fishers equation with a slightly different perspective. He did not emphasize on the velocity of money within a periode but on the part of the GNP are realized in the for min cash. Mathematically, the theory can be written as follows:

(2.4)

Where:

M = Money supply

k = Part of GNP in cash form, total is equal to 1/v

P = Price

Y = Real GNP, replacing T as a tool to measure the output

Marshall's equation is been able to said as an equation shows the demand for money which people require a certain part of their income in cash. Thus the equation is no longer an identity Marshall like Fisher equation, but has an equation of the quantity theory of money which is often called as Chad balance equation.

According to the quantity theory of moeny, the changing in money supply will cause the changing in price proportionally, means that if the incresed two times then the prices will also increase two times. This perspective based on assumptions:

a. In equation MV = PT, T is assumed constant because it is under fullemployment (Say's law).
b. Vellocity is assumed constant. This vellocity will only change if there is a change in the costum of society to make payments. Generally, changes in payment habits is slow (in a relative long terms), and thus be considered as low velocity.

The implication from two assumptions above is that the money supply is only affects the price, and the effect is proportinal. Thus, the money can not affect in real sector, the affect isi n monetary sector.

The cores of the quantity theory of money are (Hidayat, Syukri: 2004) :

The cores of the quantity theory of money are (Hidayat, Syukri: 2004) :

a. Inflation can only occur if there is additional volume of money supply (whether in from currency and demand deposits or does not matter). Increase in the amount of money is like "fuel" to inflation. If money is stopped increase, inflation will stop it self no matter the cause of inflation.
b. Inflation rate is determined by the rate of money supply and psychology and social expectations of higher future prices. There are three possibilities circumstances, first, is when pepople dosen't expect the price to rise in coming months this means that most of increase the money not spent on the purchasing goods and means there is no significant increase in demand for goods. Second, where the community began to realize that there is inflation. The addition of the money supply is no longer socially acceptable fatherly accepted the post cash, but will be use to but goods. Third, in the worst inflation (hyper inflation), people have lost confidence in the currency values.

2.1.2.2.Keynesian Theory

" Keynesian theory of inflation based on the theory of macroeconomics and highlights other aspects of inflation. According to this theory, inflation occurs because people want to live beyond its economic capabilities. Inflation process other than the provision in the struggle between social groups who want a larger part than can provided by the community. The process of this struggle ultimately translates into a situation where the demand for public goods will always exceed the the amount of goods available (inflationary gap)".(Handriati, Maya: 2006)

Inflationary gap rises because the community groups that successfully translate their aspirations into effective demand for goods. Segments of society such as this probably the govenrment it self, which is trying to gain a larger share of the output of the community by running a deficit in its budget by printing new money. The community may also private entrepeneurs who want to make new investment and obtain financing funds from bank loans. These groups could also trade union are trying to get a raise for its members exceeds the increase labor productivity.

When the number of requests from all segments of society effective at the prevailing price level exceeds the maximum number items that can be produced by society, then inflationary gap rised. Because the total demand excess the amount of goods available, then the price will go up. The existence of increase of prices means that most of the plans the purchases of goods from the factions can not be met. In the next periode of the factions will try to obtain more funds again (from printing new money or loans from larger banks or larger salar increase).

Cetainly not all groups who succeeded in obtaining additional funds required. Society can obtain more runding could get portain of the output more. They can not obtain the funds will get the output of smaller. Inflation process will continue for the number of effective demand from all segments of society that could exceed the amount of the output produced society. Inflation stops when the total effective demand does not exceed the prevailing price level and the amount of output available.

2.1.2.3.The Structuralist Theory of Inflation

The structuralist theory is the theory based on the expereince in Latin American countries. This theory is put pressure on the rigidity of the structure of the economies of developing countries. Because the inflation is associated with the structural factors of the economy, this theory called a theory of long term inflation. In the other words, are highlighted here is the long-term factors that lead two main information in the economies of developing countries which lead to inflation.

The first explanation i the form of export revenues are inelastic, ie the value of the export grew slowly compared with growth in the other sector. The inertia caused by the world price of goods from the export merchandise more unprofitable than the price of imported goods to be paid. The sluggish growth in export value is also duet o supply or production of export goods that are not responsive to price increases (supply of goods that are not elastic). This inertia means that the growth of export earnings growth inertia ability to import needed goods.

The second explanation is related to the inelastic supply or production of foodstuffs in the country said that domestic food production is not growing as fast as Population growth and per capita income, so the price of foods in the country tend to exceed the upward price increases of other goods. The next results is the emergences of the demands of the employees (in industry) to earn a wage or salary increase. Increases in wages means an increase in production costs, which also means rising prices of these items.

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Inflation process that arised because of both explanation above in practice clearly doesn't stand alone. General, both processes are interrelated and often reinforce each other. For example, food production in the country will cause the

pressure to import food stuffs and subsequently make the balance of payments problem get worse and further encourages excessive import substitution process and the subsequent rise in prices.

2.1.2.4.Ortodoks Analysis of Inflation

Economist agree that inflation is the cause of rapid expansion in money supply caused by the large government budget defisit on an ongoing basis to fund the development, eventhough tax revenues are not sufficient. Other aggreement is any cause of inflation, that inflation can not occur continously in a long time without an increase in the amount of money circulation.

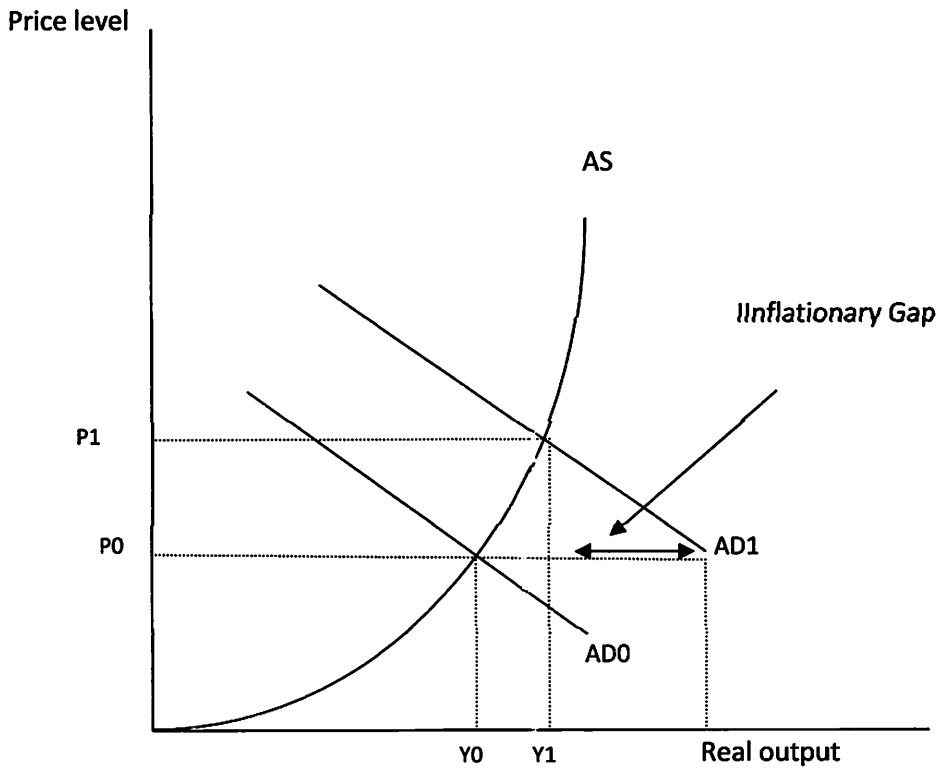
According to Lipsey and Steiner, there are three major groups of theories of the inflation there are inflation caused by the tendency of increasing od aggregate demand resulting inflationary gap, inflation theory that emphasizes the occurance of aggregate supply and theory which said the increase in the aggregate supply as a result of the increasing of aggregate supply.

2.1.2.5.Demand-Pull Theories of Inflation

According to this theory, inflation is caused by factors that shift aggregate demand so as to create excess demand, which is the inflation gap, Thus holding down price to rise. Increasing in aggregate demand on output with full-employment will cause excess demand in the market for goods and services, thus increases the price of goods and services. Increasing in goods and services lead to increasing the factors of production. So the increament of price of goods and services and the increament of factor of production will lead to the inflation of an economy.

Figure 2.1

Demand Pull Inflation



Source: Mishkin, Frederic S, *The Economics of Money, Banking and Finacial Markets*: 1998-670

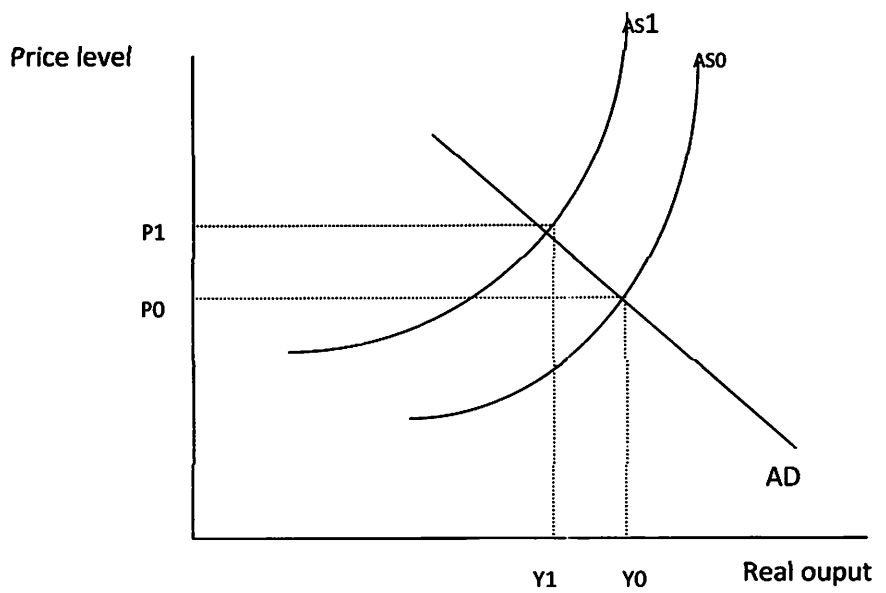
2.1.2.6.Supply-Side Theories of Inflation

According to supply-side theories of inflation the main factor that causes inflation is emphasized in shifting of aggregate supply curve and it is also known as cost-push inflation or supply shock inflation. The factors that shift the aggregate supply are: wages, domestic prices, prices of imported goods. The increase in labor cost will raise the price, so the higher production cost will charge to consumer (wage cost-push inflation). Monopoly power will raise the price of output to increase profit margin, this also can push the inflation called price-push inflation.

The existence inflation in countries that their goods to Indonesia will also caused the inflation called import cost push inflation. The structural rigidity theory of inflation assumed that economic resources can not be quickly changed their use and the wage and price level rises but dufficult to easily fall back. With this assumption, change in demand pattern and/or cost and the adjustment is very slow. Low mobility of resources within the economy from the weak sector towards developing sector, led to idle capacity in the sector are weak and lack the resources that drive the increase in the growing sector. The existence of sticky price that fall in weak sector is accompanied by an increase in price in growing sector increase the aggregate price and inflation.

Figure 2.2

Supply Side Inflation



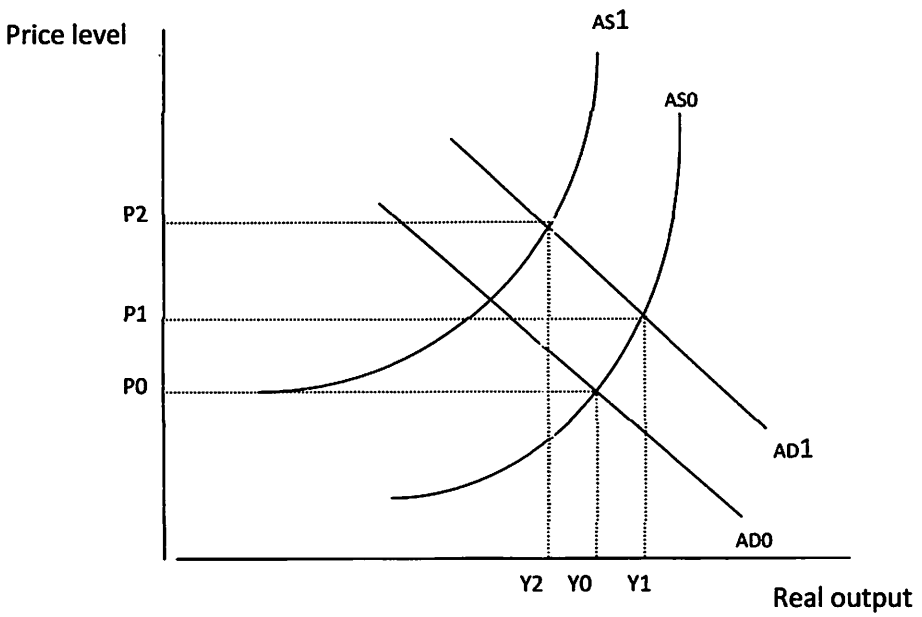
Source: Mishkin, Frederic S, *The Economics of Money, Banking, and Finacial Markets*: 1998-664

2.1.2.7. Demand-Supply Theories of Inflation

An increase in aggregate demand will cause the price increases followed by the increament of aggregate supply, and the price will rise even higher. The interaction between aggregate demand and aggregate supply is depressing prices said as a result of expectations or estimates (expectation) in the future, that the price level and wage rate will increase because of inertia of past inflation. Inflation is often reffered to as expectation-inflation.

Figure 2.3

Demand-Supply Inflation



Source: Mishkin, Frederic S, *The Economics of Money, Banking, and Finacial Markets*: 1998-675

2.1.3. The Demand for Money Theories

One of the essential of money demand is that individuals are interested in the purchasing power their money holdings-the value of their cash balances in terms of the goods the cash will buy (Dornbusch, rudiger).

2.1.3.1. Keynes's Liquidity Preference Theory

In his famous 1936 book *The General Theory of Employment, Interest, and Money,* Keynes developed a theory of money demand which he called liquidity preference theory. Keynes abandoned the classical view that velocity was a constant, emphasized the importance of interest rates. He postulated that there are three motives behind the demand for money: the transactions motive, the precautionary motive, and the speculative motive.

Transactions motive. Keynes emphasized that this component of the demand for money is determined primarily by the level of people's transactions. The transactions demand for money arises from the lack of synchronization of receipts and disbursements. In other words, people aren't likely to get paid at the exact instant you need to make a payment, so between paychecks people keep some money around in order to buy stuff. Keynes believed that these transactions were proportional to income, like the classical economists, he considered the transactions component of the demand for money to be proportional to income.

Precautionary motive. Keynes also recognized people hold money not only to carry out current transactions, but also as cushion against an unexpected need. Because people are uncertain about the payments the might want, or have, to make. If people don't have money with which to pay, they will incur a loss. When you are holding precautionary money balances, you can take advantages of the sale. Keynes believed that the amount of precautionary money balances people want to hold is determined primarily by the level of transactions that they expected to make in the future and that these transactions are proportional to

income. So he considered the demand for precautionary money balances to be proportional to income.

Speculative motive. The transactions motive and the precautionary motive for money emphasized medium–of-exchange function of money, for each refers to the need to have money on hand to make payments. Keynes agreed with the classical Cambridge economists that money is a store of wealth and called this reason for holding money the speculative motive. He also considered that wealth is tied to closely to income, the speculative component of money demand would be related to income. Keynes believed that interest rates have an important role to play in influencing the decisions regarding how munch money to hold as a store of wealth.

Keynes divided the assets that can be used to store wealth into two categories: money and bonds. He also asked why individuals would decided to hold their wealth in the form of money rather than bonds. Keynes assumed that the expected return on money was zero in his time, unlike today. For bonds, there are two components of the expected return: the interest payment and the expected rate of capital gains. As we know, when interest rates rise, the price of a bond falls. If you expected interest rates to rise, you expect the price of the bond to fall and suffer negative capital gains. In this case, people would want to store their wealth as money because its expected return is higher; its zero return exceeds the negative return on the bond.

Keynes assumed that individuals believe that interest rates gravitate to some normal value. When interest rate are below the normal value, people expect

the interest rate on bonds to rise in the future and so expect to suffer capital loss on them. Therefore, people will be more likely to hold their wealth as money rather bonds, and the demand for money will be high. And contrariwise, they will be more likely to hold bonds than money, and the demand for money will be quite low. Therefore, money demand is negatively related to the level of interest rates.

Keynes carefully distinguished between nominal quantities and real quantities. He reasoned that people want to hold a certain amount of real money balances (an amount that the three motives indicated would be related to real income Y and to interest rates i. Keynes developed the following demand for money equation, known as the liquidity preference function, which says that the demand for real money balances M^d/P is a function of i and Y:

$$\frac{M^d}{P} = f(i_-, Y_+) \tag{2.5}$$

Where the minus sign below i in the liquidity preference function means that the demand for real money balances is negatively related to the interest rate, and plus sign below Y means that the demand for real money balances and real income Y are positively related. Keynes thought that the demand for money is related not only to income, but also to interest rates.

Because the transactions motive and precautionary motive demand for money is positively related to real income Y, speculative motive demand for money is negatively related to interest rate i, the demand for real money balances M^d/P can be rewritten as :

$$\frac{M^d}{P} = L_1(Y) + L_2(i) \tag{2.6}$$

where L_1 means the transactions demand for money; L2 means the speculative demand for money.

By deriving the liquidity preference function for velocity PY/M, we can see that Keynes's theory of the demand for money implies that velocity is not constant but instead fluctuates with movements in interest rates. The liquidity preference equation can be rewritten as:

$$\frac{P}{M^d} = \frac{1}{f(i,Y)} \tag{2.7}$$

Multiplying both sides of this equation by Y and recognizing that M^d can be replaced by M because they must be equal in money market equilibrium, we solve for velocity:

$$V = \frac{P^y}{M} = \frac{Y}{f(i,Y)} \tag{2.8}$$

Keynes's liquidity preference theory of the demand for money indicates that velocity has substantial fluctuations as well.

2.1.3.2. The Money Demand for Transaction

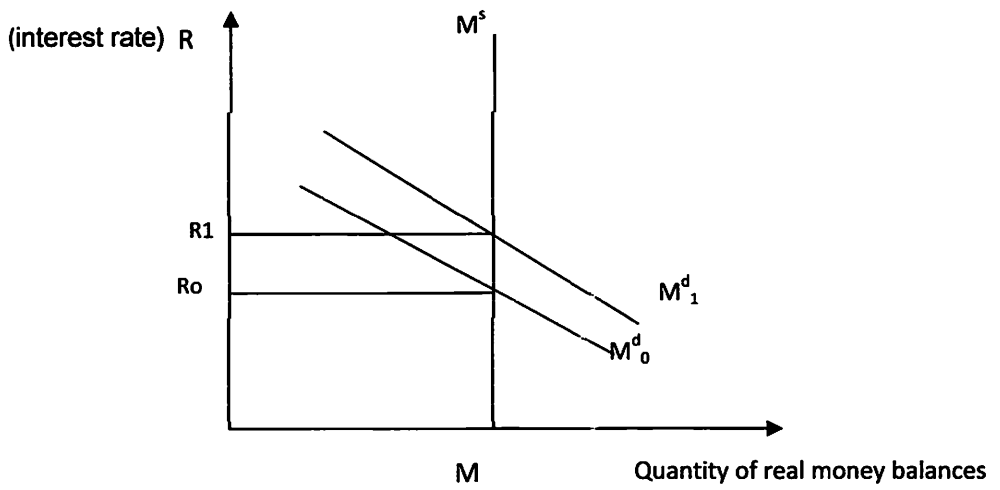
The existence of the motive to keep the money for speculative motive introduced by Keynes. The classical put more emphasis on the motive for transaction, the magnitude depend on the output. The increase in output lead to increase the demand money for transaction, because people wants more cash money in large numbers of transaction. In the money market the demand for money called liquidity preferences by Keyness. Keyness admitted the motive for transaction but not very important.

The transaction demand for money arises from the use of money in making regular payments for goods and services. The implications of the dependence the demand for money on output is that the interest rate will change when output changes, because changes in ouput will affect the demand for money with fixed the amount of money, the changes in demand for money will also change the interest rate.

Keyness analyzed that the interest rate are influenced by the money Market equilibrium, so when the demand for money increases, the interest rate will rise and the price level will decrease, affect the demand for money has a negative affect on inflation.

Figure 2.4

The market for money



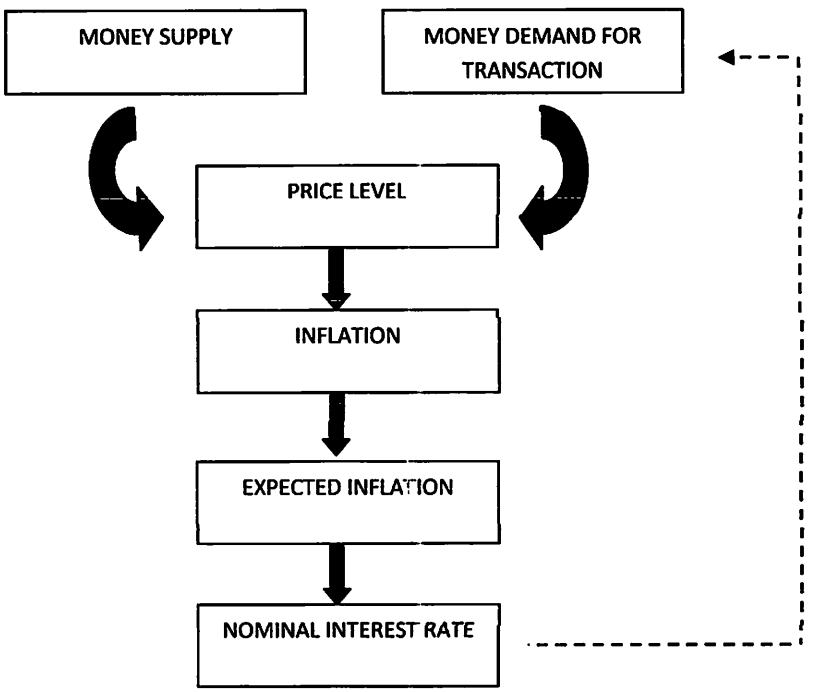
Source: Mankiw, N.Greogory, *Macro Economic(fourth edition)*: 1996-277

William Baumol and James Tobin independently developed similar demand for money models, which demonstrated that even money balances held for transactions purposes are sensitive to the level of interest rates. They

considered a hypothetical individual who receives a payment once a period and spends it over the course of this period in developing their models. In their models, money which earns zero interest, is held only because it can be used to carry out transactions. The conclusion of the Baumol-Tobin analysis is as follows: as interest rates increase, the amount of cash held for transaction purposes will decline, which in turn means that velocity will increase as interest rates. The transactions component of the demand for money is negatively related to the level of interest rates.

Figure 2.5

The Inflation flow with Others Related Variables



Source: Mankiw, N.Greogory, *Macro Economic(fourth edition)*: 1996-279

Figure above illustrates the flow and relationships among money, prices and interest rate. Money supply and money demand determine the price level. Changes in prices level determine the inflation rate. The inflation rate influences the nominal interest rate. Because the nominal interest rate is the cost of holding money, it may affect money demand. This last link is ommitted the basic quantity theory of money (Mankiw, Gregory).

2.1.4. Factor Affecting Money Demand for Transaction to Inflation

2.1.4.1.Money Supply

Understanding of money supply consists of two differentiation between narrow money(M1) and broad money (M2). The narrow money is the amount of currency or liquid money that consists of coins, paper money and commercial bank's reserve with the central bank, while the broad money consist of M1 plus savings deposits which are not components of money surplus, but is part the liquidity in the economy.

M1 is the most restrictive, measure of money supply since it only measures the most liquid forms of money; it is limited to currency actually in the hands of the public (inflationdata.com: 2009). This includes checking accounts travelers checks, and other deposits against which checks can be written.

The relationship between money supply and inflation is explained differently depending on the type of economic theory used. In the quantity of money theory, also called monetarism, the relationship is expressed as MV=PT, or Money Supply x Money Velocity = Price Level x Transactions. The Velocity and Transactions are considered to be constants, so according to this explanation

supply and prices have a direct relationship. In Keynesian theory, while there is still a relationship between money supply and inflation, it is not the only large factor that can affect inflation and prices. Generally, the Keynesian theory stresses the relationship between total or aggregate demand and inflationary changes.

Changes in money supply are often used to try and control inflationary conditions. When a region is trying to lower inflation, central banks will generally lower lending rates and increase interest. When inflation drops below a target level, these standards are generally relaxed in an attempt to stimulate the economy. Usually, countries use a federal banking system to set lending and interest limits based on economic data.

2.1.4.2.Real Output

According to Lipsey (1995), Gross Domestic Product (GDP) is the national income as measured from the expenditure side is the amount of consumption expenditure, investment, government spending and import-export. GDP is categorized into two, namely the nominal and real terms. It said nominal GDP, if the total GDP valued at current prices. While GDP is valued at the price of basic period is called real GDP, often referred to as the real national income.

In macro-economic framework illustrates the output as economic activiy within in a country. The output is affected by economic activity, both domestic and factors that influenced the situation an economy and the patterns of international trade and monetary situation of the GDP can be used as one way to measure the growth of output. The increasing of output shows the improvement of

the economy of a country generally. Nevertheless the the calculation of output are nutrients that affect the value of nominal output. Because Real GDP x Price Index = nominal GDP, then growth rate of real GDP + growth rate of price index (the inflation rate) = growth rate of nominal GDP. Real output has negative relationship with inflation, and positive relationship with money demand.

2.1.4.3.Interest Rate

The real interest rate is the difference between the nominal interest rate and the rate of inflation. Economists call the interest rate that the bank pays the nominal interest rate "i" and the increase in consumer purchasing power the real interest rate "r". If we let "π" represent the inflation rate the relationship among these variables is $r = i - \pi$.

The price of money is nominal interest rate, which is linked to inflation rate through Fisher equation. The Fisher equation states that the nominal interest rate can be affected by either the real interest rate or inflation. Recall that according to the quantity theory of money a 1% increase in money growth implies a 1% increase in the rate of inflation. According to the Fisher equation a 1% increase in inflation implies a 1% increase in the nominal interest rate. This one-to-one relationship between the inflation rate and the nominal interest rate is called the Fisher effect.

2.2.Literature Review

Park, Chan Il in *Transactions Demand For Money And The Inverse Relation Between Inflation And Output : The Case Of Korean Economy,* International Economic Journal Vol. 12 No. 1, Konju University,1998. Factors

that influence the demand for money for transaction indirectly affect the inflation, such as: real output has positive relationship with the demand for money for transaction so indirectly have negative relationship with inflation, trading of shares has positive relationship with the demand for money for transaction indirectly have negative relationship with inflation, volume of international trade has possitive relationship with money demand for transaction and not directly have possitive relationship with inflation, and the last one is that the interest rate has negative relationship with the inflation.

Budina, Nina (2002) in *Money, Inflation and Output in Romania, 1992-2000.* Using cointegration techniques to examine relations between real money, output and inflation in Romania, between 1992 and 2000. The three variables are found to be linked by a cointegrating relation that can be interpreted as an expanded Cagan (1956) money demand function. Output is shown to be strongly exogenous. But the dynamics of inflation and real money are satisfactorily described by error correction mechanisms, which include significant short-run effects of monetary disequilibria. The coefficients of those dynamic equations are stable, and do not show signs of structural break during the liberalization of 1997.

Ozturk, Ilhan (2008) in *The Demand for Money in Transition Economies.* The journal examined the long-run determinants of the demand for money in ten transitions Countries using panel data for the 1994-2005 periods. The paper found that the demand for money in the long run positively responds to an increase in real income and negatively to a rise in the rate of inflation and the real effective exchange rate. He found that M2 is a predictable monetary aggregate. As the consequences of inflation and exchange rate depreciation risks, households keep

deposits in dollars; thus existing currency subsitution can reduce the Monetary Independence of the transition economies.

Gunnar, Jonsson (2001) in *Inflation, Money Demand, and Purchasing Power Parity in South Africa.* It is well known that cointegration tests in the Johansen setting are sensitive to the lag-length of the VAR. The paper indicated that stable money demand type of relationship exists among domestic prices, broad money, real income, and nominal interest rates, with plausible estimates of the long run coefficients, as well as a long run relationship among domestic prices, foreign prices, and the nominal effective exchange rate; and in the short run, shocks to exchange rate affect domestic prices but have virtually no impact on real output, while shocks to broad money have a temporary impact on real output before inflation picks up. Both types of shock seem to trigger a monetary policy reponse, as the short term interest rate adjusts quickly and substantially.

Cooray, Arusha.V (2008) in *A Model of Inflation for Sri Lanka.* The paper used an open economy model and a close economy model to estimate price equation in Sri Lanka. The study found that a long run relationship between the price level, real GNP, the exchange rate and import prices. With the opening up of the economy, import prices and exchange rate movement appear to have a significant impact on the general level of prices.

Sari, Ramazan (2005) in *Inflation, Stock Returns, and Real Activity in Turkey.* In this study they are examine the relationship between inflation and real stock returns in Turkey. According to their results, expected inflation and real returns are not correlated; however, there seems to be a negative relationship between inflation and stock returns. This negative relationship appears to be

stemming from the negative impact of unexpected inflation on real stock returns. Then, we examined the validity of the proxy explanation for the negative relationship between inflation and real returns. Our results provide weak support for the proxy explanation. In conclusion, Turkish stocks do not appear to be a perfect hedge against inflation.

Mehrotra, Aaron (2006) *in Demand for Money in Transition: Evidence from China's Disinflation.* Mehrotra set out to examine the demand for broad money M2 in the Chinese economy during a period characterized by a significant process of disinflation and even deflation. Our paper established a stable money demand relationship in a vector error correction framework. The finding of system stability, together with the observation of broad money shocks leading to increased inflation, supports the PBoC's current policy of specifying intermediate targets defined in terms of the growth rate of broad money M2. Interestingly, their results suggest that movements in the nominal effective exchange rate should be taken into account in a successful conduct of such a policy.

Cziráky, Dario in *Stable Money Demand and Nominal Money Causality of Output Growth: A Multivariate Cointegration Analysis of Croatia.* By focusing on the demand for real money balances, the Fisher equation of interest rates, and the effect of nominal money on output in Croatia over the 1994-2002 period, their find a setable long-run money demand with the inclusion of inflation rate in addition to the nominal interest rate. Inclusion of inflation in the long-run money demand relationship is justified by the failure of the nominal interest rate to move one-for-one with inflation, as predicted by the Fisher equation, which we find not to hold in Croatia. We also find that the negative trend in money velocity cannot

be explained by a deterministic trend. Hence an apparently systematic decline in the money velocity is stochastic and this implies that no fixed annual percent decline can be expected.

Emerson, Jamie (2006) in *The Quantity Theory of Money: Evidence from the United States.* This paper finds convincing evidence in support of the quantity theory of money using time series data from the United States for the period 1959-2004. By including an additional decade of information, this paper improves upon previous studies that could not find a long-run relationship between money, prices, interest rates, and output for the United States (for example, Miyao (1997)). This paper uses the Johansen procedure to estimate the long-run relationship between prices, money, output, and nominal interest rates. Likelihood ratio tests show that, within the framework of this paper, the restrictions implied by the quantity theory of money cannot easily be rejected for the entire sample period. However, when considering different sub-periods of the data, there is mixed evidence concerning the quantity theory of money, particularly in recent decades. It appears that more research, incorporating different methodologies is required in this area.

Matthew, O. Augustina (2010) in *Empirical Modelling of the Impact of Financial Innovation on the Demand for Money in Nigeria.* This study has looked at the demand for money and how it has been affected by financial innovations in the financial sector of Nigeria arising out of the Structural Adjustment Programme (SAP) of 1986. The term financial innovation refers to anything which ensures greater access to information, quicker means of carrying out transactions and greater ease of liquidity with lower risk. It need not be a

technological innovation as Solans (2003) pointed out even the 'euro' is a financial innovation, It has both reduced transaction costs and eliminated exchange rate risks, and has also acted as a catalyst for a number of improvements in various areas that have helped to create a more efficient financial system in the euro area as a whole. However, its effect on the demand for money is what has aroused so much interest to it among economic scholars. Of particular interest has been its effect on the stability of the demand for money, in that if its impact on the demand for money is significantly large, then the effectiveness of monetary policy may be seriously threatened. In order to ascertain this impact, a model was specified and estimated using the cointegration technique method. Data for the analysis was taken from 1970-2008. After carrying out appropriate analysis using our model, it was discovered that on the basis of individual tests of significance, all the slope coefficients were individually statistically significantly different from zero with the exception of DSAP, RTD and RTB which failed the test of significance at the 5% level. Hence their major findings :lagged Interest on time deposits is negatively related to the demand for money, lagged Treasury bill rate is negatively related to the demand for money, real income is positively related to the demand for money, price level is positively related to the demand for money ,structural Adjustment Programme has had an indirect effect on the demand for money via financial innovation. In view of the above findings, the following are possible implications arising: the low interest elasticity of our demand for money is indicative of underdeveloped nature of the money market in Nigeria. The money market particularly the treasury bills are dominated by government (the Central Bank) with the end result being that the market lacks the depth and

flexibility that it might have had with the presence of a diversified participant base. This is also indicative of the ill developed nature of our financial system. Keynesian doctrine holds that for the smooth functioning of his liquidity preference theory the money market must be well developed. Second income level is a primary determinant of demand for money by economic agents in Nigeria. And third the analysis also shows that for the atmosphere to be conducive for the effective use of monetary policies, financial innovations should be made to affect the demand for money significantly; there is still a place for monetary policy as a macroeconomic stabilization measure.

Hughart, Matthew (2002) in *Controlling Inflation: Applying Rational Expectations to Latin America.* This paper was an effort to prove the hypothesis that the Latin American countries of Argentina, Brazil and Chile were able to control inflation without experiencing a rise in unemployment. This hypothesis was tested using a model that incorporated the variables of inflation, unemployment and change in the money supply. The results indicate that inflation changes with expectations in inflation. Further, the results indicate that there is no significant relationship between inflation and unemployment, indicating that these countries were able to reduce inflation without seeing an increase in unemployment. Further work in this area needs to focus on testing REH in other conditions. Although the test lends support to REH, further testing will need to be completed before all confidence can be put behind REH. These tests can be applied to other developing countries or developed countries in a time when they were developing, because this is when countries are most likely to experience inflation.

Boyd, Derick in *An Autoregressive Test of Inflation and Economic Performancein the Caribbean.* Examination of historical statistics suggests dividing these twelve countries into two groups, the high inflation countries, Jamaica, Trinidad and Guyana, and the other nine. They are able to estimate with a standard autoregression model to see whether the estimates allow us to discern differences in policy, behaviour or performance between the countries. They are able with the autoregression to discern differences between the countries inflation performance that may be attributed to policy responses conditioned by institutional structure. The estimates are able to show that the inflation experience of the ECCB countries, Bel, Bar and Bah with low mean inflation, low persistence and low variation stand in contrast to that of Guy and Jam with AB and TT falling somewhere between. This, it can be argued, may be attributable to the institutionally framework within which the monetary policies are developed. Specifically, in the group of nine, the institutional framework does not allow fiscal dominance either institutionally or through adoption of such a policy. This results in relatively low rate of growth in the money supply. On the other hand, fiscal dominance is a feature of the group of three to a greater or lesser extent. This is reflect in the high growth of money supply over long periods of time, resulting in high inflation and low real rate of growth in output.

2.3.Hypothesis

1. Money supply possitively affect the inflation.
2. Real output positively affect money demand for transaction and indirectly has negative relationship on affecting inflation.

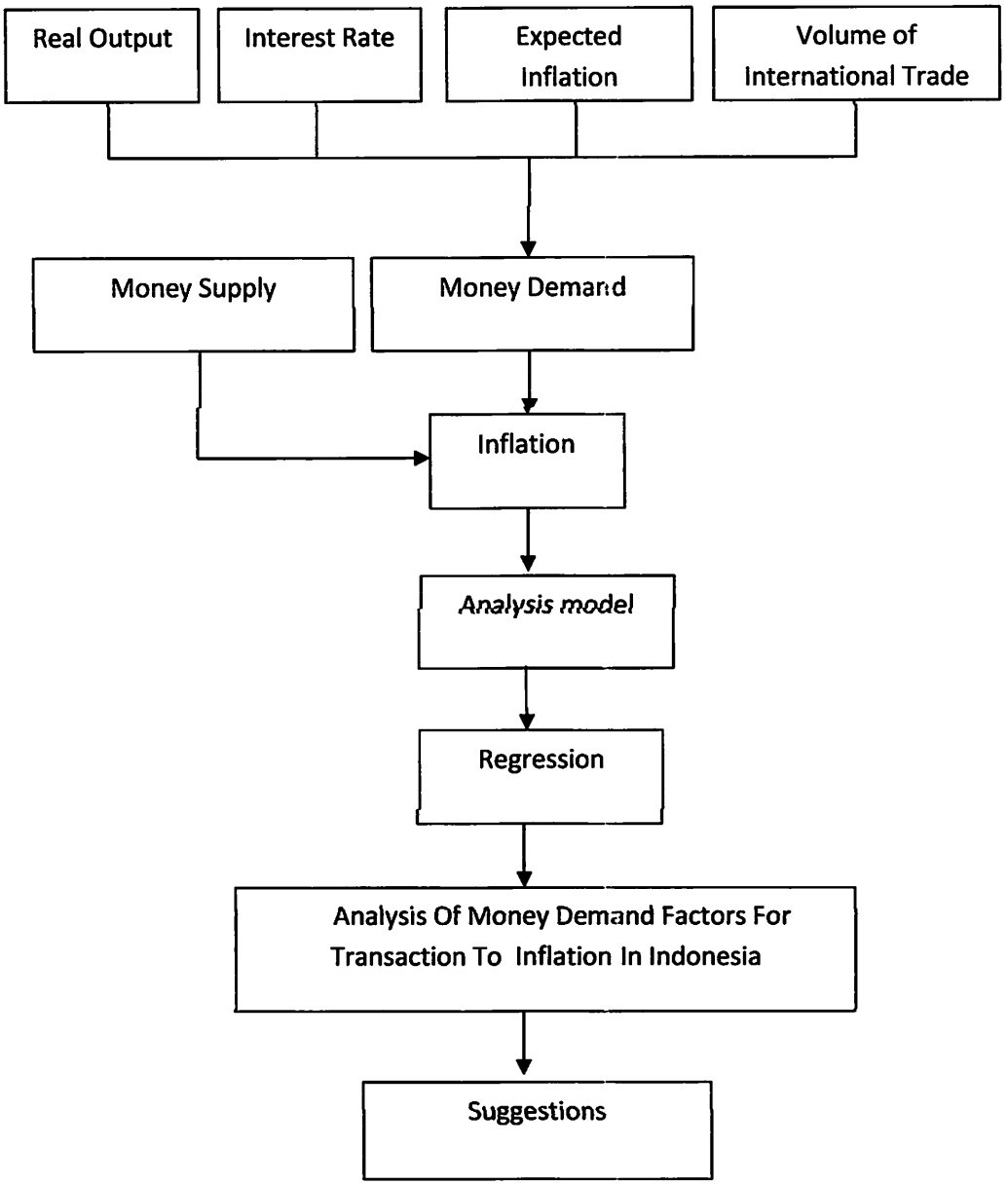
3. The volume of international trade positively affects money demand for transaction and indirectly has negative relationship on affecting inflation.
4. Interest rate has negative relationship on affecting inflation.
5. The expected inflation for the previous year included as an additional variabel indicating that the inflation equation also influenced by the expectations of society that have positive effect to the inflation.

2.4.Framework of Operational Analysis

Inflation is one of the dominant economic problem and experienced by all countries so that this topic still interesting to be observed. Inflation is the tendency of rising prices for general and continously. The increase in the price of one or two goods not include to the inflation, unless the increase is spread and lead to increase in most of the price of other goods. The increase in prices duet o seasonal or just happened once and has no further effect also not included to inflation

The independent variables in this study is the nominal money supply, real GDP, international trade volume, the interest rate, and expected inflation while the dependent variable is the inflation within money demand for transaction framework.

Figure 2.5 The Framework of Operational Thought



CHAPTER III

RESEARCH METHODOLOGY

3.1. Research Scope

This study focused on the monetary analysis to inflation in Indonesia with addition independent variables money supply, real output, the interest rate and the volume of international trade.

3.2. Types and Sources of Data

The source of data has a very important role in research because with a source of data the researcher will find a place / source that can be used to identify all sources of information relating to the research undertaken. The data taken by authors in this research is secondary data, the use of secondary data because the study conducted on the macro object. The data derived from official publications, the Central Bank of Indonesia, Statistics Economic and Financial of Indonesia, International Financial Statistics Year Book published by IMF, Ministry of Trade, World Bank, Asian Development bank, Comtrade, books, journals, papers and scientific works related to this research. Year data is data for 1980 until 2010. The data used in this research contains by:

a. Inflation (P)

   Inflation data used based on the consumer price index sourced from The Central Bank of Indonesia

b. Nominal Money Supply (M1)

Nominal money supply data used is the money supply in the narrow sense (M1) because it is used for transactions. Units used for the money supply is sourced billion rupiah from The Central Bank of Indonesia.

c. Real Output

Output data used were obtained from real gross domestic product (GDP) derived from real GDP divided by Nominal GDP Deflator. Real GDP data using the unit million Rupiah sourced from Output data used were obtained from real gross domestic product (GDP) derived from real GDP divided by Nominal GDP Deflator. Real GDP data using the unit billion Rupiah sourced from The Central Bank of Indoensia.

d. The Volume of International Trade

International trade data is the dollar (based on prevailing exchange rate) by adding real exports to real imports. Writer get real exports and real imports by dividing both the CPI. Data volume of international trade using billion Rupiah units sourced from Central Statistical Bureau and Ministry of Trade and Industry.

e. Interest Rate

The data of interest rate used is the six-month deposit rate, sourced from The Central Bank of Indonesia.

Table 3.1

The Variables and Data Sources

Data	Data Sources	Collecting Data
The Inflation Rate (%)	Central Bank of Indonesia	Indirect
Nominal Money Supply in sense of Narrow Money / M1 (Million Rupiah)	Central Bank of Indonesia	Indirect
Real Output (Million Rupiah)	Central Bank of Indonesia and Ministry of Trade and Industry	Indirect
Interest Rate (%)	Central Bank of Indonesia	Indirect
International Trade Volume	Central Beureu of Statistic	Indirect

3.3. Model Building

The monetary analysis to inflation in Indonesia is influenced by the real output, money supply, the volume of international trade, interest rate and the expected inflation. The model that used in this research adopted the model from Park, Chan Il (1998), where the formulation of the model is the first step in studying the relationship between variables:

M^d = nominal money demand

P = price

m^d = real money demand

Money demand function in market equiliblirum in money market with the natural logarithm and first differencing we will form equation:

$$\Delta \ln P_t = \Delta \ln M_t^s - \Delta \ln m \qquad (3.2)$$

The money demand equation that influenced by factors with transaction motive, resulting equation money demand for transaction become:

$$\Delta \ln m_t^d = a_0 + a_1 \ln y_t + it_t - a_2 \ln R_t \qquad (3.3)$$

Where :

y = real output

it = volume of internasional trade

R = interest rate

The substitution of equation (3.3) into (3.2) produces the following form of inflation equation:

$$\Delta \ln P_t = -a_0 + \ln M_t^s - a \ln y_t - a \ln it_t + a \ln R_t \qquad (3.4)$$

Where:

lnP = *Inflation*

The model used can be specified as follows:

$$\ln P = b_0 + b_1 \ln Y_t + b_2 \ln IT_t + b_3 \ln i_t + b_4 \ln M1_t + e_t \qquad (3.5)$$

where :

P	=	Price
Y	=	Real Output
It	=	International Trade Volume
R	=	Interest Rate
M1	=	Money Supply (Narrow Money)
b0	=	Intercept
b1 b2 b3 b4	=	Regression coefficient
μ	=	Error variabel

3.4. Econometric Analysis

3.4.1. Stationary Test

After checking whether the model is linear or log-linear, we need to check stationary of each variable, by using Augmented Dickey Fuller (ADF) test of stationary. If the variables are not stationary at the *level* or it will be stationary at *different levels* then continue by co-integration test, it will be used to apply the OLS.

The one of requirements to meet the VAR model is observed data by using stationarity test. There are several methods to test of presence of stationarity. Augmented Dickey Fuller (ADF), Z (Phillip and Peron, 1988), stationarity KPSS (Kwiatkosksi et al, 1992), and DP (Dickey and Pantula, 1987). The root of the

unit is a way to test stationary and it is developed by Augmented Dickey Fuller(ADF). In principle, the root test unit is intended to observe whether a particular coefficient of the model have estimated the value of one or not.

In this study will use the unit root test through Augmented Dickey Fuller(ADF) test for knowing whether the data use in time series has a unit root problems or not.

$$\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \sum_{i=1}^{m} \alpha_i \Delta Y_{t-i} + \varepsilon_t$$

Several model constructed in this unit root test are:

- Model with Intercept

$$\Delta Y_t = \beta_1 + \delta Y_{t-1} + \alpha_i \sum_{i=1}^{m} \Delta Y_{t-1} + \varepsilon_t$$

- Model with Trends and Intercept

$$\Delta Y_t = \beta_1 + \beta_{2t} + \delta Y_{t-1} + \alpha_i \sum_{i=1}^{m} \Delta Y_{t-1} + \varepsilon_t$$

- Model with None (without intercept and trends)

$$\Delta Y_t = \Delta Y_t = \delta Y_{t-1} + \alpha_i \textstyle\sum_{i=1}^{m} \Delta Y_{t-1} + \varepsilon_t$$

Variable Y_t is observed in period t, Y_{t-1} is the value of variable Y at a previous period. β_1 is a constant, β_2 is the trend coefficient, β_i is the coefficient of lagged variables Y. m is the long length.

The data is stationary when the average, variance and covariance at each lag is to stay at the same time. Usually, time series data is need to check stationary

of each variable. Most economic time series generally integrated of order 1or called $I(1)$.

If the data of each variable is not stationary in at $I(0)$, it should differentiated to reach stationary condition, and differentiated in to I(1) and I(2). Stationary condition for differentiated will satisfy if Augmented Dickey Fuller value smaller than critical value, may be for I(1) even I(2). Hypothesis for this test:

- $H_0 : \delta = 0$ (presence of unit root, not stationer)
- $H_1 : \delta \neq 0$ (no unit root, or data is stationer)

3.4.2 Statistical Testing

To determine whether the model used is good or not, there are several criteria for statistical testing of the coefficient of determination or R-Sq, F test and t test.

3.4.2.1. The coefficient of determination/ R-Square (R^2)

According to Nachrowi and Usman (2002), to measure the adequacy of regression models, can be seen from the coefficient of determination (R-Sq). The value of determination coefficient is a measure that shows the large contribution of the explanatory variables against response variables. The greater the coefficient of determination, then the model better. R-Squared is a statistical term saying how good one term is at predicting another. If R-Squared is 1.0 then given the value of one term, we can perfectly predict the value of another term. If R-Squared is 0.0 then knowing one term doesn't help us know the other term at all.

More generally, a higher value of R-Squared means that we can better predict one term from another. Or we can say R-Squared is the square of the correlation coefficient between the dependent variable and the estimate of it produced by the regressors, or equivalently defined as the ratio of regression variance to total variance.

3.4.2.2. F-test

F test used to see whether the explanatory variables together (simultaneously) gave a significant effect or no effect on the dependent variable (Nachrowi and Usman, 2002). First step we have to do is create hypothesis:

Ho = independent variable have no significant effect to the dependent variable

Ha = independent variable significantly affect to the dependent variable

$$F - test = \frac{R^2/(k-1)}{(1-R^2)/(n-k)}$$

R^2 = determination coefficient

k = independent variable

n = total sample

F-table = $\{\alpha; df_1 = (k-1); df_2 = (n-k-1\}$

If F-test > F-table, Ho is rejected and we accept Ha, it means that all of independent variables together significantly affect dependent variable.

3.4.2.3. T-test

T-test is a test that aims to find out whether or not a significant regression coefficient. T-test used to see whether the explanatory variables individually

significant effect or no effect on the dependent variable (Nachrowi and Usman, 2002).

$$Ho: \beta = 0$$

$$Ha: \beta \neq 0$$

Based on data, value of β will be tested, if β = 0 it means that coefficient of dependent does not have significant effect with independent variable. If β ≠ 0 it means that coefficient of dependent have significant effect with independent variable. T-test:

$$\{\text{T-test}\} = \frac{\widehat{\beta}_j}{SE(\widehat{\beta}_j)}$$

$$\{\text{T-table}\} = \{\alpha; df = (n-k)\}$$

If t-test > t-table it means Ho rejected, it means β ≠ 0 or β is statistically significant.

3.5. Testing of Classical Assumptions

According to Santoso (1999), in making a multiple regression equation testing the assumptions needed to see whether the regression model that was created could be used. Regression model obtained from ordinary least squares method is the OLS regression model that produces linear unbiased estimator of the best (best linear unbiased estimator / BLUE) this condition occurs when filled several assumptions, called assumption-free classics including multicollinearity, heterocedastity, and autocorrelation.

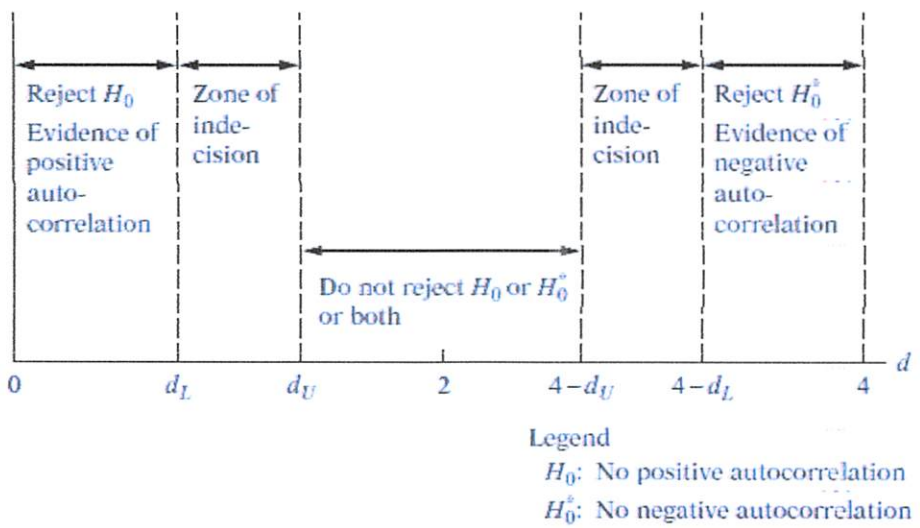
3.5.1. Autocorrelation

Autocorrelation test is used to determine whether there is any deviation classical autocorrelation assumption, namely the correlation between residuals in one observation with another observation on the regression model. Prerequisites that should be fulfilled is the absence of autocorrelation in the regression model. Testing method that often used is by Durbin-Watson test (DW test) with the following conditions:

a) If d is smaller than dL or greater than (4-dl) then the null hypothesis is rejected, which means there is autocorrelation.

b) If d lies between dU and (4-dU), the null hypothesis is accepted, which means there is no autocorrelation.

c) If d lies between dL and dU or in between (4-dU) and (4-dL), it does not produce definitive conclusions.



Value of dU and dL can be obtained from Table Durbin Watson statistics which depend the number of observations and many variables that explain.

Durbin Watson test formula as follows: (Alhusin, 2003) :

$$d = \frac{\Sigma(e_n - e_{n-1})^2}{\Sigma e_x^2}$$

Description:

d = Durbin-Watson value

e = residual

3.5.2. Heteroscedastisity Test

Heterocedastity is a state where the residual variance from one observation to another observation occurred inequality (various). The occurrence of this phenomenon as a result of the inequality data and too varied data values examined. Heterocedastity will often encounter in cross section data. Time series data rarely contain elements heterocedastity, because in the residual time series data is expected to relate to each other between one observation with other observations (autocorrelation). Methods for detecting the presence or absence heterocedastity problem can be done informally or formally. We can use White's method without cross term (white heterocedasticity no cross term) to test the heteroscedasticity problem.

If the probability value of Chi-Squares on White's test results without cross terms greater $\alpha = 5\%$, it can be said that the model equation is not affected regression heterocedastity. There are several testing methods that can be used such as the Park Test, Test Glesjer, Seeing Patterns Regression Graphics, and Spearman Correlation Coefficient Test.

3.5.3. Multicolinearity

Double multikolinearitas created by *Ragner Frish.* It means there is a perfect linear relationship among independent variables in regression model.

Multikolinearitas happen in regression model because of :

a. Error theory in regression function formation;
b. Total observations that will be analyzed in regression model are too small.

There are several method to examine the multikolinearitas:

- Using Variance Inflation Factor (VIF), if the value of VIF < 10, so there is no problem with multikolinearitas.
- Compare the value of individual coefficient determination (r^2) with (R^2)
- Through eigenvalue and condition index.

Multicollinearity has the meaning of a perfect linear relationship or a less than perfect linear relationship between independent variables in multiple regressions. To detect whether there is or not multicollinearity in a regression model, one method used is to look at the value of correlation coefficient (r) between independent variables. If the value of the correlation coefficient between each independent variable is less than 0.7 then the model can be declared free of the classical assumption of multicollinearity. If more than 0.7 we assume it has a very strong correlation between independent variables causing multicollinearity.

CHAPTER IV

AN OVERVIEW TO INDONESIAN ECONOMY

4.1. Indonesian Inflation Rates

As developing country, Indonesia is frigidly exposed to the inflation and inflation occurs often fluctuate from time to time. This is caused by the economic circumstance in developing countries generally still less settable. Thus, the slightest disruption in the economy will cause a shock in the price of goods or services. As in developing countries case generally, the phenomenon of inflation in Indonesia is still of the various "disease" the attack macroeconomic moreover for the community.

In the year of 1990 the increase in inflation due to the dual impact of fuel price and the increase in investment demand and consumption are very fast in the country exceeds the ability to fulfill it. On July 1 1th 1991 there was an increase in oil prices affecting the inflation rate. In 1992 the inflation rate is quite low due to tight money policy and rising fuel prices had not increased since 1993 the inflation rate not increase because the increasing on oil price. And from 1994 to 1995 the increase in inflation rate caused by the drought, crop failure and the delay of rice import.

The inflation rate also decreases through carefully monetary policy and fiscal policy and also the increase of production and the distribution of goods and services. The good maintenance continues till first semester of 1997. The monetary crisis from the mid of 1997 and supported by political instability forced the society to draw their money from the banks (rush) and impact on the

increment of the money supply and also society bought the needs excessively make the producer couldn't provide it causing the hyper inflation at 1998. Before the end of the new order government (before monetary crisis) the annual interest rate can be reduced to a singlet digit, but in general still contain vulnerability if it seen how a large percentage of community groups who suffered from inflation. The more so after getting continuing monetary crisis which is then followed by the economy crisis, and become the causes of the fall of the new order government, the inflation rate rise rapidly (reaching greater than 75% in 1998).

But in 1999 tend to decline because government imposed some policies in economic and other sectors also supplied the need and the Rupiah. In 2000 inflation tend to increase again because the seducement of subsidize to the fuel and cigarettes taxes.

Indonesia's economy began to improve in 2000, when the declining of inflation rate from 77.63% in 1998 to 2.01% in 2000, but this increased again in 2002 as much as 12.55%. The improved performance was also followed by increasing precipitant income of the community ie from 4.49 million dollars in 1998 and 5.78 million in 2000 to 6.86 million rupiah in 2001 (Badan Pusat Statistic, 2003). The recovery supported by the improving condition of existing infrastructure and policies adopted by good government fiscal and monetary policies..

The financial crisis in 2008 led to surges in inflation rate in Indonesia, the higher the inflation pressure duet to high global commodity prices. Increasing in fuel prices pushed inflation reached 12.14% at September 2008. But inflation

eased in the late of 2008 because of declining commodity prices and decreasing prices fuel subsidies. In 2009 Indonesian economy still threatened by the effect of the global crisis, but Indonesia could pass it so much more better than the expectation. This was the best achievement in over 10 years. For 2010 inflation rate is 6.20% because the expectation from previous year, and the improvement of the economics performance of Indonesia.

Table 4.1

Inflation Rate Based on Indicator CPI Indonesia 1991- 2010

Year	Inflation rate (%)
1991	9,41
1992	7,53
1993	9,68
1994	8.52
1995	9,43
1996	7,97
1997	6,23
1998	58,39
1999	20,49
2000	3.72
2001	11,50
2002	11,88
2003	6,59
2004	6,24
2005	10,45
2006	13,11
2007	6,32
2008	10,10
2009	6,38
2010	6,20

source: *worldbank.org*

4.2. Nominal Money Supply

Understanding the amount of money in circulation to distinguish between the money supply in the narrow sense (M1) and money supply in a broad sense (M2).The money supply in the narrow sense is the amount of currency (banknotes and coins) and demand deposits issued by the central bank (BI) plus checking account balances issued by commercial banks, while broad money supply consists of preformance of M1 plus savings futures are not a component of money supply, but is part of the liquidity in the economy (quasi money).

On February 27, 1991 took place a tight monetary policy that forced the government to freeze the deposits fund 21 agencies of State-Owned Enterprises (SOEs) in the Commercial Bank 8.1 trillion worth of government in exchange for Setifikat Bank Indonesia (SBI). The money supply and its growth is relatively stable early 1990s, slowed somewhat in 1996 due to growth in currency demand deposits decreased and growth increased and indicated increase in the role of demand deposits as a means of payment. In the 95/96 period characterized by the efforts of the monetary sector of the government. To restore the monetary expansion in order to reduce the strength of domestic demand pressure on macro-economic balance.

In 1998 the money supply increased due to caution the people in the face of uncertainty due to the monetary crisis, especially with regard to banking recapitalization program implementation plan and support the transfer of funds in liquid form. In 2000 there was an increase in money supply is an indication of motive in case people have not related to the recovery of the banking system and

socio-political conditions and the increase in transactions that show the business world began over economic activity.

In line with efforts to control the growth of some monetary amount to be slower as seen below:

Narrow Money (M1) in Indonesia 1991- 2010

(in billion Rupiah)

YEAR	M1
1991	26.676
1992	28.426
1993	37.036
1994	45.374
1995	53.339
1996	64.089
1997	78.343
1998	101.197
1999	124.633
2000	162.186
2001	177.731
2002	166.769
2003	223.799
2004	245.946
2005	271.140
2006	347.013
2007	450.055
2008	456.787
2009	515.824
2010	605.411

source: *Statistik Ekonomi dan Keuangan Indonesia, Bank Indonesia.*

4.3. Real Output of Indonesia

The main indicator for economic development in one country is an the economic growth. The economic growth determines whether one country is scarce or wealth. In this research, to measure the economic growth annually, we use gross domestic product. Dolan et al. (1991) examined the economic growth is most frequently expressed in terms of increase in Gross Domestic Product (GDP), a measure of the economy's total output of goods and services.

In late 1970 to 1990, Suharto implements some policies in *new orde* to stabilize currency, eliminate inflation rate, reschedule foreign debt, and attract foreign investment. In 1970s crude oil price increases in international market led to soaring export value, and trigger the economic growth rate of 7%.

At the time Indonesia oriented to export oil and gas commodities, while crude oil boom, it brought the economic growth for Indonesia. Because many countries import more oil and gas from other countries to cover their supply. Most Asian countries were satisfied with this condition, their the economic growth increase around 8%, this moment called *Asian Miracle*.

Based on the central bank of Indonesia the economic growth increase from 1990 to the end of 1997, with the value of gross domestic product around 942.929,45 billion of rupiah to 1.506.602.70 billion of rupiah. In 1995, Indonesia reached the highest the economic growth in late past 10 year, for 8.2%. At the time, consumption and investment plays important role to increase the economic growth. But in the mid of 1997 until 1998, gross domestic product slumped to 1.308.835,10 billion of rupiah with the economic growth in 1998 is -13%. Indonesia hit by economic recession. The economic growth fall down

significantly as a result of crisis, where rupiah depreciation against dollar at the time was increase from 4.650 rupiah for 1 US in 1997 become 8.025 rupiah for 1 US$ in 1998.

The table below show the Real GDP of Indonesia from 1991- 2010:

Table 4.3

Real GDP of Indonesia (billion Rupiah) 1991- 2010

Year	Real GDP (billion Rp)
1991	1.001,31
1992	1.073,61
1993	1.151,49
1994	1.238,31
1995	1.342,28
1996	1.444,87
1997	1.512,78
1998	1.314,20
1999	1.324,59
2000	1.389,77
2001	1.442,98
2002	1.506,12
2003	1.579,55
2004	1.655,22
2005	1.750,81
2006	1.847,12
2007	1.964,32
2008	2.082,31
2009	2.176,97
2010	1.131,82

source: *Statistik Ekonomi dan Keuangan Indonesia, BI*

A drop in the economic growth is inseparable from the performance of the latest efforts of the private sector. This is due to the difficulty of obtaining raw materials imports as well as the burden of debt of countries that increasingly swelled in line with the weakening of the rupiah and high interest rates of the bank (Bank Indonesia 1999). Besides that, reducing on consumption and investment sharply also affect to the economic growth. Suharto tried to recovery

economic situation at the time through REPELITA IV. In the following years, Indonesia need quite longer time for economic recovery rather than other Asian countries.

Slowly but sure, in 1999 gross domestic product increase 1.319.189,64 billion of rupiah. Although in the beginning of 2000 to 2008, the economic growth still increase in bad political condition, sluggish investment climate, highest level of crime and terrorism. It is prove that in 2000 the value of gross domestic product is around 1.389.769,90 billion of rupiah increase to 2.082.316,90 billion of rupiah in 2008.

Economic recovery in Indonesia after the impact of the crisis is continuing to improve in 1999, up to 2000, the economic growth continued to increase up to 5.3% higher than Bank Indonesia expected in the early years of around 3%. Export and investment plays a role in the ongoing economic recovery in the year 2000 (Bapenas,2001). Economic performance in 2001 indicates low progression. The economic growth is around 3.64% less than year of 2000. The slow the economic growth in Indonesia is not only causes by world economy recession but also, the high risk and uncertainty.

Driven by macroeconomic instability, the economic growth showed an increase in 2002. Gross domestic product based on constant 2002 is around 4.5% higher than previous year for 3.6%, with value of gross domestic product is 1.505.216 billion of rupiah. It is support by enhance on non oil and gas export commodities, improving on investment activities, improvement of income level, and competitive exchange rates. In subsequent years, indicates a sustainable enhancing on the economic growth. Indirectly, the Indonesian economy was also

affected by the tragedy of the Bali bombing in late 2002 but the economic growth in 2003 did not show a decline.

In 2003, the economic growth improves for 1.577.171 billion of rupiah. But the economic growth is not accompanied by absorption of labor; as a result number of unemployed had increased. Increasing on the economic growth as a result of increasing on value of export for non oil and gas commodities, it is impact of increasing on prices for commodities non oil and gas in international market. The changing on economic structure affect to the economic growth, where Indonesia usually depends on agricultural sector and mining replace by manufacturing sector.

Although, Indonesia economy still on recovery from crisis, as well as the obligation of foreign debt repayment are still large to meet strong economic development, but fortunately it's followed by the economic growth in 2004 for 4.78% large than previous year. The value of gross domestic product at the time is 1.656.516 billion of rupiah. The economic growth in 2004 was supported by rising on public trust toward presidential election. Indonesia achieved stronger the economic growth in 2005 around 5.69% higher than last year. This effort reached through vigorous expansion in consumption and investment, while import activities declined.

The Indonesian people entered the year 2006 with great un-expectation when the economy was rocked by soaring oil prices in the world market and increases in oil fuel (BBM) prices on the domestic market. Increasing of crude oil price in international market around 100 US$/barrel. The government's decision to cut of subsidized BBM. As a result is slump notably in the manufacturing sector

in 2006 which mostly rely on oil fuel for production process. It's stimulating on commodities prices and indicates higher inflation. Like domino effect, the economic growth in 2006 decreases for 5.5% less than previous year for 5.6% as a result of booming of international oil prices. Different with the nominal value of gross domestic product improve from 1.750.815 billion of rupiah in 2005 to 1.847.292 billion of rupiah in 2006.

In August-Sept. 2007 the world's economy was jolted by the U.S. sub-prime mortgage crisis causing a loss of billions of U.S. dollars to number financial agencies in a number of countries in the world. Fortunately, Indonesia fared better, economic performance in Indonesia relatives good, drive by rising on value of foreign direct investment around 40.145.80 billion of rupiah or around 1.57% and improving on export performance for 18% large than last year. Three main sectors contributed to gross domestic product for past 3 years were manufacturing, trade and agriculture.

And in 2008 when the economic of USA attacked by financial crisis Indonesia's economy didn't face the impact as bad as other countries. Because at the time was periode of general election for presiden and parlemen so government expenditure was issued in huge number to finance it. So thats why Indonesia's GDP increased to the level Rp.2.082,31 billion ,and increased also in 2009 as the amount of Rp.2.176,97 billion and decreased in 2010 as Rp.1.131,82 billion.

4.5. The Volume of International Trade

4.5.1. Export

Indonesia as one of the developing countries have opened themselves to take part in international trade and world economic growth is very fast, then demanded the ability to compete can participate in it. Export will continue to occupy an important role as driving force in the domestic economy over the next decade, it is seen with many efforts to encourage export activities, whether conducted by government and employers, for example : by the issuance of wisdom such as reducing some import duty tariff (especially material supporting exports). Simplification of certain commodity export trade system and other policies.

Indonesia's export consists of various kinds of goods or commodities to many countries in all over the world. However, the composition of commodities is dominated by certain commodities, so that the total export depend on the results of export that commodities. Export destination of the market segmentation is concentrated in to a handful of specific countries, so that the total export is affected by the economic situation and political atmosphere in those countries.

Export dependence in terms of commodities or destination country, is not profitable and not calm. The short term risk is the vulnerability of export receipts. Acquisition volatile, vulnerable to changes that occur in the mooring depended. The fluctuation that arises with regard to export commodities that depend on scarcity of raw materials, the price decline, or obsolesce benefits) will easily reduce export earnings significantly. In the other hand, the fluctuation that

emerged in the country of the contraction (like recession, primordial sentimental on racial and foreign Products, or even a political struggle) can decline export revenues dramatically.

To get the real export writer using the value exports divided by the consumer price index, as shown table below :

Table 4.4

Export of Indonesia (Million US $)

Year	Export	CPI	Real Export
1991	32.457.000.000,00	20,15	1610382572,43
1992	37.187.000.000,00	21,67	1715841716,08
1993	**40.566.000.000,00**	**23,77**	1706514391,30
1994	45.020.000.000,00	25,80	1745183203,67
1995	52.923.000.000,00	28,23	1874693367,43
1996	56.787.000.000,00	30,48	1863079656,34
1997	63.239.000.000,00	32,38	1953083155,84
1998	54.849.971.800,00	51,28	1069528538,22
1999	**55.840.471.034,80**	**61,79**	903713724,47
2000	70.621.534.779,71	64,09	1101911917,30
2001	62.865.038.246,50	71,46	879723457,13
2002	65.828.019.016,64	79,95	823364840,73
2003	69.402.129.559,02	85,22	814387814,59
2004	82.812.559.661,96	90,54	914651641,95
2005	99.921.822.250,97	100,00	999218222,51
2006	115.047.793.463,95	113,11	1017131937,62
2007	130.501.310.000,00	120,26	1085159737,24
2008	154.852.513.067,99	132,40	1169580914,41
2009	133.255.343.439,02	140,85	946079825,62
2010	15779103470,00	120,97	130438153,84

Source: *bps.go.id*

4.5.2. Import

In line with the increase in economic activity in the domestic, import expenditure shows an increasing trend year after year. The increase was also

associated with various policies of deregulation and de-bureaucratization is launched. Bureaucratization and deregulation in the form of simplification of import in general trade system, change the form of non-tariff protection to the protection of tariffs, reduction of tariffs and import licenses to many companies. The essence of all that is imports. Import policies are always in harmony with development efforts in the domestic industry, stimulating investment and raising exports.

Judging is based on country of origin of imports; Indonesia imports composition resembles the composition of export destination countries. Japan and the United States listed as countries of origin of major import. Furthermore, a third of our imports come from these countries. Both are undoubtedly major trading partner of Indonesia. Both also became a major trading partner of many countries in the world. It shows that America and Japan is a country that always must be taken into accountt and woven by the other countries in the world. Germany is the third country of origin of imports for Indonesia. The value of exports from these countries ranges from 6-7 percent of all imports annually. Singapore ranked Germany and Singapore following an important trade partner for Indonesia, countries other important trading partners are the Netherlands and the UK. The structure of Indonesia's foreign trade with countries in Europe is much better in comparison with countries in the Americas. Trade with the Americans concentrated on one country: the United States, both in exports and imports. Concentration is not the case with countries in Europe, exports and imports of Indonesia to the European countries are relatively evenly distributed.

The dominance of imports of raw materials in the structure of Indonesia indicates how dependent on the supply of industrial raw materials from abroad. to see the development of imports can be seen in table 4.5:

Table 4.5

Import of Indonesia (Million US $)

year	import (us $)	Cpi	real import
1991	31398000000,00	20,15	1557839356,97
1992	34874000000,00	21,67	1609117810,16
1993	38222000000,00	23,77	1607907929,41
1994	43738000000,00	25,80	1695486960,51
1995	54461000000,00	28,23	1929173997,77
1996	59379000000,00	30,48	1948118529,14
1997	62830000000,00	32,38	1940451535,94
1998	44030357373,16	51,28	858555113,40
1999	42974513498,07	61,79	695493016,64
2000	56002459139,43	64,09	873809629,26
2001	50548622608,70	71,46	707369473,95
2002	52696767225,61	79,95	659121541,28
2003	56946590677,39	85,22	668230352,94
2004	71471152278,04	90,54	789387588,67
2005	91510592533,21	100,00	915105925,33
2006	95261792802,18	113,11	842204869,62
2007	109588090000,00	120,26	911259687,34
2008	144934861722,92	132,40	1094674182,20
2009	112233022578,91	140,85	796826571,38
2010	135663284048,00	120,97	1121462214,17

Source: bps.go.id

International trade in this study is real real exports plus imports as listed in the table below :

Table 4.6

The Volume of International Trade (Million US $)

Year	Real Export	Real Import	Volume of Int.Trade
1991	1610382572,43	1557839357	3168221929,40
1992	1715841716,08	1609117810	3324959526,24
1993	1706514391,30	1607907929	3314422320,71
1994	1745183203,67	1695486961	3440670164,18
1995	1874693367,43	1929173998	3803867365,20
1996	1863079656,34	1948118529	3811198185,48
1997	1953083155,84	1940451536	3893534691,77
1998	1069528538,22	858555113,4	1928083651,62
1999	903713724,47	695493016,6	1599206741,10
2000	1101911917,30	873809629,3	1975721546,56
2001	879723457,13	707369474	1587092931,08
2002	823364840,73	659121541,3	1482486382,02
2003	814387814,59	668230352,9	1482618167,52
2004	914651641,95	789387588,7	1704039230,62
2005	999218222,51	915105925,3	1914324147,84
2006	1017131937,62	842204869,6	1859336807,23
2007	1085159737,24	911259687,3	1996419424,58
2008	1169580914,41	1094674182	2264255096,61
2009	946079825,62	796826571,4	1742906397,00
2010	130438153,84	1121462214	1251900368,01

Source: bps.go.id

4.6. Interest Rate

Interest rate is calculated by subtracting the inflation rate from nominal interest rate that is set. Real interest rate such very important factor to compare factor to compare the effective income of different investment by calculating the present value or future value by estimating the rate of inflation in the foreseeable income.(Bank Indonesia: 2010)

The interest rate plays an important role in influencing the selection of communities for better performance assets in cash or other financial assets such

as deposits or securities in the money market, so interest rates can be considered as factors that determine the demand for money. The higher interest rate then the community more and more are choosing a financial asset or a form of time deposits and bonds means less holding cash. In addition, interest rates will also affect people's desire for the transaction. Fluctuating levels of 6-month deposit rate in Indonesia from 1991 to 2010 period is shown by table:

Table 4.7

The Interest Rate (6 months deposit) of Indonesia 1991-2010

Year	I
1991	22,65
1992	17,78
1993	13,08
1994	13,33
1995	16,95
1996	16,78
1997	16,96
1998	36,78
1999	14,25
2000	13,31
2001	16,18
2002	13,79
2003	8,25
2004	7,12
2005	10,17
2006	10,70
2007	7,65
2008	10,34
2009	7,87
2010	7,20

source: *Statistik Ekonomi dan Keuangan Indonesia, Bank Indonesia.*

CHAPTER V

EMPIRICAL RESULT AND ANALYSIS

5.1. Empirical Results

5.1.1. Regression Result Analysis

The first step to analyze the data is by regressed the data using the computer program which is competent and representative with the research. The computer program used by the writer is EVIEWS 6.0 in order to make the data estimation easier. The EVIEWS computer program also helps the writer to reduce and avoid computing error. The regression result of Ordinary Least Square model is shown in table 5.1 below.

The model of this research :

$$\ln P = b_0 + b_1 \ln Y + b_2 \ln IT + b_3 \ln i + b_4 \ln M1 + e$$

Table 5.1
The Regression Results

Dependent Variable: P
Method: Least Squares
Date: 07/27/11 Time: 15:26
Sample: 1991 2010
Included observations: 20

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Y	0.007129	0.005877	1.413130	0.2438
IT	-1.65E-10	1.20E-10	-1.378277	0.1883
i	-1.823727	0.258927	7.043398	0.0000
M1	4.97E-05	2.22E-05	2.237277	0.0409
C	-23.55383	9.533651	-2.470599	0.0260

R-squared	0.781637	Mean dependent var	11.50735
Adjusted R-squared	0.723407	S.D. dependent var	11.59686
S.E. of regression	6.099036	Akaike info criterion	6.666456
Sum squared resid	557.9735	Schwarz criterion	6.915389
Log likelihood	-61.66456	Hannan-Quinn criter.	6.715051
F-statistic	13.42325	Durbin-Watson stat	1.545041
Prob(F-statistic)	0.000076		

The regression results can be simplified as follow:

ln P = -23.55 + 0.007 ln Y – 1.65 ln IT + 1.82 ln i + 4.97 ln M1 + e_t

t-test (-2.434) (1.413) (-1.378) (7.043) (2.237)

R^2 = 0.781637

Adjusted R^2 = 0.723407

DW = 1.545041

F-stat = 13.42325

.From the regression equation above, we can conclude that; while all independent variables are equal to 0 (zero), the level of the inflation rate is -23.554 %. The coefficient of determination test is intended to measure the affect of changes in the independent variables used in the model is able to explain its influence on the independent variable. These test look at the value of the coefficient of determination R^2 of the equation in the reggresion. The value of R^2 from the model is 0.781637 means that 78.16% the inflation rate for a future periode is influeced by determinant variables in the model, while the remaining as amount of 0.23554 influenced by other variables outside the model.

5.1.2. F-Test

Statistical test is used to see any influence of independent variables toward dependent variable. Then the f-statistic is used to test the sigificance level of influence together in explaining the variation of the independent variables. After estimation, the value of F-statistic for 13.42325 while,

F-table:

Table 5.2

Critical Value of F-table of The Regression

n_2	n_1	α	
		5%	1%
15	4	3.06	4.99

F-stat > F-table , 13.42325 > 3.06, it means that independent variables the real output, international trade volume, interest rate and nominal money supply significantly influence on the inflation rate.

From the estimation result is shown that the function has value of F-statistic 13.42325 so when compared with the table 5.1 then the confidence level of 1% and 5% were jointly independent variables affect the variation of the independent variable.

5.1.3. T-Test

To test whether the partially independent variables have a marked influece on the independent variables used t-test below shows the value of the critical value for the test t-statistic, each at a significant level of 5% and 1%:

Table 5.3

Critical Value of T-table of The Regression

Df	α		
	1%	5%	10%
15	2.602	1.753	1.341

If t-test > t-table it means Ho rejected, it means $\beta \neq 0$ or β is statistically significant.

Table 5.4

Result of T-test

Variables	t-stat	Ho	Explanation
Real Output	1.413130	Rejected	Significant at α =10 %
International Trade Volume	-1.378277	Rejected	Significant at α = 10 %
Interest Rate	7.043398	Rejected	Significant at α = 1 %
Nominal Money Supply (M1)	2.237277	Rejected	Significant at α = 5 %

To investigate influence of independent variables to dependent variable, we use T-test. Where the estimation results for this research shoes the value of of T-test for real output is 1.413130 means that T-test > T-table, so the real output is significant influence the inflation rate. The same thing with the value of T-test of international trade volume where the value of T-test is -1.378277 it is bigger than the T-table and significant at 10%. For the interest rate the T-test value is 7.043398 which is bigger than the T-table, so the interest rate is significant influence the inflation rate. And for nominal money supply in term of narrow money has T-test value 2.237277 also bigger rather than its T-test, so the nominal money supply is significant influece the interest rate.

5.2. Regression Analysis

5.2.1. The Influence of Real Output Indonesia toward The Inflation Rate

We are able to investigate any influence of each independent variable on dependent variable through T-test. An estimation result show, the value of T-test from the real ouput is 1.413130 while T-table 1.341, conclude that T-test > T-table. Regression coefficient for real output is 0.007129. It means the real output positive and significant inflation rate.

The regression results show that at each increase of real GDP by 10%, ceteris paribus will cause increasing in the inflation rate at 0.7% at 99% level.

This situation is appropriate with the theory of measurement of real output, then the cause of the inflation that occurs that the demandpull inflation, when the aggrehate demand increases, then the output will increase, and rising the price and inflation rate.

5.2.2. The Influence of International Trade Volume toward The Inflation Rate

Coefficient value of -1.65 means that the independent variable of volume of international trade has negative relationship with dependent variable inflation rate. The regression results show that at each increase of the volume of international trade by 100%, ceteris paribus will decrease the inflation rate at 16.5% at 99% confidence level.

This results is appropriate with the liquidity preferences framework, any increase in the volume of international trade will increase the demand for money for the transaction so the money demand curve will shift to the right, it will

causing the increase in interest rate, due to the increases in interest rate will decrease the inflation rate.

5.2.3. The Influence of Interest Rate toward The Inflation Rate

Coefficient value of -1.824 means that the independent variable interest rate has negative relationship with the dependen variable inflation rate, the regression result indicate that the decline in interest rate by 100% will increase the rate of inflation by 182.4%, ceteris paribus.

This situation in suitabe with the monetaris theory that inflation is a monetary phenomenon, so the cause of inflation is one of them is the money supply, so as control inflation by regulating the money supply, so any decrease in interest rates would increase the amount of money in circulation which in turn will increase the aggregate price.

5.2.4. The Influence of Nominal Money Supply toward The Inflation Rate.

Coefficient vale of 4.97 means that the variables in the money supply has posotive relationship with the variable inflation rate, the regression results show that increasing the money supply in the sense of narrow money (M1) for this time periode significantly affect the rising rate of inflation at a future periode. If there is an increase in changes in the money supply by 100%, ceteris paribus the the inflation rate will increase 49.7% at 90% confidence level. The direction of this coefficient according to the theory that the expansion of the money supply will increase.

5.3 Classical Assumption Test

5.3.1 Autocorrelation test

Autocorrelation means that there is correlation between one intercept and the others. In this case, to know any indication of autocorrelation problem, able to use Durbin Watson tests. Estimation result show, the value of D-W statistic is 1.986466.

Figure 5.1

Regional Acceptance & Rejection Hypothesis Ho, autocorrelation test

Reject Ho, meaning there is positive autocorrelation	Can not be decided	Do not reject Ho, means no autocorrelation	Can not be decided	Reject Ho, there is a negative autocorrelation

0 d_L d_u 2 $4-d_u$ $4-d_L$ 4

1,10 1,54 2,46 2,90

Based on D-W *d* Stat figure above, from analysis result of D-W for 1.545041 it is located on $dU \leq d < 4-dU$ or between 1.54 (dU) of lower border and 2.46 (4-dU) of upper border. In other words, the value analysis of D-W is no positive or negative autocorrelation.

5.3.2. Multicolinearity Test

To detect multicolinearity within the regression model, we can observe from coefficient correlation (*r*) between independent variables. If the value of coefficient correlation of each independent variable is less than 0.85, it means the model is free from multicolinearity. But if the value of coefficient correlation is greater than 0.85, it assumes strong correlation among independent variables or the model detects multicolinearity on it. But multicolinearity result can be ignored since the value of R^2 is greater than those correlation independent value

In the research, we estimate and found indication of multicolinearity within the model on the coefficient correlation value greater than 0.85 on nominal money suppy and international trade volume.

5.3.3 Heteroscedasticity Test

Heteroscedasticity appears if the error or residual of the observed model does not have a constant variance of one observation to another observation. Heteroscedasticity situation occurred because of several reasons, among others:

a. The nature of the variables included into the model
b. The nature of the data used in the analysis, cross section data more often creating heteroscedasticity compared with time series data.

In this research to detect heteroscedasticity problem on regression equation we use white heteroscedasticity without cross term method. If the value of Chi-square is greater than 5%, indicate there is no heteroscedasticity on regression equation model. From estimation result, writer got the value of Chi-squares probability for 0.0579, which is greater than 5%. It means there is no heteroscedasticity problem on regress equation model.

Table 5.5

Heteroscedasticity Test

Heteroskedasticity Test: White

F-statistic	7.389929	Prob. F(10,9)	0.0030
Obs*R-squared	17.82869	Prob. Chi-Square(10)	0.0579

CHAPTER VI

CONCLUSIONS AND RECOMENDATIONS

6.1. Conclusions

Based on quantitative and descriptive analysis conducted in previous chapters can be seen that this research intends to see any indication of the factors that influence the monetary analysis to inflation in Indonesia during the periode 1991- 2010 are :

a. Variable real output, interest rate, the volume of international trade, and nominal money supply (M1) are all factors that effecst the inflation rate in Indonesia in the periods of 1991- 2010.
b. The estimation result overally indicate that variables nominal money supply and real output is positively affecting the rate of inflation, which means that any increase in these variables causing the increase of the inflation rate. While the variables of the volume of international trade and the interest rate affecting the inflation negatively, which means that any decrement of these variables will cause the rising of the inflation rate.
c. In many of statistical testing performed coefficient results and significant partially. While together, all independent variables affect the rate of inflation, and the coefficient of determination obtained is able to explain the influence of independent variables on the dependent variables.
d. Variable real output, international trade volume, interest rate and nominal money supply significantly affecting inflation in Indonesia during the periods 1991- 2010, so it can be concluded that the money demand for

transaction affecting the inflation in Indonesia during the periods 1991-2010.

6.2. Recommendations

Recommendation based on the estimation result are:

1. The estimation result overally indicate that variable real output is positively and significantly affecting the rate of inflation. Indonesia's goverment should increase the growth rate while decrease the inflation rate from the other variables not from the variable of real output.

2. The estimation result overally indicate that variable nominal money supply (M1) is positively and significantly affecting the rate of inflation. The Central Bank of Indonesia as the institution that hold the authority to Control the Monetary sector should be consistent in aim the inflation targeting to push the inflation rate to be as low as possible. The Central Bank of Indonesia should strengthen the coordination with the government to minimize the disturbance raise from money supply. Because the expansion of money supply will raise the demand for money for transaction and rising the price level.

3. Interest rate affecting the inflation negatively and significantly. So through monetary policy using BI rate as refference rate in controlling the monetary sector. And also the BI respons it using the interest rate by increasing the nominal interest rate greater than deviation of inflation duet o the target so the real interest rate remain positive.

4. The international trade volume affecting the inflation negatively and significantly. Export affecting the BOP positive, Indonesia's government should increase the international trade volume of Indonesia through encourging the export. So, policy must concentrate on role of export as growth engine and enhance on improving the competitiveness of exports products.

5. For further research writer suggest to see monetary analysis to inflation in Indonesia by adding more variables it can help policymakers to make a regulation in term of decreasing the inflation rate of Indonesia.

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Appendix

The Data from 1991- 2010

year	p	y	it	i	m1
1991	9,41	1.001,31	32955839356,97	22,65	26.676
1992	7,53	1.073,61	36483117810,16	17,78	28.426
1993	9,68	1.151,49	39829907929,41	13,08	37.036
1994	8,52	1.238,31	45433486960,51	13,33	45.374
1995	9,43	1.342,28	56390173997,77	16,95	53.339
1996	7,97	1.444,87	61327118529,14	16,78	64.089
1997	6,23	1.512,78	64770451535,94	16,96	78.343
1998	58,39	1.314,20	44888912486,56	36,78	101.197
1999	20,49	1.324,59	43670006514,70	14,25	124.633
2000	3,72	1.389,77	56876268759,70	13,31	162.186
2001	11,50	1.442,98	51255992082,65	16,18	177.731
2002	11,88	1.506,12	53355888766,90	13,79	166.769
2003	6,59	1.579,55	57614821030,32	8,25	223.799
2004	6,24	1.655,22	72260539866,71	7,12	245.946
2005	10,45	1.750,81	92425698458,55	10,17	271.140
2006	13,11	1.847,12	96103997671,80	10,70	347.013
2007	6,32	1.964,32	110499349687,34	7,65	450.055
2008	10,10	2.082,31	146029535905,12	10,34	456.787
2009	6,38	2.176,97	113029849150,29	7,87	515.824
2010	6,20	1.131,82	136784746262,17	7,20	605.411

The Data After Loan

year	p	ln y	ln it	i	lnm1
1991	9,4105	6,90906	24,21843	22,65	10,19152
1992	7,5312	6,97878	24,32012	17,78	10,25506
1993	9,6827	7,04881	24,40788	13,08	10,51965
1994	8,5206	7,12150	24,53952	13,33	10,72269
1995	9,4334	7,20212	24,75556	16,95	10,88442
1996	7,9700	7,27577	24,83949	16,78	11,06803
1997	6,2299	7,32170	24,89412	16,96	11,26885
1998	58,3871	7,18098	24,52746	36,78	11,52482
1999	20,4891	7,18886	24,49993	14,25	11,73313
2000	3,7184	7,23689	24,76414	13,31	11,9965
2001	11,5039	7,27447	24,6601	16,18	12,08803

2002	11,8788	7,31729	24,70025	13,79	12,02436
2003	6,5857	7,36490	24,77705	8,25	12,3185
2004	6,2435	7,41169	25,00354	7,12	12,41287
2005	10,4520	7,46783	25,24967	10,17	12,51039
2006	13,1104	7,52138	25,2887	10,70	12,75712
2007	6,3205	7,58290	25,42828	7,65	13,01713
2008	10,0981	7,64123	25,70707	10,34	13,03197
2009	6,3812	7,68569	25,45092	7,87	13,15352
2010	6,2000	7,03158	25,64167	7,20	13,31366

Regression Result

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Method: Least Squares
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Sample: 1991 2010
Included observations: 20

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Sum squared resid	557.9735	Schwarz criterion	6.915389
Log likelihood	-61.66456	Hannan-Quinn criter.	6.715051
F-statistic	13.42325	Durbin-Watson stat	1.445041
Prob(F-statistic)	0.000076		

Heterocedascity test
Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	9.317321	Prob. F(4,15)	0.0005
Obs*R-squared	14.26049	Prob. Chi-Square(4)	0.0065
Scaled explained SS	9.424157	Prob. Chi-Square(4)	0.0513

Multicolinearity test

Y	IT	I	M1
	-		-
	0.231668406853754	0.787616169377	0.18902240170697
-0.1432714768261985	4	6456	55
1	0.687159524744348	-	0.65108445868403

	3	0.4813754136235696	17
0.6871595247443483	1	-0.5646302887356491	0.9315037789274474
-0.4813754136235696	0.5646302887356491	1	-0.5973481564698747
0.6510844586840317	0.9315037789274474	0.5973481564698747	1

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