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AN EMPIRICAL STUDY OF FOREIGN EXCHANGE RESERVE THROUGH THE BALANCE OF PAYMENT OF INDONESIA BASED ON THE KEYNESIAN AND THE MONETARY APPROACH

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Abstract: *The main objective of this research is to analyze the change of the Balance of Payment in Indonesia country based on variables that derived of the Keynesian Balance of Payment Theory (KBPT) and the Monetary Approach to the Balance of Payment (MABP). This research used Error Correction Model (ECM) to analyze the short term effect and the long term effect on Balance of Payment.The results showed that in the long run the National Income, the Domestic Credit, the Exchange Rate and the Interest Rate can change the Foreign Exchange Reserve significantly partially and simultaneously. Moreover the results showed that the effect of the independent variables to the Foreign Exchange Reserve is the same as the hypotheses of the KBPT and MABP. It can be concluded from Error Correction Term (ECT) value that in Indonesia the economy needs 6-7 quartals (1.5 years) to reach the new equilibrium.*

Keywords: *The Foreign Exchange Reserve, The Keynesian Balance of Payment Theory and The Monetary Approach to the Balance of Payment, The Error Correction Model.*

JEL Classification : *F41.*

1. INTRODUCTION

This research is the study of factors affecting the changes in the value of foreign exchange reserves. Referring to the theory of International Economic such factors can be searched through the analysis of the International Balance of Payments (BOP). According to Bhandari (2006) that the size of the foreign exchange reserves of a country depends on various factors that affect each of the elements in the BOP. There are factors that affect the account balance goods through export and import variables. Then there are factors that affect the balance of capital through capital inflows and capital outflows. Ultimately these factors can lead to dynamics

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in continuous BOP. The dynamics are seen in situations that BOP can reach deficit or surplus (disequilibrium) and at other times the BOP can reach a balanced position (balance or equilibrium) (Boediono, 1999 and Ball, *et. al.*, 2000).

This study focused on the change of "the Foreign Exchange Reserve through Balance of Payments Dynamics Analysis ".

There are several reasons for selecting the research topic which can be grouped into :

1. theoritical gap,
2. research gap, and
3. empirical gap.

The Grand Theory of International Balance of Payments analysis is The Open Macroeconomic Theory or The International Economics. The focus of the analysis of the theory lies in some argument about why a country should be have a connection to the economic activity in other countries. The answer lies in the benefits obtained by the state of international economic transactions. One is the presence of international economic activity, then a country can obtain a number of foreign exchange through banking as capital development. To see how the value of the foreign exchange reserves change, then in International Economic Theory has developed a variety of approaches that focus on the analysis of the International Balance of Payments (BOP).

Landerth, *et. al.* (1989) classify these theories into :

1. Pre-Classical Theory,
2. Classical Theory,
3. Keynesian Theory,
4. Neo-Classical Monetary Theory and
5. The Balance of Payments Constrained Growth Model Theory.

Each has a different assumptions, variables and propositions (see also Snowdon, *et. al.*, 1994; Sukirno, 2000 and McCombie, *et. al.*, 2002).

According to Frenkel, *et. al.* (1980) and Nwaobi (2003) that the school of thought that more intensive elaborate theory of BOP are the Keynesian theory and Monetarist theory. But the two groups have different views on the BOP (reserves) of a country. The difference mainly lies in understanding aspects and factors that affect the BOP (see also Alexander, *et. al.*, 1998 and Kavous, 2005).

The study of the dynamics of a country's balance of payments have been carried out. These studies grounded in both the Keynesian Theory (KBPT) and Monetarist Theory (MABP). Studies on the dynamics of BOP conducted abroad and in the country of Indonesia. Researchers who have studied Indonesian BOP only a few researchers such as Bijan Aghevli (1974) with a study period from 1968 to 1973;

Boediono (1979) with a study period from 1970 to 1976; Djiwandono (1980) with a study period from 1970 to 1979; Nopirin I (1983) study period from 1970 to 1979; Nopirin II (1998) with a study period from 1980 to 1997; Nusantara, *et. al.* (2000) with a study period from 1985 to 1997; Judge (2000) the study period 1986.1-1997.4; Djauhari (2003) with the study period 1994.1-2000.4 and Sugema (2005) the study period 1984.1-1997.2.

Most of these studies used the Monetary approach. Only Nopirin ever perform the synthesis of Keynesian and Monetarist for the period 1970-1979 and the period 1980-1997 using a simultaneous approach. This study will also perform synthesis of Monetarist and Keynes theory to the analysis of the BOP in Indonesia. However, this study has differences with Nopirin. This study uses time period which has a crisis time and moreover this study use a dynamic single equation in the data analysis.

2. A LITERATURE REVIEW

A. Development of Theories of BOP

Landerth, *et. al.* (1989) classify the theories of International Balance of Payments into :

1. The Pre- Classical Theory BOP,
2. The Classical Theory,
3. The Keynesian theory,
4. The Neo - Classical Monetary Theory and
5. The Balance of Payments Constrained Growth Model Theory. Each has a different assumptions, variables and propositions (see also Snowdon, *et. al.*, 1994; Sukirno, 2000 and McCombie, *et. al.*, 2002).

B. Previous Research

Empirical Studies of the BOP has done well overseas and domestic Indonesian. The approach used in these studies is based on the Keynesian approach and Monetarist. Although the basic theory used is relatively the same, but most of the conclusions do not show the same results.

Porter in 1972 researching Reserves in Germany. The model used is the Capital Flow Equation for the period 1963-1970. The dependent variable is Net Private Capital. The independent variables consist of the Current Account, Government Capital Accounts, National Income, Price Level, Interest Rate, Money Supply and Domestic Credit. The conclusion does not support the propositions of monetary approach to the balance of payments.

Richard Zecher in 1974 conducted research in Australia. The model used was the Reserve Flow Equation with time period 1951.2-1971.1. The dependent variable was foreign exchange reserves and the independent variables were: national income, price level, interest rates, money supply and domestic credit. Zecher found that national income had positive impact to the foreign exchange reserves, price level had negative impact, the interest rate had no impact, the money supply had negative impact and the domestic credit had negative impact to the foreign exchange reserves. So it supported the monetary approach.

De Granwe in 1976 conducted research about foreign exchange reserves in 7 European countries. The model used was the Reserve Flow Equation for the period 1959-1970. The dependent variable was the Foreign Exchange Reserves. The independent variables consist of national income, price level, interest rates, money supply and domestic credit. The results of the study did not support the propositions of monetary approach to the balance of payments.

Aghevli and Khan in 1977 conducted research about foreign exchange reserves in 39 Developing Countries. The model used was the Reserve Flow Equation for the period 1957-1966. The dependent variable was the Foreign Exchange Reserves. The independent variables consist of national income, price level, interest rates, money supply and domestic credit. Conclusion partially supported propositions monetary approach to the balance of payments, but most did not.

Sykes Wilford and Walton Wilford conducted research about foreign exchange reserves in Honduras in 1978. The dependent variable was the Foreign Exchange Reserves. The independent variables were; national income, price level, interest rates, money supply, domestic credit. The model used ws the Reserve Flow Equation with period : 1966.4-1974.4. Both researchers founded that the national income had positive effect, price level had no effect, interest rates had no effect, the money supply had negative effect, domestic credit had negative effect to the foreign exchange reserves. So it supported the monetary approach.

Neuman in 1978 conducted research about foreign exchange reserves in Germany. The model used was the Capital Flow Equation for the period 1963-1970. The dependent variable was Net Private Capital. The independent variables consist of the Current Account, Capital Accounts, National Income, Price Level, Interest Rate, Money Supply and Domestic Credit. The Conclusions supported the propositions of monetary approach to the balance of payments, but some did not.

Agheveli Bijan in 1974 conducted research in the period 1968-1973 in Inodonesia. Dependent variable was Foreign Exchange Reserves. The independent variables consist of; Government Spending, Credit of Central Bank and National Income. The results showed that the monetary expansion in Indonesia is consistent with the growth and inflation targets.

Then Boediono in 1979 examined the years 1970 to 1976 study period. Bound Variable : Current Account. Variables consist of; Government Revenue, Government Expenditure, Money Supply, and the Price Level of Consumption. The results showed that the combination of policies necessary to achieve the set targets.

Then Djiwandono in 1980 examined the years 1970 to 1979 study period. Bound variables are Foreign Exchange Reserves. Variables consist of; National Income, Level Price, Interest Rate, and Credit Multiplier Domestic figure. The results showed that in general the case of Indonesia to support the monetary hypothesis.

Nopirin I in 1983 examined the years 1970 to 1979 study period. Bound variables are Foreign Exchange Reserves. Variables consist of; National Income, Domestic Credit, Exchange rate USD/IDR, Government Spending, Reserve yrs ago. The results showed government spending and domestic credit negatively affect foreign exchange reserves. The influence of government expenditure is greater than domestic credit. It should be a combination of policies.

Nopirin II in 1998 examined the years 1980 to 1996 study period. Bound variables are Foreign Exchange Reserves. Variables consist of; National Income, Domestic Credit, Exchange rate USD/IDR, Government Spending, Reserve yrs ago. The results showed the national income and domestic credit is significant at the 5 percent level and negatively related to foreign exchange reserves (reserve). It shows the essence of Keynes and Monetarist view. Government spending is positive, contrary to Monetarist function.

Nusantara in 2000 researching the study period 1985.I-1997.IV. Bound variables are Foreign Assets. Variables bound composed of; Exchange rate USD/IDR, national income, price level, interest rates, figures multiplier, domestic credit. The results showed that the exchange rate is positive and significant effect in the short term and long term. Inflation in the world and a significant positive effect in the short term and long term. Economic growth tends to be not significant. LIBOR significant negative effect, especially in the short term. Offset coefficient between –0.28 and –0.37.

Judge in 2000 researching the study period 1986.1-1997.4 year. Bound variables are Reserve. Variables consist of; National income, domestic credit, exchange rate USD/IDR, government spending, the Reserve yrs ago. The results showed that all parameters significant at the 5 percent level. Unless government spending on Keynes approach is not significant.

Djauhari in 2003 examines the research year period 1994.1-2000.4. Bound variables are Devisa. Variabel Free Reserves consist of; National Income, Domestic Credit, Exchange rate USD/IDR, Expenditures and Reserve yrs ago. The results showed that the only variable domestic credit, real national income and price levels have a significant impact on the balance of payments.

C. Hypotheses Development According to the Keynesian approach and Monetarist

According to Tambunan (2003) that monetary balance in the balance of payments recorded a foreign exchange reserve changes based on current foreign exchange transactions coming into and out of a country in a given period were recorded by the central bank. While changes in foreign exchange reserves or balances (BOP) is obtained from the sum of the current account balance (NTB) and the capital account balance (NTM). In the form of mathematical equations can be written as follows :

$$NPI = NTB + NTM \quad (1)$$

Where :

BOP = Balance of Payment

NTB = Current Account Balance

NTM = Capital Account Balance

In connection with the term position or balance, meaning that the following described based on the theory of International Economics. According to the theory that forms the balance of payments is no 3 is: surplus, deficit and balance. If we want to analyze what caused the third position/balance, then we need to explore what factors affect each of the elements forming the Current Account and Capital Account. To see that according Soediyono (1987) that we use the concept of balance Monetary Transactions. By using the concept above, then the next can be traced to factors that affect a country 's forex reserves through : Current Account Balances and Capital Account Sado. In the following paragraphs will be described one by one the elements and factors of influence on the balance-sheet.

According to the International Economic theory that the Current Account established pursuant flow record exports and imports. Balance is dependent on the results of the comparison of export value and import value. The size of the value of exports and imports depend on factors influence each. In Macro Economics stated that export predominantly influenced by the exchange rate (domestic price representation) and international revenue, while imports were predominantly influenced economic growth and foreign exchange rate (price of foreign representation). Based on that statement, it can then be formulated equations and identities in order to form a functional equation model of this study, as follows :

$$NTB = X - M \quad (2)$$

Where :

X = Exports

M = Imports

If exports (X) is influenced by the income of the people of the world (World Income = Yw) and foreign exchange (Exchange Rate = e), then the functional equation can be expressed as follows :

$$X = f(Y_w, e) \tag{3}$$

Where :

–Y_w = World Income,

–E = exchange rate,

Then when imports (M) affected Economic Growth (National Income = Y_n) and foreign exchange (Exchange Rate = e), then the functional equation can be expressed as follows :

$$M = f(Y_n, e) \tag{4}$$

Where :

–Y_w = World Income,

–E = exchange rate,

From equation (3) and (4) it can be concluded that the position of NTB depends on world income (Y_w), Economic Growth (Y_n) and foreign exchange rates (e). In the functional equation can be expressed as follows :

$$NTB = f(Y_w, Y_n, e) \tag{5}$$

Next will trace elements of Capital Account Balance (NTM). The balance sheet consists of the recorded balance of capital inflows (capital inflow = CI) and capital outflows (capital outflow = CO). Thus the balance of NTM is obtained from the difference between the two. In equation can be formulated as follows :

$$NTM = CI - CO \tag{6}$$

where :

–NTM = Capital Account Balance

–CI = Capital Input

–CO = Capital Output

According to Macroeconomic theory that the factors that affect the flow of capital out of or entry into a country is the domestic interest rate and the level of international interest.

$$NTM = f(i_d, i_f) \tag{7}$$

where :

$-I_d$ = Domestic Interest Rate

$-I_f$ = International Interest Rate

Furthermore, if equation (5) combined with equation (7) as a representation of the balance of payments, it can be stated that the *BOP* can be influenced by world income (Y_w), Economic Growth (Y_n), foreign currency exchange rates (e), the domestic interest rate (i_d) and international interest rate (i_f). In the functional equation can be expressed as follows :

$$NPI = f(Y_w, Y_n, e, i_d, i_f) \quad (8)$$

From the above description to obtain information on the structure and the elements that exist in the BOP of a country as a whole. The next question is whether the factors that affect a country's balance of payments? How is the relationship between these factors with the position of the *BOP*? The answers to these questions can be found on the main explanation of the two basic theories used in this research. The explanation is as in the following paragraphs.

BOP group Keynesian analyzes related to the components of trade and capital flows. In connection with it, according to Blejer, *et. al.* (1995) there are several approaches that support the Keynesian theory BOP (see also Filho, *et. al.*, 2002 and Bhandari, 2006) : Elasticity Approach proposed by Robinson in 1937; Absorption Approach proposed by Alexander in 1952; Policy Approach proposed by Meade in 1951; and raised again by Tinbergen in 1952 and the IS - LM Approach. These approaches hereinafter referred to as BOP Keynesian theory (Keynesian Balance of Payment Theory = *KBPT*).

In general, these approaches rest on the assumption that a country's balance of payments do not automatically reach equilibrium, but need the intervention of the government to reach its equilibrium. This is supported also by the assumption that the level of wages and prices are sticky (rigid), so there should be a policy action to change it. According KBPT that to keep the balance of payments can be done via the control variable economic growth, interest rates, domestic credit and foreign exchange rates (exchange rate). In connection with the Frenkel, *et. al.* (1980) states that a country's balance of payments can be affected by Economic Growth, Domestic Credit, Foreign Exchange and Interest Rate (see also Ackcay, *et. al.*, 2001 and Agbola, *et. al.*, 2004).

From the description of the mechanism of the relationship between the variables influence KBPT BOP is based on the theory above, it can be stated briefly proposition-proposition as follows (*ee* also Nopirin, 1983; Duasa, 2000 and Perraton, 2003) :

(a) If the Economic Growth rise, then the *BOP* will be impaired balances and can further reduce the growth rate of a country's foreign exchange reserves. This happens with the assumption Domestic Credit, Foreign Exchange and Interest Rate is fixed. And vice versa.

(b) If the Domestic credit rose, the *BOP* will be impaired balances and can further reduce the growth rate of a country's foreign exchange reserves. This happens with a notion that if Economic Growth, Foreign Exchange and Interest Rate unchanged. And *vice versa*.

(c) If the Foreign Exchange has appreciated, the *BOP* will have improved its position and can further increase the growth rate of a country's foreign exchange reserves. This happened with the notion of Economic Growth, Domestic Credit and Interest Rate is fixed. And *vice versa*.

(d) If the interest rate rises, the *BOP* will have improved its position and can further increase the growth rate of a country's foreign exchange reserves. This happened with the notion of Economic Growth, Domestic Credit and Foreign Exchange Rates are fixed. And *vice versa*.

From the above statements clearly seen that the two approaches yield different predictions with regard to the effects of changes in income and the interest rate on the BOP. MABP further emphasis on the analysis of long-term, so they say that the monetary authorities can not sterilize surplus or deficit of the balance of payments position. Instead KBPT emphasis on short-term analysis. Thus implicitly assume there is full sterilization.

3. METHODS

A. Types and Sources of Data

The data used in this study is a secondary data time series in the period 1983.1-2008.2. Data obtained from various Indonesian government official publications or publications of international institutions such as the Economic Indicators published by *BPS* in Jakarta, Indonesia Financial Statistics published by Bank Indonesia in Jakarta, and International Financial Statistics (*IFS*) in various editions and International Monetary Funds : Balance of Payments (*BOP*) in the various editions of the Yearbook. *IFS* publications and *BOP* Yearbook published by the International Monetary Fund (IMF) in New York.

B. Data Analysis Techniques

The data analysis technique used in this study is a data analysis technique which models the dynamic Error Correction Model (*ECM*).

1. Formulation Process of Error Correction Model

There are several ways to derive the *ECM*. According to Thomas (1997) for the formation of the *ECM* can be done through higher order or through a cost function, both the cost function and the period of plural single period cost function squared. While according to Domowitz and Elbadawi in 1987 in Insukindro (1999) that error correction can be derived from a single quadratic cost function. This method is used in this research.

Appropriate theoretical basis and previous studies it is known that changes in Foreign Exchange Reserves (*Devt*) desired (Desired Devt) affected by Economic Growth (*PNT*), changes in Domestic Credit (KDT), changes in Foreign Exchange Rates (*NTVt*) and changes in Interest Rate (*TBT*). In a long-term relationship (long run relationship) or relationship balance (equilibrium relationship) can be expressed as follows :

$$DEV_t^* = b_0 + b_1 PN_t + b_2 KD_t + b_3 NTV_t + b_4 TB_t$$

$$b_1 > 0; b_2 < 0; b_3 > 0; b_4 > 0 \quad (1)$$

If changes Reserves (*Devt*) be in equilibrium to Economic Growth (*PNT*), changes in Domestic Credit (*KDT*), changes in Foreign Exchange Rates (*NTVt*) and change in Interest Rate (*TBT*) requirement means the balance equation (1) are met. But in the economic system in general are rare balance as desired, so that when changes Reserves (*Devt*) has a different value to the equilibrium value then there is the difference in value between the right and left side of equation (1) by :

$$DE = DEV_t^* - b_0 - b_1 PN_t - b_2 KD_t - b_3 NTV_t - b_4 TB_t \quad (2)$$

According to Thomas (1997) the value of this difference is known as the error imbalance or disequilibrium error (*DE*). Economic agents require a fee to address this imbalance. Based on the approach developed by Domowitz and Elbadawi on tahun1987 in Insukindro (1999) quadratic cost function can be formulated single period (a single period cost function) as follows:

$$C_t = a_1 (DEV_t - DEV_t^*)^2 + a_2 (DEV_t - DEV_{t-1})^2 \quad (3)$$

In equation (3) above, there are two (2) elements of costs faced by economic agents that charge imbalance and adjustment costs. Adjustment costs are costs that must be incurred to make the adjustment towards equilibrium in the long run through correction mechanism (Error Correction Term (*ECT*)). These costs are incurred to adjust the actual rate of depreciation expectations back to the desired level. While the imbalance costs are incurred due to misuse/depreciation of

long-term equilibrium (an alternative cost because the public should gain maximum benefit from Devt if it is in a state of equilibrium). According Insukindro (1999) that this was due to lack of knowledge, incomplete information, technology constraints, bureaucratic rigidity and shocks in the economy.

Due to these costs, the rational economic actors will perform a cost function minimization action against the demand of foreign exchange reserves (Devt) so that the equation will be as follows :

$$\partial C_t / \partial DEV_t = 0 = 2a_1(DEV_t - DEV_t^*) + 2a_2(DEV_t - DEV_{t-1}) \quad (4)$$

or

$$0 = a_1(DEV_t - DEV_t^*) + a_2(DEV_t - DEV_{t-1}) \quad (5)$$

or

$$0 = a_1 DEV_t - a_1 DEV_t^* + a_2 DEV_t - a_2 DEV_{t-1} \quad (6)$$

$$a_1 DEV_t + a_2 DEV_t = a_1 DEV_t^* + a_2 DEV_{t-1} \quad (7)$$

or

$$(a_1 + a_2) DEV_t = a_1 DEV_t^* + a_2 DEV_{t-1} \quad (8)$$

or

$$DEV_t = \left(\frac{a_1}{a_1 + a_2}\right) DEV_t^* + \left(\frac{a_2}{a_1 + a_2}\right) DEV_{t-1} \quad (9)$$

If $\alpha = \left(\frac{a_1}{a_1 + a_2}\right)$ and $(1-\alpha) = \left(\frac{a_2}{a_1 + a_2}\right)$, then equation (9) can be written in another form below. In this case it is assumed that value $a_1 + a_2 = 1$. It shows there is a trade-off between costs and cost adjustments imbalance. If the higher adjustment costs, then the cost will be smaller imbalance. Economic actors will choose the composition of the two costs are the total cost (*C*) is minimal. Because of $\alpha + (1 - \alpha) = 1$, so $\left(\frac{a_1}{a_1 + a_2}\right) + \left(\frac{a_2}{a_1 + a_2}\right) = \left(\frac{a_1 + a_2}{a_1 + a_2}\right) = 1$. Equation (9) can be rewritten as follows :

$$DEV_t = \alpha DEV_t^* + (1-\alpha) DEV_{t-1} \quad (10)$$

When equation (3.1) are substituted into equation 10), it will be obtained :

$$DEV_t = \alpha(b_0 + b_1 PN_t + b_2 KD_t + b_3 NTV_t + b_4 TB_t) + (1-\alpha) DEV_{t-1} \quad (11)$$

It becomes;

$$DEV_t = \alpha b_0 + \alpha b_1 PN_t + \alpha b_2 KD_t + \alpha b_3 NTV_t + \alpha b_4 TB_t + (1-\alpha) DEV_{t-1} + \varepsilon_t \quad (12)$$

For simplicity, equation 12) can be written in another form as follows :

$$DEV_t = \theta_0 + \theta_1 PN_t + \theta_2 KD_t + \theta_3 NTV_t + \theta_4 TB_t + \theta_5 DEV_{t-1} + \varepsilon_t$$

where

$$\theta_0 = b_0\alpha; \theta_1 = b_1\alpha; \theta_2 = b_2\alpha; \theta_3 = b_3\alpha; \theta_4 = b_4\alpha; \theta_5 = (1-\alpha); \quad (13)$$

itassumed : $0 < \theta_5 < 1$

The main problem in estimating equation (13) associated with variable levels that may not be stationary. If the variables are not stationary level then estimate equation (13) using *OLS* (Ordinary Least Square) or classical regression can lead to the emergence of spurious regression. According to Thomas (1997) that in order to overcome the problem of equation (13) should be reparameterized by subtracting DEV_{t-1} on each segment so that the above equation becomes :

$$DEV_t - DEV_{t-1} = \theta_0 + \theta_1 PN_t + \theta_2 KD_t + \theta_3 NTV_t + \theta_4 TB_t + \theta_5 DEV_{t-1} - DEV_{t-1} + \varepsilon_t \quad (14)$$

To get the value of Error Correction Term (*ECT*), the form of equation (14) over the re-parameterized by adding and subtracting lag effect of each variable *Devt*($\theta_i X_{it-1}$). Value helpful *ECT* as a bookmark existence error correction model, where the case of shock that upsets the balance, magic powers (the invisible hand in the classical economic theory) will correct these irregularities and bring the economy back to equilibrium. Therefore the form of equation (14) over the reparameterized by adding and subtracting lag effect of each variable $Dev_t(\theta_i X_{it-1})$ thus becomes :

$$DEV_t - DEV_{t-1} = \theta_0 + \theta_1 PN_t + \theta_2 KD_t + \theta_3 NTV_t + \theta_4 TB_t + \theta_5 DEV_{t-1} - DEV_{t-1} - \theta_1 PN_{t-1}$$

$$+\theta_1 PN_{t-1} - \theta_2 KD_{t-1} + \theta_2 KD_{t-1} - \theta_3 NTV_{t-1} + \theta_3 NTV_{t-1} - \theta_4 TB_{t-1} + \theta_4 TB_{t-1} + \varepsilon_t \quad 15)$$

or $DEV_t - DEV_{t-1} = \theta_0 + \theta_1 PN_t - \theta_1 PN_{t-1} + \theta_2 KD_t - \theta_2 KD_{t-1} + \theta_3 NTV_t - \theta_3 NTV_{t-1}$

$$+\theta_4 TB_t - \theta_4 TB_{t-1} + \theta_1 PN_{t-1} + \theta_2 KD_{t-1} + \theta_3 NTV_{t-1} + \theta_4 TB_{t-1} + \theta_5 DEV_{t-1} - DEV_{t-1} + \varepsilon_t \quad (16)$$

or $DEV_t - DEV_{t-1} = \theta_0 + \theta_1 (PN_t - PN_{t-1}) + \theta_2 (KD_t - KD_{t-1}) + \theta_3 (NTV_t - NTV_{t-1})$

$$+\theta_4 (TB_t - TB_{t-1}) + \theta_6 PN_{t-1} + \theta_7 KD_{t-1} + \theta_8 NTV_{t-1} + \theta_9 TB_{t-1} + (1-\theta_5) DEV_{t-1} + \varepsilon_t \quad (17)$$

If the difference is a variable period *t* with period *t* – 1 is given the symbol Δ (the first difference) and λ for (1 – θ5), then equation 17) re-parameterized as:

$$\Delta DEV_t = \theta_0 + \theta_1 \Delta PN_t + \theta_2 \Delta KD_t + \theta_3 \Delta NTV_t + \theta_4 \Delta TB_t - \lambda (DEV_{t-1} - \theta_6 / \lambda PN_{t-1}$$

$$- \theta_7 / \lambda KD_{t-1} - \theta_8 / \lambda NTV_{t-1} - \theta_9 / \lambda TB_{t-1}) + \varepsilon_t \quad (18)$$

Then equation (18) direparameterisasi be :

$$\Delta DEV_t = \theta_0 + \theta_1 \Delta PN_t + \theta_2 \Delta KD_t + \theta_3 \Delta NTV_t + \theta_4 \Delta TB_t - \lambda(DEV_{t-1} - \beta_1 PN_{t-1} - \beta_2 KD_{t-1} - \beta_3 NTV_{t-1} - \beta_4 TB_{t-1}) + \varepsilon_t \quad (19)$$

Where Dimana $\beta_1 = \theta_6/\lambda$; $\beta_2 = \theta_7/\lambda$; $\beta_3 = \theta_8/\lambda$; $\beta_4 = \theta_9/\lambda$; $\beta_5 = \theta_{10}/\lambda$ is a new parameter first. Direparameterisasi further can be :

$$\Delta DEV_t = \theta_1 \Delta PN_t + \theta_2 \Delta KD_t + \theta_3 \Delta NTV_t + \theta_4 \Delta TB_t - \lambda(DEV_{t-1} - \beta_0 - \beta_1 PN_{t-1} - \beta_2 KD_{t-1} - \beta_3 NTV_{t-1} - \beta_4 TB_{t-1}) + \varepsilon_t \quad (20)$$

Where $\beta_0 = \theta 0/\lambda$; Δ = first difference as the two new parameters. The parts that are in brackets in equation (20) can be referred to as "the disequilibrium error" of periodet -1. Thus equation (20) can be interpreted that the change request Reserves ($\Delta DEVt$) depending on changes in the independent variables (ΔPNT; ΔKDT; ΔTVt Δ and ΔTBT) and the adjustment to "the disequilibrium error" of periodet-1. Therefore, equation (20) can be referred to as "first-order error correction model".

From equation (20) can be obtained relationship between the change request information Reserves (*Devt*) with Economic Growth, Domestic Credit changes, changes in Foreign Exchange and Interest Rate change in the short term and long term. The distinctive feature of this model is the addition of a variable Error Correction Term (*ECT*) in the equation, where the coefficient is statistically significant *ECT* should thus be a valid model specification.

Thus the short-term relationship can be seen from the coefficients of the first difference of independent variables (θ_1, θ_2, θ_3, θ_4 and θ_5). While estimates of the long-term *ECM* can be found through the following process :

In the long run – *Devt Devt* = 1; *PNT* = *PNT* – 1; *KDT* = *KDT* – 1; *NTVt* = *NTVt* – 1; *TBT* = *TBT* – 1. Hence, then Δ = ΔPNT *Devt KDT* = Δ Δ = Δ = *NTVt TBT* = 0. Thus, the long-term equation model of this study can be written as follows :

$$0 = \theta_0 + 0 + 0 + 0 + 0 + 0 - \lambda(DEV_{t-1} - \beta_1 PN_{t-1} - \beta_2 KD_{t-1} - \beta_3 NTV_{t-1} - TB_{t-1}) + \varepsilon_t \quad (21)$$

Atau

$$\lambda DEV_{t-1} = \beta_0 + \beta_1 PN_{t-1} - \beta_2 KD_{t-1} - \beta_3 NTV_{t-1} - \beta_4 TB_{t-1} + \varepsilon_t \quad (22)$$

Atau

$$DEV_{t-1} = \left(\frac{\beta_0}{\lambda}\right) + \left(\frac{\beta_1}{\lambda}\right) PN_{t-1} + \left(\frac{\beta_2}{\lambda}\right) KD_{t-1} + \left(\frac{\beta_3}{\lambda}\right) NTV_{t-1} + \left(\frac{\beta_4}{\lambda}\right) TB_{t-1} + \left(\frac{1}{\lambda}\right) \varepsilon_t \quad (23)$$

If $\psi_0 = \left(\frac{\beta_0}{\lambda}\right)$; $\psi_1 = \left(\frac{\beta_1}{\lambda}\right)$; $\psi_2 = \left(\frac{\beta_2}{\lambda}\right)$; $\psi_3 = \left(\frac{\beta_3}{\lambda}\right)$; $\psi_4 = \left(\frac{\beta_4}{\lambda}\right)$ and $\psi_5 = \left(\frac{1}{\lambda}\right)$, the long-term equation can be formulated in this study as follows :

$$DEV_{t-1} = \psi_0 + \psi_1 PN_{t-1} + \psi_2 KD_{t-1} + \psi_3 NTV_{t-1} + \psi_4 TB_{t-1} + \psi_5 \varepsilon_t \quad (24)$$

Then based on the characteristics of the study sample contained time period of the monetary crisis in 1997 which later turned into the next period of economic crisis, then equation 24), hereinafter referred to in this study the first model to be developed into a new model which is hereinafter referred to as Model II. Model II is a research model plus a dummy variable in the estimation equation. Dummy variable in this study is used to distinguish the period before and after the economic crisis. Model II is written as follows :

$$DEV_{t-1} = \psi_0 + \psi_1 PN_{t-1} + \psi_2 KD_{t-1} + \psi_3 NTV_{t-1} + \psi_4 TB_{t-1} + \psi_5 \varepsilon_t + \psi_6 \text{ dummy}$$

$$\psi_1 \neq 0; \psi_2 < 0; \psi_3 > 0; \psi_4 \neq 0; \psi_5 \approx 0; \psi_6 < 0 \quad (25)$$

2. *Test of Normality and Classical Linear Regression Model*

(a) Normality test

Normality detection aims to determine whether the regression model, confounding variables have a normal distribution. Detection of normality in this study was done by using Jargue-Bera test (*JB*-test).

(b) Assumptions Classical Linear Regression Model

According to Thomas (1997) and Firman (2005) that this method is considered to have properties that can be seeded because technically it is very easy in the calculation and interpretation withdrawal. In addition, due to the nature of the OLS estimator is the Best Linear Unbiased Estimator (BLUE), where the value of the estimator is not biased, having minimum variance. OLS should be supported by a set of assumptions that must be met in order to achieve optimum results. According to Gujarati (2006) that Classical Linear Regression Model Assumptions need to be tested are; Multicolinearity Test, Autocorrelation Test, Heteroschedasticity Test, Criteria Models Test, Unit Root Test, Cointegration Test, Structural Stability Test and Hypotheses Test.

4 RESULTS

A. Classical Linear Regression Model Assumptions

The model in this research has fullfilled about the assumption of normality based on Jarque-Bera test. For all levels of the variables (1) and level two (2) have a

stationary either at alpha 1 percent, 5 percent and 10 percent. It is proved that the ADF count value is greater than the value of the ADF table. The model estimates are qualified cointegration at the 1 and 5 percent confidence level. Thus the estimated model can be interpreted further. After repairing by Orcut Cohran Method, then there is no problem of autocorrelation in the model. There are no symptoms of multicolinearity between independent variables in this study and there is no problem of heteroscedasticity.From the test results of the estimation model stability can be concluded that the structural stability owned estimation model is not significant, because the probability value of the *F*-statistic and the log likelihood ratio in both the Chow Breakpoint Test, and Chow Forecast Test is under 0.05.

B. Long-Term Results of Estimation

Based on the output in Appendix Table 4 Long-term equation can be written as follows Model I :

$$\ln DEV = 4.853 + 0.381 \ln PN - 1.061 \ln KD + 0.128 \ln NTV - 0.100 TB$$
$$(6.195)\ \ (6.204)\ \ (-16.543)\ \ (2.510)\ \ (-5.587)$$

$F_{\text{hit}} = 314.312$ dengan probability value $= 0.000000$

Adjusted $R^2 = 92,61\%; AIC = 0.841; SIC = 0.970; DW$ stat $= 0.430$

$F_{\text{tabel}\,(96;5;0.05)} = 2.29;\ t_{\text{tabel}(101;0.05)} = 1.65; DW_{\text{tabel}}\ \ dgn\ dl = 1.57\ dan\ \ du = 1.78$

Based on the output of Table 5 in Appendix long- term equation can be written as follows Model II :

$$\ln DEV = 3.308 + 0.522 \ln PN - 1.131 \ln KD + 0.137 \ln NTV$$
$$(3.571)\ \ (6.798)\ \ (-17.039)\ \ (2.776)$$
$$-0.103 TB - 0.454 \text{ Dummy}$$
$$(-5.955)\ \ (-2.880)$$

$F_{\text{hit}} = 272.213$ dengan probability value $= 0.000000$

Adjusted $R^2 = 93,13\%; AIC = 0.777; SIC = 0.932; DW$ stat $= 0.5178$

$F_{\text{tabel}(96;5;0.05)} = 2.29; t_{\text{tabel}(101;0.05)} = 1.65; DW_{\text{tabel}}\ \ dgn\ \ dl = 1.57\ dan\ \ du = 1.78$

Of both the long-term equation above shows that Model II is relatively better than Model I is shown by the larger value of the coefficient of determination of 92.61 percent in Model I to 93.13 percent in Model II. Similarly, judging from the value of the Durbin-Watson stat that tends to increase from 0.4304 to 0.5178 in Model I to Model II. SIC also tended to decrease in value from 0.970 to 0.932 in Model I to Model II. AIC also tended to decrease in value from 0.841 to 0.777 in Model I to Model II.

Of tests of significance is partially visible that Dummy variables are included in Model II has a *t* value (–2880) < *t* table (–1650). Thus Dummy variables had a significant association with changes in Foreign Exchange Reserves. The entry of the Dummy variables in the model also retains significant value simultaneously indicated by the calculated *F* value (272 213) > *F* table (2:29). Thus further analysis in this study will use the Model II.

C. Analysis of Results of Estimation Error Correction Model (ECM)

One important thing to note in the analysis Error Correction Model (ECM) is that the value of the coefficient of *ECT* must have a value sufficient significance. This requirement arises because these variables reflect the degree of adjustment to disequilibrium conditions. If the *ECT* is not significant, it indicates the imbalance assumption is violated.

From the analysis of the software Eviews known that the *ECT* Model I is equal to –0145 and indicated by significant *t* value = –3115 smaller than *t* table = –1645 or 0.0024 probability of < 0.05. The *ECT* Model II is significant at –0145 and indicated by the value *t* = –3097 smaller than *t* table = –1645 or 0.0026 probability of < 0.05. Therefore, the *ECM* method requirements have been met thus this model can be used to estimate the next.

ECT value mentioned above can be understood that the process of adjustment to imbalances Reserves Change in Indonesia in the period 1983-2008 is relatively fast. This is indicated by the small value of *ECT*. *ECT* value of –0.145 means that when there is an imbalance in the past by 1 percent, then the Reserves will adjust to the decreased by 0,145 percent. Or if there is an imbalance in the past 100 percent, then the Reserves will adjust to the decline of 14.5 percent. Thus it can be interpreted that the adjustment process in the case of Indonesia's forex reserves requires approximately 6-7 (100 percent : 14.5 percent) quarters or 1.5 years to achieve balance in full (100 percent) change in foreign exchange reserves.

In the process towards equilibrium, the dynamics of the *BOP* (Changes in Foreign Exchange Reserves) depending on changes in the independent variables in the model. However, based on empirical evidence for the period 1983-2008 that the short-term changes in foreign exchange reserves are less responsive to changes in the influence of variables in the model. Only changes Domestic Loans that have a significant influence on the dynamics of changes in Foreign Exchange Reserves. But the effect is not due to the elasticity coefficient of only –0.982 (less than –1 = not elastic negatively).

While changes in foreign exchange reserves are not responsive to changes in Exchange Rates in the short term. Variable Exchange Rates also do not have the significant impact on the dynamics of changes in short-term reserves. Statistically significant relationship between the two is not.

Economic growth affects the change in foreign exchange reserves amounted to 0.147 percent. ECT affects changes Reserves by 0,145 percent. Interest rate changes affect the change in foreign exchange reserves amounted to 0.006 percent. After the 1997 Economic Crisis Reserves decreased by -0.001 through constants. It can be concluded that the variables that dominate the dynamics of changes in foreign exchange reserves is Domestic Credit changes, changes in Exchange Rates, Economic Growth and ECT.

Based on the output of Table 2 in the Appendix, it can be formulated without the short- term equation Dummy variable as follows :

$$DLnDEV = 0,145DLnPN - 0,983DLnKD + 0,170DLnNTV$$
$$(0,753) \qquad (-12,285) \qquad (1,248)$$
$$-0,006TB - 0,145ECT$$
$$(-0,652) \quad (-3,115)$$

$F_{hit} = 44,62$ dengan probability value $= 0,000000$

Adjusted $R^2 = 63,56\%; AIC = -0,823; SIC = -0,693; DW$ stat $= 1,774$

$F_{\text{tabel}(105;5;0.05)} = 2,37;\ t_{\text{tabel}(105;0.05)} = 1,65; DW_{\text{tabel}}\ \ dgn\ \ dl = 1,59\ dan\ du = 1,76$

Based on the output in Table 3 in Appendix formulated short-term equation with dummy variables as follows :

$$DLnDEV = 0,147DLnPN - 0,982DLnKD + 0,171DLnNTV$$
$$(0,747) \qquad (-12,192) \qquad (1,240)$$
$$-0,006TB - 0,001\text{Dummy} - 0,145ECT$$
$$(-0,650) \qquad (-0,058) \qquad (-3,098)$$

$F_{hit} = 35,32$ dengan probability value $= 0,000000$

Adjusted $R^2 = 65,02\%; AIC = -0,803; SIC = -0,648; DW\,stat = 1,774$

$F_{\text{tabel}(105;5;0.05)} = 2,37;\ t_{\text{tabel}(105;0.05)} = 1,65; DW_{\text{tabel}}\ \ dgn\ \ dl = 1,59\ dan\ du = 1,76$

Based on the short- term equation above shows that Model I is relatively better than Model II as indicated by the value of the coefficient of determination of the Model I Model II 63.56 percent while 63.18 percent Deteminasinya coefficient values. Similarly, judging from the value of the Durbin-Watson statistic is 1.774 in Model I, whereas Model II also around 1.77. Then judging from the SIC also tended to decrease in value from 0.693 to 0.648 in Model I to Model II. AIC also tended to decrease in value from 0.823 to 0.803 in Model I to Model II.

Then based on partial test of significance is known that the dummy variables are included in Model II has a negative effect on the change in foreign exchange

reserves amounting to –0.001. However, this coefficient is not significant indicated by the *t* value (–0.058) > *t* table (–1.650). The entry of the Dummy variables in the model also retains significant value simultaneously indicated by the calculated *F* value (35.32) > *F* table (2.37).

To test the significance of the partial show the following results. Economic growth in the short term have a positive relationship with the change in foreign exchange reserves. But the relationship is not significant. This is evidenced t value (0.747) < *t* table (1,650). Thus the null hypothesis is not rejected. This means that in the short term there is no effect of changes in economic growth to changes in foreign exchange reserves.

Domestic Credit then to change in the short term have a significant negative correlation with changes in Foreign Exchange Reserves. This is evidenced by the *t* value (–12.192) < *t* table (–1.650). Thus the null hypothesis is rejected. This means that there is a negative relationship between changes in domestic credit by changes Reserves.

Further changes in Exchange Rates in the short term have a positive relationship with the change in foreign exchange reserves. But the relationship is not significant. This is evidenced by the *t* value (1.240) < *t* table (1.65). Thus the null hypothesis is not rejected. This means that in the short term there is no significant relationship between changes with changes in Exchange Rates Foreign Exchange Reserves.

Interest rate changes have a negative relationship with changes in Foreign Exchange Reserves. But the relationship is not significant. This is evidenced by the *t* value (–0.650) > *t* table (–1.65). Thus the null hypothesis is not rejected. This means that in the short term there is no relationship between changes significantly the foreign interest rate with changes Reserves.

D. Implications of Research Results

1. Economic Growth

From the estimation above shows that in the short term relationship between Economic Growth with Foreign Exchange Reserves change is positive but not significant with the coefficient of 0.147. While the long-term positive and significant relationship with a regression coefficient of 0.522. This means the Growth Economics significant effect only in the long term. Positive relationship corresponding conclusions *MAB*P theory. Regression coefficient 0.522 is < 1 indicates that although significant, however Reserves are less responsive to changes in economic growth. In the long term any increase that occurs in 1 percent Economic Growth will only lead to an increase in the change in foreign exchange reserves amounted to 0.522 percent.

Therefore, the sign of the coefficient is positive in both the short term and in the long term, the effect on the growth Ekonnomi Reserves Monetarist follow the logic of the theory. This means that in the short-term and long-term changes in income will affect the equilibrium in the domestic money market through changes in the demand for domestic money. An increase in people's income will increase the demand for money. If the increase in demand for public money is not matched by domestic credit expansion by the Indonesian government, then it actually could push up domestic interest rate. Furthermore, this will increase the flow of capital in order to bring the balance of payments surplus in Indonesia.

Positive and significant relationship between economic growth over the long term showed that within the period 1983-2008 the proportion of Indonesia's economic growth contributed more to the success of managing the export activity tends to be greater than the activity of imports of both goods and services. This Keberhasilann especially after Indonesia continues to promote non-oil exports are strongly supported by industry sector.

The above findings are also in line with the findings of Richard Zecher (1974) in Australia, the findings Sykes Wilfrod Wilfrod and Walton (1978) in Honduras, Bijan Aghevli findings (1974) in Indonesia, Boediono findings (1979) in Indonesia, Djiwandono (1980) in Indonesia, Nopirin I (1983) and II (1998) in Indonesia, Hakim (2000) in Indonesia, Djauhari (2003) in Indonesia. These studies have concluded that there is a significant positive relationship between the change in the Economic Growth Reserves.

2. Exchange Rates

From the estimation results in Table 5.5 and Table 5.6 it appears that in the short term relation between Exchange Rates Change with Indonesian Foreign Exchange Reserves Change is positive but not significant with elasticity of 0.171. In the longer term is also positive and significant relationship with elasticity of 0.137. Thus the relationship between the Exchange Rates Foreign Exchange Reserves is significant only in the long term. Regression coefficient 0.137 is < 1 indicates that although significant, however Reserves are less responsive to changes in Exchange Rates. In the long term any increase that occurs in 1 percent Economic Growth will only lead to an increase in the change in foreign exchange reserves amounted to 0.137 percent.

This positive relationship is consistent with the approach MABP. According to the approach that if the domestic currency depreciates or foreign currency appreciates, then domestic prices will increase which in turn will increase the demand for nominal money. If the increase in money demand can not be met by

the resources of the country, then the Interest Rate changes will increase and encourage the flow of funds from abroad increased in the short term lead to a surplus on changes Reserves. The surplus will continue until the excess demand of domestic money is lost. This effect is only transitory. In the long run depreciation according to the monetary approach has no effect. In case Inodnesia proven that in the long -term effect of Exchange Rate Changes on Changes in Foreign Exchange Reserves are significant.

When using logic theory KBPT approach, then decrease Changes in Exchange Rates of the rupiah against the dollar have an influence on the low prices of export goods or increased price competitiveness in the short term is expected by the price mechanism that increased export volumes, import volumes are declining. The difference between exports and imports that are then increase the acquisition of foreign currency which means there is an increase in foreign reserve changes.

The above findings are consistent with the findings Nopirin I (1983) and II (1998) in Indonesia, the archipelago (2000) in Indonesia, Hakim (2000) in Indonesia, Djauhari (2003) in Indonesia. These studies have concluded that there is a significant positive relationship between changes with changes in Exchange Rates Foreign Exchange Reserves.

3. Domestic Credit

From the estimates in the short term relationship between changes in the Domestic Credit to change its foreign exchange reserves is negative and significant with a negative elasticity of 0.982. That is assuming the influence of other factors constant, then any increase in short-term changes in domestic credit by 1 percent would cause a decrease in the change in foreign exchange reserves amounted to 0.982 percent. Then in the long run also negative and significant relationship with negative elasticity of 1.131. That is assuming the influence of other factors constant, then in the long term any increase in domestic credit changes by 1 percent would cause a decrease in the change in foreign exchange reserves amounted to 1.131 percent.

Coefficient associated with the variable called offset credits coefficient, according to the Archipelago (2000) there are two versions of opinions. The first version states that the offset coefficient has a value of minus one (–1) as told Connolly and Taylor (1976), Genberg (1976), Guitian (1976) and Zechner (1976). And the second version states that the offset coefficient has a negative value but not equal to minus one. The second version is presented by Kouri and Porter (1974).

From the foregoing it appears that the short -term credit coefficient is -0.982. This value indicates that the short-term foreign exchange reserves are less responsive to changes in domestic credit. But in the long run Reserves responsive

to changes in domestic credit is equal to –1.131. Coefficient offset short-term above tends to support the thesis Kouri and Pourter stating that the offset is not equiproportionate to changes in foreign exchange reserves. This value is quite different from the results of the study Supreme Archipelago (2000) that ranged from (–0.28) to (–0.37).

This has implications that Bank Indonesia does not have the ability to perform sterilization perfectly. The main reason was lack of monetary policy instruments that can be used to influence the money market. In the study period, the instruments used by Bank Indonesia and SBPU that SBI is only a relatively small amount compared to the total assets held by commercial banks demand deposits creator. The second important cause is the relatively high cost to be borne by Bank Indonesia to operate SBI and SBPU. Indonesian banks have to pay interest. In the absence of the ability to menstrelisasi change Bank Indonesia 's forex reserves (foreign assets), it is possible that an increase in the money supply through commercial banks demand deposits creator.

The above findings are consistent with the findings of Richard Zecher (1974) in Australia, the findings Sykes Wilfrod Wilfrod and Walton (1978) in Honduras, Aghevli and Khan (1977) in 39 Developing Countries, Djiwandono findings (1980) in Indonesia, Nopirin I (1983) and II (1998) in Indonesia, the archipelago (2000) in Indonesia, Hakim (2000) in Indonesia, Djauhari (2003) in Indonesia. However, the above findings contrast with the findings of De Granwe (1976) in 7 European countries, Porter (1972) in Germany and Neuman (1978) in Germany. These studies have concluded that there is a negative and significant relationship between changes in the Domestic Credit Changes in Foreign Exchange Reserves.

4. Interest Rate

From the estimation results in the short term relationship between Interest Rate Change with Changes in Foreign Exchange Reserves is negative but not statistically significant, the short-term elasticity of -0.006. In the long term relationship is also negative and statistically significant, with the long -term elasticity of –0.103. In the short-term interest rate changes do not affect changes in Foreign Exchange Reserves. While in the long term interest rate changes can affect changes Reserves in the opposite direction. If the interest rate changes increased 1 percent, then the changes will Reserves fell by 0.103 percent.

The findings in the short-term results of the study support the conclusions of Richard Zecher (1974) in Australia, the findings Sykes Wilfrod Wilfrod and Walton (1978) in Honduras, the findings of De Granwe (1976) in 7 European countries, the findings of Porter (1972) in Germany and the findings of Neuman (1978) in Germany. Their conclusions stated that the relationship between interest rate

changes with changes Reserves is negative but insignificant. But for the long term in the above findings support the findings Djiwandono (1980) in Indonesia and Nusantara (2000) in Indonesia.

Negative relationship between the variable interest rate of LIBOR with changes Reserves, can be read together with the positive relationship between the domestic interest rate to changes in foreign exchange reserves. The findings are thus consistent with KBPT. According KBPT that affect Rate Reserves change through the mechanism of revenue. If for some reason a country's interest rate increase, and it will encourage investment in the country's decline. The impact of the decline in investment is also able to lower the aggregate income. Further reduction in aggregate revenue may decrease the value of imports of goods demand that the trade balance into a surplus position. And *vice versa*. Therefore, according to *KBPT*, assuming ceteris paribus, the relationship between the *BOP* Rate is positive.

5. CONCLUSION

Results of the analysis some conclusions can be formulated as follows :

1. In the long run Economic Growth has a significant positive relationship with the Reserves. Thus the findings of this study are consistent with the MABP which states that the relationship between Economic Growth with Foreign Exchange Reserves is positive.
2. In the long term Domestic Credit has proved a significant negative relationship with the Reserves. Thus the findings of this study are consistent with *KBPT* and *MABP* which states that the relationship between the Domestic Credit Reserves is negative.
3. In the long term Exchange Rates has a significant positive relationship with the Reserves. Thus the findings of this study are consistent with *KBPT* and *MABP* which states that the relationship between the Foreign Exchange Reserves is positive.
4. Interest Rate has a significant negative relationship with the Reserves. Thus the findings of this study are consistent with the *MABP* which states that the relationship between the interest rate is positive Reserves.
5. Dummy variables have a significant relationship with the Reserves. This means that the economic crisis is likely to reduce the value of the total reserves of foreign exchange reserves through a constant value.
6. In the long-term changes in Foreign Exchange Reserves only responsive to changes in domestic credit variable. This is indicated by the value of the coefficient of Domestic Credit –0.1131 (elastic). While the other free variables in the model changes Reserves less responsive (inelastic).

7. Value of *ECT* in the *ECM* model used in this study meet the statistical requirements. Thus *ECM* models in this study can be used to estimate the next.
8. From the *ECT* can be concluded that for the case of Indonesia takes approximately 6-7 quarter (or 1.5 years) to reach the equilibrium position of the *BOP* (Reserves). This illustrates the ability of the Government and the Central Bank were relatively good in anticipating and managing the changes that occur in the macro economy, especially concerning the balance of payments and foreign exchange reserves.
9. From the analysis also concluded that the process towards equilibrium, the dynamics of changes in foreign exchange reserves are still dependent on changes in variables; Domestic Credit, Exchange Rates, Economic Growth, Interest Rate and Error Correction Term (*ECT*).

Suggestion

There are several suggestions as a recommendation to the Government and the Central Bank :

1. Keep pushing the high economic growth. The recommended way is by increasing investment and exports. The investment is expected to grow foreign direct investment (FDI). To attract FDI, it is necessary that adequate infrastructure readiness in areas that were subjected to FDI. The infrastructure in question is a road, electricity, water, telephone, banking facilities and government facilities. Besides, efforts to cut red tape of licensing both at central and regional level I and level II regional level continues.
2. Then export enhanced by addition of conventional retaining market share is America, Japan, European Union, China, India and ASEAN, then, now and in the future Indonesia needs to expand the market to new countries in Africa to grow like, East Europe, Latin America and some countries in Asia. Priority commodities to these countries is like building materials and home furnishings and hotel.

References

Ackcay, Cevdet and Unal Zenginobuz, (2001). "Vulnerability to Purely Contagious Balance of Payment Crises in Emerging Economies: An Application to the Cases Of Russia, Turkey and Brazil". *Russian and East European Finance and Trade*, Vol. 37, No.5. September-October 2001. p.5-21.

Agbola, Frank W. (2004). "Does Devaluation Improve Trade Balance of Ghana". *Paper of policy, JEL*: C32, F31, F41. University of Newcastle, Callaghan. Australia. P.1-19.

Aghevli, Bijan B., and Khan, M.S., (1977), "Inflationary Finance and Dynamic of Inflation: Indonesia 1951-1972." *American Economic Review*, June, p. 390-403.

Aizenman, Joshua and Jaewoo Lee, (2005), "Foreign exchange reserve: Precautionary vs. Mercantilist Views, Theory and Evidence". *Working Paper*. P. 1-30.

Araujo, Ricardo Azevedo and Gilberto Tadeu Lima, (2007), "A Structural Economic Dinamycs Approach to Balance of Payments Constrained Growth". *Cambridge Journal of Economics*, May 15, 2007, p.1-20.

Ardalan, Kavous, (2003), "The Monetary Approach to Balance of Payments : A Taxonomy With A Comprehensive Reference to the Literature". *Journal of Economics and Economic Education Research*. P. 39-61.

_____, (2005), "The Monetary Approach to Balance of Payments : A Review of the Seminal Long-Run Empirical Research". *Journal of Economics and Economic Education Research*. P. 37-73.

Aristovnik, Aleksander, (2005), "Public Sector Stability and Balance of Payments Crises in Selected Transition Economies". *Faculty of Administration Journal*, University of Ljubljana. P. 1-15.

Arslan Razmi, (2005), "Balance of Payments Constrained Growth Model: The Case of India," *Working Papers* 2005-05, University of Massachusetts Amherst, Department of Economics.

Bhandari, Narendra C., (2006), "The Balance of Payment Equilibrium Model, A Matter of National Determination and Leadership". *Faculty Working Papers*. Year 2006. Lubin School of Business. Pace University. New York. P. 1-22.

Cheung, Yin-Wong, Menzie D. Chin and Eiji Fujii, (2009), "China's Current Account and Exchange Rate". *NBER Working Papers Series*. January 2009. p. 1-54

Cho, Seonghoon, November (2003), "A New Monetary Policy Transmission Mechanism in a Small Open Economy: External Wealth Effect" *Preliminary Draft*.

Christopoulus, Dimitris K., (2003), "A Reassessment of Balance of Payments Constrained Growth: Results from Panel Unit Root and Panel Cointegration Tests". *International Economic Journal*. Volume 17, Number 3, Autumn 2003. Panteion University. P 39-54.

Dornbusch, R., *et. al.* (2001), *Macroeconomics*. 8th Edition. The McGraw-Hill/Irwin. USA.

Duasa, Jarita, (2000), "The Malaysian Balance of Payments: Keynesian Approach versus Monetary Approach". *Working Paper*. JEL Classification: C2; E0; E6. p.1-13.

Filho, Nelson H. Barbosa, (2002), "The Balance of Payments Constraint : From Balanced Trade to Sustainable Debt". *CEPA Working Paper* 2001. Center for Economic Policy Analysis. New School University. New York. P.1-24.

Frenkel, JA, Th Gylfason and Helliwell, JF. (1980), "A Synthesis of Monetary and Keynes Approaches to Short – run Balance of Payment Theory". *The Economic Journal, September.*

Frenkel, JA and A Razin. (1993), "The Mundell-FlemingModel: A Quarter Century Later". *IMF Staff Papers*. 40 (2): 567-620.

Gujarati, Damodar N. (2003), *Basic Econometrics*. McGraw-Hill Book. Singapore.

Hachicha, Nejib. (2003), "Exports, Export Composition and Growth : A Simultaneous Error-Correction Model for Tunisia". *International Economic Journal*. Vol. 17, Number 1. 101-120.

Hansen, Jorgen Drud and Virmantas Kvedaras, (2004), "Balance of Payments Constrained Economic Growth in Baltics". *Ekonomika*. 2004. ISSN 1392-1258. p.1-10.

Jonathan Perraton, (2003), "Balance of Payments Constrained Growth and Developing Countries: an examination of Thirlwall's hypothesis," *International Review of Applied Economics, Taylor and Francis Journals*, vol. 17(1), pages 001-022.

Lopez, Penelope Pacheco and A.P.Thirlwall, (2005), "Trade Liberalisation, the Balance of Payments and Growth in Latin America". *Paper, JEL Classification:* C21, C22, F13, F32, F34. University of Kent. P. 1-31.

Magee, Stephen P. (1976), "The Empirical Evidence on Monetary Approach to the Balance of Payments and Exchange Rate", *American Economic Association*, May 1976, p.163-168.

Mankiw, N. Gregory. (2010), *Macroeconomics*. Worth Publisher. New York.

Mendoza, Enrique G, (1995), "The Terms of Trade, the Real Exchange Rate, and Economic Fluctuations," *International Economic Revie*w, Department of Economics, University of Pennsylvania and Osaka University Institute of Social and Economic Research Association, vol. 36(1), pages 101-37.

Mrak, Mojmir and Joze P.Damijan, (2001), "Trade Reinteration of SouthEast Europe in View of Projected Balance of Payment Developments: The Role of Neighbouring Slovenia". *First Draft.* December, 2001. University of Ljubljana. P.1-30.

Nelson H. Barbosa Filho, (2002), "The Balance-of-Payments Constraint: From Balanced Trade to Sustainable Debt," *CEPA Working Papers* 2001-06, Center for Economic Policy Analysis (CEPA), New School University.

Nwaobi, Godwin Chukwudum. (2003), "The Balance of Payments as a Monetary Phenomenon: an Econometric Case Study of Nigeria". *Papers by JEL Classification.* pages 1-34.

Polak, Jacques J., (2001), "The Two Monetary Approaches to the Balance of Payments : Keynesian and Johnsonian". *IMFWorking Paper*. WP/01/100. JEL Classification Numbers: B-22, B-31, C-51, E-21, E-51, F-40. p.1-22

Prasad, Eswar S. (2009), "Some New Perspectives on India's Approach to Capital Account Liberalization". *NBER Working Paper Series*. January 2009. p.1-52.

Razmi, Arslan, (2005), "Balance of Payments Constrained Growth Model: The Case of India". *Working Paper*. 2005. University of Massachusetts. Amherst. P.1-30.

Richards, Dawn –Elliot, (1994), "The Jamaican Balance of Payments and the Monetary Approach". *Atlantic Economic Journal*; Mar 1994; 22, 1; ABI/INFORM Research. P.101-140.

Rineon, Hernan C., (1998), "Testing the Short and Long Run Exchange Rate Effects on Trade Balance : The Case of Columbia". *Working Paper*. JEL Classification: C2; E0; E6. p.1-41.

Sau-Him Paul Lau. (2003), "Using an Error Correction Model to Test Whether Endogenous Long Run Growth Exists". *JEL Classification* Numbers: 040; E22. p.1-28.

Soedradjad Djiwandono, (1980), "A Monetary Analysis of an Open Economy: The Case of Indonesia 1968-1978". Unpublished Ph.D Dissertation, Boston University.

Sugema, Iman, (2005), "The Determinants of Trade Balance and Adjustment to the Crisis in Indonesia". *Discussion Paper*. No.0508. June, 2005. Centre for International Economic Studies. University of Adelaide. Australia. P.1-28.

Thomas, R.L. (1995), *Introductory Econometrics*. Second Edition. Longman Publishing. New York. USA.

Thirlwall, A.P, (2003), "Trade, Balance of Payments and Exchange Rate Policy in Developing Countries". *Oeconomicus*, Volume VII, 2004-2005. p.141-146.

Thirlwall, Anthony P & Hussain, Mohammed Nureldin, (1982), "The Balance of Payments Constraint, Capital Flows and Growth Rate Differences between Developing Countries," *Oxford Economic Papers,* Oxford University Press, vol. 34(3), pages 498-510.

Vera, Leonardo V., (2005), "The Balance of Payments Constrained Growth Model : A North-South Approach". *Escuela de Economia*. Universidad Central de Venezuela. P.1-26.

Whitesell, William. May (2003), "Tunnels and Reserves in Monetary Policy Implementation". *JEL Classification*, E4, E5.

_____, (2007). *"Asian Development Outlook (ADO)"*. Asian Development Bank (ADB).

APPENDIX

Table 1
Augmented Dickey Fuller Test

	Unit Root Test		
Variabel	*(C, 4)*	*(T, 4)*	*(N, 4)*
LDEV	–1.569(*)	–1.264(*)	0.539(*)
D(LDEV)	–4.390(a)	–4.508(a)	–4.341(a)
DD(LDEV)	–7.195(a)	–7.158(a)	–7.236(a)
LPN	–0.968(*)	–1.080(*)	–3.182(a)
D(LPN)	–4.261(a)	–4.329(a)	–2.724(a)
DD(LPN)	–7.995(a)	–7.964(a)	–8.044(a)
LKD	–2.707(*)	–1.481(*)	–1.116(*)
D(LKD)	–5.029(a)	–4.308(a)	–4.329(a)
D(LKD)	–7.426(a)	–7.114(a)	–7.196(a)
LNTV	–1.132(*)	–1.735(*)	1.812(*)
D(LNTV)	–4.381(a)	–4.398(a)	–4.048(a)
DD(LNTV)	–6.699(a)	–6.662(a)	–6.736(a)
TB	–2.523(*)	–2.740(*)	–0.704(*)
D(TB)	–5.025(a)	–6.640(a)	–6.604(a)
D(TB)	–7.847(a)	–9.315(a)	–9.418(a)

Note: Significant : a = 1%; b = 5%; c = 10%; * = insignificant

Table 2
Short Term Modle 1

Dependent Variable: DLDEV
Method: Least Squares
Date: 11/11/09 Time: 23:36
Sample(adjusted): 1983:2 2008:2
Included observations: 101 after adjusting endpoints

Variable	*Coefficient*	*Std. Error*	*t–Statistic*	*Prob.*
DLPN	0.145152	0.192740	0.753099	0.4532
DLKRD	–0.982633	0.079986	–12.28510	0.0000
DLNTV	0.170152	0.136360	1.247814	0.2151
DLBR	–0.006282	0.009637	–0.651844	0.5161
ECT	–0.144879	0.046511	–3.114922	0.0024

Cont. table 2

Variable	*Coefficient*	*Std. Error*	*t–Statistic*	*Prob.*
R–squared	0.650223	Mean dependent var	0.026776	
Adjusted *R*–squared	0.635649	S.D. dependent var	0.259277	
S.E. of regression	0.156503	Akaike info criterion	–0.823242	
Sum squared resid	2.351355	Schwarz criterion	–0.693780	
Log likelihood	46.57370	*F*-statistic	44.61523	
Durbin-Watson stat	1.774360	Prob (*F*-statistic)	0.000000	

Table 3
Short Term Modle 2

Dependent Variable: DLDEV
Method: Least Squares
Date: 11/11/09 Time: 23:34
Sample(adjusted): 1983:2 2008:2
Included observations: 101 after adjusting endpoints

Variable	*Coefficient*	*Std. Error*	*t-Statistic*	*Prob.*
DLPN	0.147254	0.197061	0.747252	0.4568
DLKRD	–0.982327	0.080574	–12.19156	0.0000
DLNTV	0.171042	0.137918	1.240174	0.2180
DLBR	–0.006294	0.009690	–0.649542	0.5176
DUMMY	–0.001416	0.024233	–0.058424	0.9535
ECT	–0.144848	0.046758	–3.097849	0.0026
R-squared	0.650236	Mean dependent var	0.026776	
Adjusted *R*-squared	0.631827	S.D. dependent var	0.259277	
S.E. of regression	0.157322	Akaike info criterion	–0.803476	
Sum squared resid	2.351271	Schwarz criterion	–0.648122	
Log likelihood	46.57552	F–statistic	35.32234	
Durbin-Watson stat	1.774484	Prob (*F*-statistic)	0.000000	

Table 4
Long Term Modle I

Dependent Variable: LnDEV1
Method: Least Squares
Date: 11/10/09 Time: 09:28
Sample (adjusted): 1983:2 2008:2
Included observations: 101 after adjusting endpoints

Variable	*Coefficient*	*Std. Error*	*t-Statistik*	*Prob.*
C	4.852929	0.783405	6.194663	0.0000
LnPN1	0.381371	0.061476	6.203565	0.0000
LnKRD1	–1.061950	0.064193	–16.54320	0.0000
LnNTV1	0.128271	0.051094	2.510498	0.0137
TB1	–0.100397	0.017969	–5.587361	0.0000

Cont. table 4

Variable	*Coefficient*	*Std. Error*	*t–Statistic*	*Prob.*
R–squared	0.929060	Mean dependent var	10.62678	
Adjusted *R*–squared	0.926104	S.D. dependent var	1.323118	
S.E. of regression	0.359675	Akaike info criterion	0.841005	
Sum squared resid	12.41914	Schwarz criterion	0.970466	
Log likelihood	–37.47075	F–statistik	314.3117	
Durbin-Watson stat	0.430485	Prob (F-statistik)	0.000000	

Table 5
Long Term Modle II

Dependent Variable: LnDEV1
Method: Least Squares
Date: 11/10/09 Time: 08:33
Sample(adjusted): 1983:2 2008:2
Included observations: 101 after adjusting endpoints

Variable	*Coefficient*	*Std. Error*	*t–Statistik*	*Prob.*
C	3.308137	0.926343	3.571181	0.0006
LnPN1	0.522022	0.076796	6.797519	0.0000
LnKRD1	–1.131148	0.066386	–17.03908	0.0000
LnNTV1	0.137008	0.049350	2.776225	0.0066
TB1	–0.103329	0.017353	–5.954718	0.0000
DUMMY	–0.453613	0.157509	–2.879926	0.0049
R-squared	0.934756	Mean dependent var	10.62678	
Adjusted *R*-squared	0.931322	S.D. dependent var	1.323118	
S.E. of regression	0.346743	Akaike info criterion	0.777105	
Sum squared resid	11.42194	Schwarz criterion	0.932458	
Log likelihood	–33.24379	F–statistik	272.2130	
Durbin-Watson stat	0.517852	Prob(F–statistik)	0.000000	

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