

# An Empirical Analysis of Determinants of Balance of Payments in Pakistan

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## Abstract

This study examines the main determinants of balance of payments for Pakistan and annual Time series data for the period 1981-2016 is analyzed. The study employs bounds testing approach to cointegration in auto regressive distributed lags framework. The factors as Money supply, domestic credit, exchange rate, and gross domestic product are incorporated in the model to check the claim of monetary and Keynesian approaches to balance of payments in Pakistan. Whereas foreign direct investment is included on the basis of a few empirical studies that have found significant association between balance of payments and foreign direct investment. The investigation reveals a long-run association in the model. Negative as well as highly significant value of coefficient with error correction term shows that convergence to equilibrium will take place within one year time period. However, Money supply and Gross domestic products are proved to be significant factors causing fluctuations in balance of payments in the long-run. Whereas remaining variables including real effective exchange rate are ineffective in determining the balance of payments in Pakistan. The study concludes that monetary approach seems to be dominant in Pakistan and effective monetary policy is required to correct disequilibrium in balance of payments.

**Keywords:** Balance of Payment, GDP, Bound test, Pakistan.

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## Introduction

Balance of payments is an account in which monetary value of goods and services, capital movements including foreign direct investment, and all other transaction that flow into or out of country, in one year, are recorded. In accordance with IMF standards, balance of payments is broken down into two main accounts namely current account and capital account. Current account shows all the transaction between residents and rest of the world that has economic value and includes all those offsets to current account that require no economic value in exchange. Capital account includes the net assets and changes in reserve account. All transactions in balance of payments are recorded under double entry accounting record system so it should always be in balance. Imbalances can only occur in components of balance of payments such as Current account and Capital account. If payments to foreigners exceed receipts of the country, it is called deficit and, if receipts are more than payments than this situation is called surplus in BOP.

BOP is the measure of relative performance of a country in the world market as it indicates how much a country has spent on imports and what has been the performance of its exports. A persistent deficit in BOP shows that country will have large debt and its currency will lose its value in the long-run. Policy makers always make policies to correct disequilibrium in BOP as persistent deficit or surplus is harmful for an economy in many aspects.

All the factors that influence foreign trade disproportionately may affect balance of payments. There are many determinants that are theoretically important to analyze the balance of payments. The Factors such as inflation rate, foreign income, domestic credit, government budget, global trade trends, trade liberalization policies, and other advertising strategies i.e. packaging, labelling etc. play a significant role in determining the external accounts of the country. According to economic survey (2009-10), FDI shows positive influence on balance of payments account through balance of trade as it is an important factor for promoting exports and substituting imports in a country. It brings new technology and capital into the home country as well. Money supply is another important determinant of balance of payments. If people demand more money than available with the central bank, it will bring money from abroad that will bring about improvement in balance of payments and vice versa. The staff notes prepared by IMF committee on Balance of payments (2000) report the disequilibrium in balance of payments is due to the problem of balance of trade. In this context, Domestic output and domestic spending are important factors in determining balance of payments. If domestic output is more than domestic expenditure, balance of payments is favourable, and is worse when it is less than domestic expenditure.

In developing countries, balance of payments situation is worse. Global Trade liberalization policy in developing countries selected from different continents, such as; Latin America, Africa, East Asia, South Asia, have caused worsening of balance of payments because it makes imports rise more than exports. These countries have to compete with the industrialized countries in world market. In Kenya, a study by Kennedy (2013) confirmed that balance of payments is affected by foreign direct investment and exchange rate. A study done by Duasa (2007) on Malaysian economy, which is a

successful developing country, shows that trade balance doesn't have a long run relationship with exchange rate but has strong relationship with money supply. In Asian crises, Indonesia suffered a large depreciation and banking collapse, and Sugema (2005) showed that devaluation was an important determinant of balance of payments in Indonesia.

Unfortunately, Pakistan has been facing deficit in balance of payments since it came in to existence except in a few years. For improving the current account in balance of payments, various short run as well as long run policies are adopted by policy makers, and one of these is the exchange rate policy. According to Rafique (1999), before 1982, Pakistan was adopting fixed exchange rate system but from 1982, it adopted managed floating exchange rate system. In 1998, when Pakistan was facing financial crises, multiple exchange rate system was adopted which composed of, floating interbank rate (FBIR), an official rate which was pegged to US dollars, and a composite rate combining both of the former rates. In 1999, three exchange rates were integrated and pegged to US dollars. Since July 2000 onward, Pakistan has been adopting floating exchange rate system.

Pakistan is also making effective policies in order to attract FDI in to the country. It has a population of more than 180 million, and it is a large market from consumption point of view. Besides having large population, it has reduced cost of labor for production. But, in spite of presence of all these favorable circumstances, Pakistan has not succeeded in bringing the desired level of foreign investment into the country. The reasons include political instability, energy crises, unskilled laborers, and possibly rigid policies of tax and duties.

### *Objectives of the Study*

The study has the following objectives:

- To investigate and examine the factors those influence the balance of payments in Pakistan in short run as well as long run.
- To suggest the policies to improve the disequilibrium in balance of payments accounts.

### *Hypothesis of the Study*

The hypotheses stated by this study are related to defining the long-run relationship of the BOP with the macroeconomic explanatory variables incorporated in the model on the basis of previous studies and theories of international trade. So, the hypotheses of the study can be summarized as follows

There exists no long-run association between the BOP and macroeconomic variables; GDP, REXR, DCRE, MS, FDI

## Literature Review

### *Empirical Literature*

There have been many studies for finding the relationship of BOP with macroeconomic variables and different results have been obtained. A few important studies that are related to this study are mentioned hereunder.

Waliullah, Kakar et al (2010), study the long-run and the short-run relationship in Pakistan's trade balance, money supply, GDP, and real exchange rate. Their research uses the annually calculated time series data for the period 1970-2005. Bounds testing methodology in ARDL framework and the ECM approaches are used for analyzing the data. VDCs and IRFs are used for further analysis. The study finds a steady long-run relationship among balance of trade, money supply, GDP and exchange rate. It is determined that devaluation of exchange rate is positively connected to balance of trade in the short-run and long-run as well. It is concluded that money supply and income play a strong role in the determination of trade balance. The results of research show that change in exchange rate will give positive results but weaker than those will be given by money supply and income.

Akbar (2011) investigates the relationship between trade deficit and a set of explanatory economic variables. The study uses the annual data containing period 1975-2008. The cointegration approach is applied to study the long-run association and vector error correction approach to analyze short-run behavior of the variables. The focus of the research is to examine the effects of domestic GDP, foreign income, foreign direct investment, foreign exchange rate and political conditions on trade deficit. The study takes exchange rate as endogenous variables in contrast to other empirical studies that take it as exogenous variable. The results indicate that income and exchange rate depreciation affect positively trade deficit of Pakistan while foreign direct investment and foreign income show negative association with trade deficit. Moreover, the non-democratic period shows decreasing trend in trade deficit whereas democratic years show increasing trend in trade deficit.

Eita (2012) finds the macroeconomic determinants of BOP in Namibia. The time period is (1999-2009). The study analyzes the data by applying Cointegrated Vector Autoregression methods. The research shows that fiscal deficit, domestic income and interest rates are the main contributing factors of BOP in Namibia. Interest rate and GDP have positive relationship with BOP. The positive effect of GDP shows that increase in exports improves the balance of current account and the overall balance of payments of Namibia. It is suggested that exports should be boosted through investment. Positive effects of interest rate show that BOP can be corrected through capital account.

Jaffri et al (2012) investigate the impact of FDI inflow on balance of current account for Pakistan, not including income outflows and current transfers of balance of payments. Research data is taken from 1983 to 2011. Autoregressive distributed lag approach is applied. The study finds that FDI increases income outflows, and worsens current transfer

in long-run period. Coefficients of error correction term associated with short run model is significant and negative which is the confirmation of a long-run relationship FDI has with income outflows, and current transfers.

Javed & Raza (2012) investigate the determinants of current account deficit. The time series annual data for the period 1976-2010 is analyzed. Cointegration for determining the long-run relationship and ECM are used for analyzing the short-run dynamics of the model. Long run significant positive relationship is found among current account deficit, trade deficit, exchange rate, and fiscal deficit. A significant negative long run relationship is observed in current account deficit with private savings and external debt. Error correction model extracts short-run relationship between current account deficit with trade deficit and fiscal deficit. They are found to have positive significant relationship with current account deficit.

Tran (2012) determines the factors that affect trade balance in Vietnam. For the purpose of explaining the trade balance, oil prices, foreign direct investment, government spending, inflation rate, manufacturing growth rate and agricultural growth. The monthly data is used for the period 2002-2011. Logarithmic regression is used to see the effects of six explanatory variables on the balance of trade. Results show that there is only one variable i.e. inflation level has negative effect on trade balance in Vietnam. The other variables that include oil prices, foreign direct investment, government spending, inflation rate, manufacturing growth rate and agricultural growth do not show significant influences on trade balance in Vietnam.

Eric (2013) finds the relationship between FDI and BOP of Kenya. The study uses the data for period from 1993-2012. The data is analyzed using descriptive statistic and OLS approach to regression. The study conclude that FDI doesn't affect BOP in Kenya, but it is the relative price of export that affect exports and relative prices of imports affect the imports of the Kenya. The study concludes that there have not been large inflows of FDI to the country so policies should be made to attract FDI in order to take advantages of FDI to the economy.

Kennedy (2013) analyzes the factors that determine the balance of payments in Kenya for the period 1963-2012. Annual time series data is used. Cointegration and error correction mechanism is used. It is observed that the non-stationary variables are found to be insignificant in determining the long-run balance of payment. It is found that exchange rate and FDI are main determinants of balance of payments. It is further revealed that FDI is the source of development of new products in the economy and it improves the BOP through increasing the exports. It is concluded that balance of payments is both a real and monetary phenomenon.

Shah & Majeed (2014) determine the correlation between BOT, money supply, GDP and real effective exchange rate in Pakistan. Time period covered is 1981-2011. The study applies bounds testing approach for cointegration testing and Error Correction Model under ARDL environment. The study finds a steady long-run relationship between balance of trade, money supply, income, and real effective exchange rate. The results indicate that GDP and real effective exchange rate both affect BOT negatively in the

short-run and long-run but Marshall Learner Condition is not satisfied. However, money supply affects BOT in long-run but doesn't leave any impact on it in short-run.

### *Theoretical Literature*

#### The Elasticity Approach

According to Sugman (2005), this approach to BOP was developed by Alfred Marshall and Abba-Lerner. Later on it was extended by Joan Robinson (1937) and Fritz Machlup (1955). The elasticity approach is basically a Keynesian approach and just like many other Keynesian approaches it corrects BOP disequilibrium through current account and seeks the determinants that affect directly current account balance. The idea is to consider the exchange rate as a relative price which clears the market. This approach emphasizes price changes through exchange rate as determinant of BOP. It is simply based on the elasticity of demand and supply for goods and services, and is applied on when Marshall Learner condition is satisfied. It advocates that disequilibrium in balance of payments accounts is only due to disequilibrium in current account balance and it can only be corrected by affecting relative prices through devaluation. But this devaluation will only be effective if the elasticity of demand and supply of imports and exports are elastic, in the country devaluing the currency. If the demand elasticity for imports is inelastic, or supply elasticity of exports is inelastic, it can cause deterioration in current account.

#### The Absorption Approach

This approach is the original Keynesian approach presented by Sidney S. Alexander (1952), of the IMF. He developed this theory as an answer to question that arose after World War II that if depreciation will really improve a country's BOT. As the "elasticity approach" is effective if certain requirements are fulfilled that include the requirement of elasticities of imports and exports to be elastic. Devaluation can only improve BOP if exports capacity is not full and imports substitutes can be easily produced in devaluing country. So, this approach is an extension to elasticity approach.

Alexander argued that in order to make devaluation successful, there must be a large difference between total real output and absorption of the domestic economy. Excess of real output over absorption will be exported to other countries, and the opposite situation will bring imports into the country. Alternatively it can be said that domestic absorption level will determine the BOP. This approach is presented by the national income identity

$$Y=C+I+G+(X-M)$$

Where Y is real output produced in the economy, the above equation can be re-written as

$$(X-M) = Y - (C+I+G)$$

Here the important factors are C, I and G. These are called absorption by Alexander as against the traditional view in which it is called domestic expenditures. This approach advocates that in order to explain BOP, determinants of total output or absorption should

be considered instead of directly defining BOP. Exchange rate and other determinants can affect BOP only if they are able to affect absorption or real output level. They may even worsen the BOP by increasing absorption or reducing output level. So these are required to determine, if ignored there will be no use of devaluation even if the condition of elasticities is fulfilled.

The absorption approach is complementing the elasticity approach by just including the supply side effects and income effects. It can be implied as well from the approach that deflation is required for an economy as it will lower the absorption level of the country.

### IS-LM-BOP Model

By keeping in view the balance of payments flow model, and Marshall-Lerner conditions inbuilt, different models were developed during the Great Bretton Woods regime. Mundell-Flemming model, Mundell (1962), Fleming (1963) is widely used in theoretical and empirical studies. It extends the standard closed economy Keynesian IS-LM model to include the role of balance of payment in an open economy. Mundell showed that government has two instruments to achieve the BOP and required output level. It can either affect interest rate or government spending. Through fiscal and monetary policy, output is affected which ultimately leads to temporary disequilibrium in balance of payments. Mundell model assumes fixed price in the short-run which leads to variations in exchange rate to restore disequilibrium in the balance of payments.

Though, Mundell no longer thinks it to be a true picture of reality yet this model is very important. The model was basically in two sections. A model of current account and a model of capital account. The Model of current account says that a higher level of income and lower level of interest level will worsen the current account because more income means more demand for imported goods. The Model of capital account says that higher interest rate will bring more capital inflows into the country so capital account will be improved.

Hence, this model advocates that higher interest rate is a good instrument but increased income will generate a deficit in BOP through BOT.

### Monetary approach

This approach presented by Johnson (1972), Johnson and Frenkil (1976), derives its basics from the species flow mechanism by David Hume (1752). It takes balance of payments as a monetary phenomenon. It represents the relationship between a country's balance of payments and its money demand and money supply. It considers that money supply has an important role in balance of payments, by varying the amount people hold in cash. When people demand more than what is in central bank, the bank will bring inflows into the country and when people demand less than what money is available with the bank, it will outflow the money through the reserve account. So, by controlling money, balance of payments problem can be solved. This approach includes in model a money supply identity, money demand function, and an equilibrium condition.

The above literature advocates that a country's balance of payments is affected by the factors money supply, exchange rate, and gross domestic income. Although admired by many economists, Monetary approach is criticized for it only considers monetary variables ignoring other factors affecting balance of payments. Similarly, Keynesian approaches consider income level and exchange rate important factors in determining the bop of any country in contrast to monetary approaches. However, the assumptions underlying these approaches don't always hold true in a country like Pakistan. So, it is wrong to think that one approach can fully be applied here. As it is a developing country and the situation of balance of payment is worse. So it is not justified to apply one particular approach to see the determinants of bop in Pakistan. This study tests the factors of both Monetary and Keynesian approaches. Furthermore, the unexplained variation will be minimized by considering all the approaches and a broader view will be obtained.

## Data and methodology

### *Data description*

Data used in this study are secondary and annual. It spans the time 1981-2016. The data for domestic credit, money supply, foreign direct investment, real effective exchange rate are obtained from the world development index except for the data of balance of payment variable which is collected from various issues of economic survey of Pakistan published by ministry of finance Pakistan, and data for Gross domestic product is obtained from the official website of IMF.

### *Model specification*

As we don't have one particular model or theory to study balance of payments phenomenon, which is commonly accepted. So this study is combining here well-known approaches to balance of payments; elasticity, absorption and monetary approaches to find the determinants of bop and will examine their effect on bop directly or indirectly in case of Pakistan. For this purpose, a Long run relationship will be specified among the following variables: real effective exchange rate (REXR), money supply (MS), foreign direct investment (FDI), National income (GDP), and Domestic Credit (DCRE).  $M_2$ , as a proxy of money supply will be analyzed in order to check the application of monetarist approach, REXR will be examined in order to check the application of elasticity approach, and GDP variable is included for observing the effect of absorption approach.

By keeping in view the theoretically important factors that determine bop, this paper proposes the economic model defined as

$$BOP_t = f (REXR_t, GDP_t, MS_t, DCRE_t, FDI_t) \dots \dots (1)$$

Econometric form of the model is:

$$BOP_t = \beta_0 + \beta_1 GDP_t + \beta_2 FDI_t + \beta_3 MS_t + \beta_4 REXR_t + \beta_5 DCRE_t + \mu \dots \dots (2)$$

Here,



GDP at purchaser's prices is the sum of all gross value added by all domestic producers in the economy, including any taxes, and excluding any subsidy not included in the value.

FDI are the net inflows of investment in order to get hold of a lasting management interest in an enterprise working in a country other than that of investor.

Money supply is  $M_2$  definition of money that is composed of currency in circulation, demand deposits, time deposits, Resident Foreign currency deposits of the scheduled banks, and other deposits with state bank of Pakistan.

REXR is the weighted average of country's currency relative to an index of other major currencies adjusted for inflation.

DCRE refers to net domestic credit. It is the sum of net claims on central government and other sectors of the economy.

BOP is calculated here as the change in international reserves as a result of changes in external transactions of the economy. Since the level of net international reserves and related items is based on strict accounting system so bop position will be determined by this approach.

## **Results**

### *Unit Root Tests Results*

Prior to applying any econometric technique on time series data, it is pre requisite to test the integration of data. For, many econometric models require the time series data to be stationary. This study uses ARDL bound testing approach which though not requires all data to be stationary, it is applied on mixture of  $I(0)$  and  $I(1)$  variables. So in order to check the order of integration of variables, Augmented Dickey Fuller (ADF) test and have null hypothesis of presence of unit root in the data against the alternative of no unit root.

Results of ADF test are presented in table 1. It could be seen from the tables that the result of regressors are found to be mixture of orders of integration i.e.  $I(1)$  and  $I(0)$ . Variable  $LN(GDP)$ ,  $LN(MS)$ ,  $LN(DCRE)$  and  $LN(FDI)$  are found to be of order one  $I(1)$ , whereas  $LN(REXR)$  and  $LN(BOP)$  are integrated to the order zero  $I(0)$ . It is also confirmed that no regressor is  $I(2)$ , the presence of which invalidates the methodology of ARDL approach.

Table 1: Present Augmented Dickey Fuller Unit Root Test Statistic Results

. Variables	ADF test statistic			Order of Integration
	Level	First difference	Lags	
LN(BOP)	-5.231***	-9.030***	0	I(0)
LN(REXR)	-3.050***	-3.416***	0	I(0)
LN(GDP)	13.102	-3.413**	0	I(1)
LN(MS)	3.658	-3.720***	0	I(1)
LN(DCRE)	3.256	-3.592***	0	I(1)
LN(FDI)	0.629	-4.673***	0	I(1)

Source: author's self-calculation.

Note: \* shows level of rejection of null hypothesis of non-stationarity. \*\*\* indicates rejection of non-stationarity at 1% \*\* indicates rejection of non-stationarity at 5%

### *ARDL Bounds Testing Estimation*

After determining that no variable in the model is integrated of order I(2), and all the variables are mixture of integrated of order I(1) and I(0), the next step is to determine the lag order of the unconstrained error correction model (equ.1) on the basis of an information criterion. However, Pasaran and Shin (1999) recommend choosing maximum 2 lag order for annual observations. From that, lag length is chosen that minimizes information criterion. In this study, lag selection is based on Schwarz-Bayesian criteria (SBC), as it is a consistent model-selector. Lag order is chosen based on smaller value of information criterion (SBC), and for this purpose different lags of dependent variable and independent variables are included in VAR model. By running different VAR models, SBC suggests maximum 1 lag of length, which is suggested by Pesaran et al. (2001) for annual time series data as well. By keeping in view lag order suggested by SBC, unconstrained or unrestricted Error Correction Model (equ.1) of ARDL is estimated and presented on the next page.

### Test Results of Serial Correlation in Unconstrained ECM

In Unconstrained equilibrium correction model, the coefficients with level variables are important in the regard that their ratios could be interpreted later for long run relationship as described by Dave (2013). The variables that are found to be significant at 5% here are MS and GDP. It is the confirmation of monetary theory, and Keynesian approach that are applicable in a developing country like Pakistan. Other variables domestic credit, foreign direct investment and real effective exchange rate are found to be insignificant at 5% level of significance.

$R^2$  has a high value which is a sign of good model fit. Adjusted  $R^2$  is also high. DW test indicates here no serial correlation in residuals as value is near to 2. However, further tests of serial correlation are also performed to check serial correlation for the fact that presence of serial correlation in the model will compute wrong t-statistic so coefficient are not reliable based on this statistic. The coefficients with difference variables are short-run dynamics which for the time being will be ignored and discussed later after estimating the final equation of model.

Table 2: Estimated Unconstrained Equilibrium Correction Model

Variables	Coefficients	Std. errors	t-Statistic	Prob.
$\Delta \ln(\text{BOP})_{t-1}$	0. 208407	0. 187738	1. 110094	0. 2816
$\Delta \ln(\text{REXR})_t$	-212. 5457	75. 13750	-2. 828756	0. 0111
$\Delta \ln(\text{GDP})_{t-1}$	-266. 1610	214. 4313	-1. 241241	0. 2304
$\Delta \ln(\text{MS})_{t-1}$	133. 8431	65. 29292	2. 049887	0. 0552
$\Delta \ln(\text{DCRE})_{t-1}$	21. 91242	80. 52189	0. 272130	0. 7886
$\Delta \ln(\text{FDI})_{t-1}$	-6. 806056	8. 507792	-0. 799979	0. 4342
$\ln(\text{BOP})_{t-1}$	-1. 451057	0. 354402	-4. 094384	0. 0007
$\ln(\text{REXR})_{t-1}$	-70. 29681	43. 63478	-1. 611027	0. 1206
$\ln(\text{GDP})_{t-1}$	158. 2763	54. 23182	2. 918513	0. 0092
$\ln(\text{MS})_{t-1}$	-133. 3438	55. 23300	-2. 414206	0. 0266
$\ln(\text{DCRE})_{t-1}$	-43. 45052	35. 91932	-1. 209670	0. 2421
$\ln(\text{FDI})_{t-1}$	-5. 252518	9. 455997	-0. 555470	0. 5854
C	755. 2642	726. 4482	1. 039667	0. 3123

Source: Author's self-calculation.

$R^2 = 0. 7403$  F-statistics = 4. 2758 Adjusted  $R^2 = 0. 5671$  Durbin Watson stat = 2. 1681

Now next step is to apply the F-test in order to test the long run relationship in the model. But before this, it has to make sure that there is no serial correlation in the residuals of model estimated as suggested by Pasaran et al. (2001). As the presence of serial correlation in error term doesn't provide minimum variance calculated by OLS, the calculated values of t-statistic and F-statistic are no longer valid. ARDL bounds testing approach estimates parameter based on these values so estimated parameters will be invalid.

To check the serial correlation in the residuals of equation (1), Breusch Godfrey LM test is applied. This test is applied here for it doesn't give inconclusive results and is appropriate for models having lags of the variables. The results of LM test are presented in table 3 below.

Table 3: Presents Breusch-Godfrey Serial Correlation LM Test Results

F-Statistic	0. 0173	Prob. F-Statistics	0. 8977
Obs* R-Squared	0. 0445	Prob. Chi square	0. 8602

LM statistic tests null hypothesis that there is no serial correlation in the model, against the alternative that it is not true. As the probability of F-statistic is 89. 77 percent which is quite high and probability of chi square is also greater than 0.05, so, we cannot reject null hypothesis and conclude that there is no serial correlation in the model. Another assumption of ARDL model is satisfied.

ARDL proposed by Hendry called ‘General to Specific Approach’ is also applied here to confirm the results of ARDL model. First of all lag order is set equal to 1 based on SBC criterion as determined earlier. Then unconstrained ECM is estimated like before and all the variables having insignificant coefficients, except level variables and intercept term are excluded from the model. Then new F-statistic is computed and value is compared with the bounds provided by Narayan (2004). The results are presented here below in table 4.

Table 4. Results of F-Statistic for Cointegration Relationship (Results are in parsimonious form)

Test statistic	Value	K	Significance level	Critical values (Restricted intercept and no trend)	
				Lower bound	Upper bound
F-statistic	6. 843	5	1%	3. 810	5. 404
			5%	2. 770	3. 973
			10%	2. 339	3. 396

Source: Author’s self-calculation. Bounds values are obtained from Narayan (2004).

It is observed from the parsimonious equation that results obtained for cointegration are stronger than earlier.

The long-run multipliers or Elasticities among the significant variables are obtained from estimated Unrestricted Error Correction model. These long-run multipliers are obtained from dividing significant coefficients of long-run part of UECM by coefficient of dependent lagged variable i.e.  $\ln(\text{BOP})_{t-1}$ . The results are given hereunder in table 5

Table 5. Results of Long-Run Multipliers (Elasticities)

Variables	Multiplier Value
LN(BOP) & LN(GDP)	0.011
LN(BOP) & LN(MS)	-0.009
LN(BOP) & LN(REXR)	-0.021

In the long-run, REXR, DCRE and FDI are found insignificant at 5 percent level of significance. REXR is found to be significant at 10% level of significance, but the model is testing every hypothesis at 5% level of significance so it is ignored. The results indicate that REXR doesn’t affect BOP in the long-run. Even though the exchange rate is one of the best options to improve the BOP disequilibrium, the implications are not visible in Pakistan. The result is rejecting the elasticity approach and Marshall Learner Condition which states that exchange rate depreciation improves BOP in the long-run. This is also due to ineffectiveness of devaluation policies in Pakistan. Multiplier between LN (BOP) and LN (GDP) implies that, in the long run, one percent change in real GDP leads to an improvement of 0.01 percent in real BOP balance. It has positive long-run effect on real BOP as suggested by Keynesian theory. The theory says that increase in income leads to increase in demand for money which ultimately increases demand for money. However,

the share of long run GDP seems less in improving BOP. This is due to the fact that increase in income is spent on imported goods as well as on domestic goods.

LN (MS) is showing negative effect on BOP as expected by monetary theory to BOP. Theory says that if money supply is increased in the economy, it may lead to inflation, which causes domestic goods to become dearer in comparison to imports, so imports become attractive and more money is spent on them. It can be interpreted from multiplier that one percent increase in money supply is going to worsen balance of payments approximately by 0.01 percent. In Pakistan, expansionary monetary policy is adopted for a long, which has caused deterioration of BOP.

The reason of insignificance of FDI can be a decrease in the volume of FDI inflows in to Pakistan for many years. The main reason for less FDI could be political situation of Pakistan.

### Estimation of Restricted Error Correction Model

Long run model is estimated after the test of cointegration. Cointegration implies that long-run relationship exists among the variables and now long-run model can be estimated in order to see the long-run effects of regressors on the regressand. The cointegration in this model is indicating that the variables I(1) are jointly moving together through a stationary path given by their linear combination (Engel, Granger, 1987).

Now the long-run equation (2) of model is estimated in levels using OLS approach and from this equation residuals series is calculated in order to calculate Error Correction Mechanism. This term indicates the disequilibrium responses. The error correction term obtained is used with one lag in determining equation (3). This presents error correction term of the short-run model. The negative sign with the coefficient of this error correction term and its value indicates the speed of convergence in short-run to long-run equilibrium. This value normally lies between 0 to -2. If the value lies between 0 to -1, it shows convergence is there and the value nearer to 1 is the sign of faster convergence to equilibrium. If the value lies between -1 to -2, it shows that convergence is overshooting and the model has lack of sufficient information. So, it can be said that for a stable model the value should be expected between 0 and -1. Results of short run dynamic model are presented in table 6.

Table 6. Results of Restricted Error Correction Model

Variables	Coefficients	Standard Errors	T-Statistic	Probabilities
C	6. 343581	11. 00480	0. 576437	0. 5702
$\Delta \ln(\text{BOP})_{t-1}$	-0. 229385	0. 157887	-1. 452841	0. 1604
$\Delta \ln(\text{REXR})_t$	-200. 7325	84. 14275	-2. 385618	0. 0261
$\Delta \ln(\text{GDP})_{t-1}$	-178. 1719	275. 4105	-0. 646932	0. 5244
$\Delta \ln(\text{MS})_{t-1}$	31. 64383	71. 50565	0. 442536	0. 6624
$\Delta \ln(\text{DCRE})_{t-1}$	-94. 63256	69. 60112	-1. 359641	0. 1877
$\Delta \ln(\text{FDI})_{t-1}$	-2. 519501	8. 773114	-0. 287184	0. 7767
$\text{ECM}_{t-1}$	-0. 872945	0. 426342	-2. 047524	0. 0527

In the above table, most of the difference variables are insignificant individually except for REXR which supports the elasticity approach. According to Elasticity approach, devaluation of domestic currency leads to improvement in balance of payments by making exports cheaper and imported goods dearer in the home country. This effect is observed in short run. The most considerable point is that coefficient of error term is significant at 5%. The negative sign with coefficient of equilibrium error term should be expected if there is cointegration in the model and it implies further that the model is moving back to the equilibrium. It is also the sign of one way causation in the model, from REXR, GDP and MS to BOP here. The value  $\eta = -0.8729$  indicates convergence to equilibrium after short-run shock. As the value nearer to 1, faster is the convergence. It can be interpreted from the value that 87% of the error is corrected in current period (1 year). It is evident from above results that one way causation is present in the model. Now the final step is that joint significance of the short-run model is tested using Wald test and following results are obtained.

### Stability Test Results of the unrestricted Error Correction Model

In order to check if the model estimated is stable, CUSUM test is applied here. The figure 1 presents the results of CUSUM test. It can be seen that as long as the broken line between two upper and lower bounds is inside these boundaries, model will remain stable. The test indicates that the ARDL model used in this study is stable and can be used for long-run analysis.

In addition to CUSUM test, CUSUM of square test is also applied and satisfactory result is obtained that is shown in figure 2

Figure 1. CUSUM Test

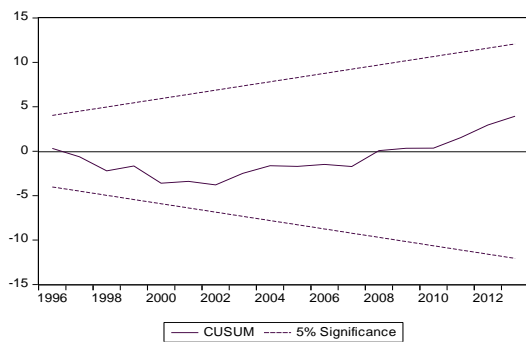
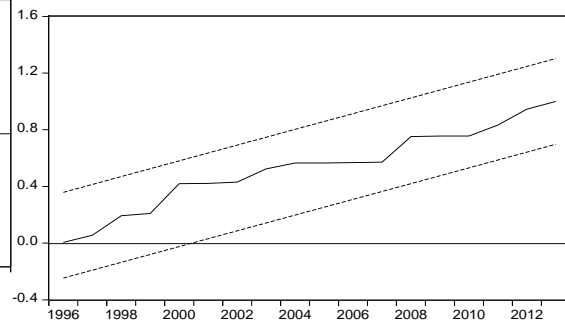


Figure 4.4: CUSUM Square test



The straight broken line in both figures indicates the bounds at 5% level of significance.

As it is known that the model has no serial correlation in it and it is stable. This implies that it can be used for forecasting and policy purposes. It is wise to check the long-run relationship of the model using bounds test to ARDL model in order to extract long-run as well as short-run relationship from it.

## Heteroscedasticity test Results of the residuals of Restricted ECM

When heteroscedasticity exists in the model, the error term constant variance premise is violated because there are multiple variances instead of single variance. It varies with the observations. The OLS estimation procedure is based upon the assumption that there is constant variance of error term. Here OLS is trying to estimate what in reality does not exist i.e. a single variance. Variance of the coefficients estimates will be biased in this situation. Therefore, Breusch-pagan test is used for the test of heteroskedasticity in the model. The statistics are used to test that error variance are all equal against the alternative that error variances are multiplicative functions of one or more variables.

Table 7. Breusch-Pagan Godfrey Heteroskedasticity Test

F-Statistic	0.1590	Prob.	0.9908
Obs R <sup>2</sup>	1.4448	Prob. Chi Square	0.9842
Scaled Explained SS	0.7155	Prob. Chi Square	0.9982

Breusch-Pagan Godfrey tests the hypothesis that the residuals of homoskedastic at 5%

## Conclusion

The purpose of this study is to empirically investigate the main determinants of Balance of Payments that have significant impact on BOP of Pakistan. As Pakistan is a small developing economy, no particular model can be applied here. For this purpose five macroeconomic variables i.e. Real effective exchange rate, gross domestic product, money supply, Domestic credit and Foreign direct investment are decided on to include in the model as explanatory variables for investigating their effects on BOP in the light of different noticeable theories of BOP. Large sample data of 36 years is used. In order to check the application of monetary theory, Money supply and Domestic credit variables are included in the model. GDP is included to see the impact of Keynesian approach which says that increase in GDP deteriorates the BOP through current account as increase in income makes demand more imported goods than domestic goods.

Real Effective Exchange Rate is included to check the application of elasticity approach in the country. Newly developed econometric approach, bounds testing approach to cointegration is applied in order to investigate long-run as well as short-run estimates of the coefficients. The approach is applied as it doesn't pre-require data to be stationary so long-run information remains intact without losing in differencing of the data. All the data is in constant prices of 2005, and is in natural log form. So the result is interpreted as elasticities of the explanatory variables with respect to BOP.

The study finds long run relationship among the variables but REXR, DCRE, and FDI are found to be insignificant factors in determining the long-run balance of payments in Pakistan, Whereas GDP and MS are found to be significant determinants. Even though Exchange Rate is one of possible determinants of BOP in the long-run according to Marshal-learner condition, Insignificance of REXR is a denial to the application of elasticity approach as well in Pakistan. As Pakistan is a developing economy, so devaluation of currency makes imported goods prices rise more than earlier. Pakistan cannot boycott the imports like machinery and technology that are used in industries, as

these cannot be developed at home. So, inelastic demand for high priced capital goods worsens the BOP instead of improving it. FDI is found to have an insignificant relationship with BOP. For a long, Pakistan's FDI is falling sharply. Its reason could be the political uncertainty in Pakistan, especially during 1988-1999, there were seven different governments. Every new government brought its own policies so no stable policy was followed in the long-run. So FDI didn't play an active role in improving BOP. DCRE is also insignificant factor though showing negative impact on BOP. It can be due to fact that DCRE is not used on imported goods or to increase exports, instead more loans are granted for non-productive uses. GDP is proved to be a significant determinant in the long-run. It is showing positive effect on BOP as advocated by monetary theories as opposed to Keynesian view that it has negative relation with BOP. Its coefficient indicates that with a ten percent increase in real GDP, balance of payments will be increased by one percent. Likewise coefficient of MS having negative sign also shows that other factors remaining the same, ten percent increase in money supply will cause approximately one percent deterioration in BOP. Significant relationship of MS with BOP in the study also supports monetarist view. Hence, it can be concluded from the study that BOP disequilibrium in Pakistan can be corrected through effective monetary policy whereas Keynesian theories are inapplicable for BOP determination in Pakistan.

### **Policy Recommendation**

Keeping in view the political situation and environmental conditions as well as the results of the study, following policies are recommended to improve disequilibrium in BOP. Policies should be developed to increase output level in the country so that the domestic demand as well as external demand should be fulfilled domestically. To achieve this target, there is an urgent need to enhance the quality of goods produced domestically specially the goods that are imports substitutes are exported to the rest of world. Devaluation or depreciation of currency should be avoided by the intervention of State Bank of Pakistan intentionally. Instead cost of production should be decreased to produce cheaper goods in the world market and infrastructure facilities should be provided to export oriented industries in order to make our exports competitive in the world market. There is an urgent need to control over energy crises as well. The development of dams for this purpose will create even employment for unskilled workers. Floating exchange rate can be an alternative measure to correct BOP. Money supply must be controlled through effective monetary policy. Savings should be encouraged in order to discourage people's extravagant behaviour towards consumption of imported goods and they must be convinced to prefer their home made goods. Instead investment in export oriented industry should be encouraged through exempting them from sales and excise duties as well as controlling political uncertainty in the country.

### **References**

- Akbar (2011), "Estimation of Long Run Trade Deficit Function of Pakistan: A Cointegration Approach" Allama Iqbal Open University, Pakistan.
- Alexandar, S., S. (1952), "Effects of a Devaluation on a Trade Balance", *International Monetary Staff Papers*, 2, pp. 263-278.



- Current Account Balance of Pakistan”, *Pakistan Economic and Social Review*, Vol. 50, No.2, pp. 207-222.
- Duasa, J. (2007), “Determinants of Malaysian Trade Balance: An ARDL Bound Testing Approach”. *Journal of Economic Cooperation*, 28(3), pp. 21-40.
- Eita, J., H. and Gaomab, M., H. (2012), “Macroeconomic Determinants of Balance of Payments in Nimibia”, *International Journal of Business and Management*, Vol.7, No.3.
- Eric, K. N. (2013), “Relationship between Foreign Direct Investment and Balance of Payments in Kenya”, University of Nairobi.
- IMF (2000), Training in the use of Balance of Payments Statistics – staff notes, Thirteenth meeting of the IMF committee on Balance of Payments Statistics, Washington, D.C. October, pp. 23–27.
- Jaffri, A., A., Asghar, N., Ali, M., M., and Rooma, A. (2012), “Foreign Direct Investment And Economic Survey of Pakistan, (Various Issues)
- Javed, S., T., and Raza, S., A.(2012), “Dynamics of Current Account Deficit: A Lesson from Pakistan”, *Transitions Studies Review*, Vol. 19, pp. 357-366.
- Kennedy, O. (2013), “Determinants of Balance of Payments in Kenya”. *European Scientific Journal*, Vol. 9, No.16.
- Mundell, R., A. (1968), *International Economics*, New York, Macmillan.
- Narayan, P., K. (2004), “Reformulating Critical Values For The Bounds F statistics Approach To Cointegration: An Application To The Tourism Demand Model For Fiji”, Department of Economics, Discussion Papers, ISSN 1441-5429.
- Pasaran, H., M. and Shin, Y. (1995), “Autoregressive Distributed Lag Modeling Approach to Cointegration Analysis”, DAE Working Paper, Series no 9514, Department of Applied Economics, Cambridge.
- Pesaran, M., H., Shin, Y., and Smith R.,P.(2001), “Bounds Testing Approach To The Analysis Of Level Relationships”, *journal of applied econometrics*, No 16: pp. 289 –332.
- Rafique, Y.(1999), “Balance of payments and exchange rate policy” *Industry And Economy*, online at <http://www.pakistaneconomist.com/issue1999/issue37/i&e3.htm>
- Shah, A. and Majeed, M., T., (2014), “Real Exchange Rate and Trade Balance in Pakistan: An ARDL Co-integration Approach”. Online at <http://mpr.aub.uni-muenchen.de/57674/>



Sugema, I. (2005), "The Determinants of Trade Balance and Adjustment to the Crisis in Indonesia", Centre for international economics studies, Discussion paper, No. 0508.

Sugman (2005), "Combined effects of exchange rate movement on export."

Tran, M., U., T. (2012), "The Factors Affecting Trade Balance in Vietnam". Online at <http://eprints.utcc.ac.th/id/eprint/1316>

Waliullah, Kakar, M., K., Kakar, R., and Kakar, W. (2010), "The determinants of Pakistan Trade Balance; An ARDL Cointegration Approach". *The Lahore Journal of Economics*, Vol.15, No.I, pp.1-26