

An Empirical Analysis of Determinants of Balance of Payments in Pakistan

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Abstract

This study investigates the determinants of balance of payments for Pakistan between 1981 and 2016. This paper using ARDL bounds testing approach. ARDL technique is used to find the short run and long run relationship of these variables with BOP. The result shows that all of exchange rate, FDI, inflation and GDP have negative relationship with Balance of payment of Pakistan. The empirical results obtained in this paper recommend the policy to decrease balance of payment fluctuations, Pakistan government has to work on both fiscal and monetary policies and structural adjustment in order to encourage and attract private investment flows, target inflation and increase trade.

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

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Introduction

Foreign direct investment is the net inflows of foreign investment in a country. 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.

Balance of payment is important because it measure the relative performance of a country in the world market as it shows how much a country has spent on imports and what has been the performance of its exports. A continuous deficit in BOP indicates that country will have huge debt and its currency will decrease its value in the long-run. Policy makers always formulate policies to correct disequilibrium in BOP as certain deficit or surplus is dangerous for an economy in many aspects.

The factors that affect foreign trade excessively may affect balance of payments. Numerous researchers have used 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. These are playing an important role in determining the external accounts of the country.

According to economic survey (2014-15), FDI is a significant determinant for increasing exports and substituting imports in a country. It also brings new technology and capital into the home country as well. Exchange rate is another significant factor of balance of payments. Exchange rate affects both current and capital accounts that determine the competitiveness of a country. In this context, inflation is an important factor

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. Unfortunately, Pakistan has been facing deficit in balance of payments in many years since it came in to existence except in a few years. That despite of over the last four decades, there has been growing trend in the fluctuations of the Pakistani balance of payments. Literature on balance of payments in Pakistan is little and distant between particularly at the theoretical level. It is worth noting that none of these studies empirically modelled the long run determinants of balance of payments fluctuation or even attempted to discuss the problems and policies of balance of payments of Pakistan and how to deal with them.

Literature Review

There have been various studies for discovering 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 here under.

Rano *et al* (2008) investigated import-export demand functions and its effects on Nigerian balance of payments, using the co-integration and error correction modeling (ECM). It was found that coefficients of GDP, foreign reserves and index of openness were positive and significant. Whereas the coefficients of exchange rate and import capacity were negative and insignificant. As far as export demand function was concerned, it was found that coefficients of exchange rate, index of openness were positive and significant, whereas coefficient of GDP was negative and significant.

Waliullah *et al* (2010) investigated the long-run and the short-run relationship in Pakistan's trade balance, money supply, GDP, and real exchange rate. They used the annually time series data for the period 1970-2005. They used Bounds testing approach and ARDL for analyzing the data. Their results indicate long-run relationship among balance of trade, money supply, GDP and exchange rate. It is investigated that devaluation of exchange rate is positively related to balance of trade in the short-run and long-run as well. It implies that money supply and income play an important role in the

determination of trade balance. The results of this study indicates that change in exchange rate will give positive results but weaker than those will be given by money supply and income.

Ali (2011) Using co-integration and error-correction modeling observed that net foreign assets, exchange rate and inflation rate positively whereas money supply and domestic credit were negatively related to balance of payments and significant. Interest rate was found to be insignificant and negative. He further declared that balance of payments as a monetary phenomenon was not the good criteria because other factors also affected the balance of payments.

Jaffri et al (2012) analyzed the impact of FDI inflow on balance of current account for Pakistan from the period of 1983 to 2011. Autoregressive distributed lag approach is applied. The study found 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) examined the determinants of current account deficit in Pakistan. They used time series annual data for the period 1976-2010. Cointegration and ECM are used for analyzing the long run and short-run dynamics of the model. Long run relationship shows positive relationship among current account deficit, trade deficit, exchange rate, and fiscal deficit. A significant negative long run relationship is found in current account deficit with private savings and external debt. Error correction model estimates found to have positive significant relationship with current account deficit.

Ray (2012) examine the role of various determinants on balance of trade in India over the period, 1972-73 to 2010-11. . Numerous econometric techniques and tools like Augmented Dickey Fuller test, Johansen Cointegration test and VECM, OLS have been used to observe long run as well as short run causality among different macro- economic variables under consideration of our study. The result suggests that long run as well as short run causality existed among different macro-economic variables like real effective exchange rate, FDI, domestic consumption and foreign income and foreign direct

investment and foreign income have significant positive impact on balance of trade whereas domestic consumption and real effective exchange rate impacted negatively on balance of trade in India.

Mohammad (2010) investigated the long run as well as short run determinant of trade deficit with reference to Pakistan by using Johansen co integration approach and Error correction model (ECM). The finding of this study suggests that foreign income, foreign direct investment, domestic house hold consumption and real effective exchange rate are significantly affect the trade deficit. To highlight the short run dynamics VECM (Vector Error correction model) was used. The result of VECM pointed out that there is disequilibrium in the short run which will be adjusted within one year.

Shawa, (2013) Analysis the impact of main determinants on trade balance in Tanzania by analyzing the impact of Foreign Direct Investment (FDI), Human Capital Development(HCD),Household Consumption Expenditure (HCEXP), Government Expenditure (GEXP),Inflation (INF),Natural Resources Availability (NRA),Real Exchange Rate (REX) and Foreign Income(WY) and Trade Liberization (TLB) etc. In this study The Ordinary Least Square method (OLS) has been used for the econometric analysis with a sample period spanning from 1980-2012 and found out that the main influencing factors for the case of Tanzania are Foreign Direct Investment(FDI),Human Capital Development (HCD),Household Consumption Expenditure(HCEXP), Government Expenditure (GEXP),Inflation (INF),Natural Resources Availability (NRA),Foreign Income(WY) and Trade Liberization (TLB) so suggested policy measures should focus on them to reduce the trade deficit in the Tanzanian economy.

Kennedy (2013) investigates 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 relationship between BOT, money supply, GDP and real effective exchange rate in Pakistan during the time period of 1981-2011. The study applies bounds testing approach for cointegration testing and Error Correction Model under ARDL environment. Their result indicates 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.

Data and methodology

Data description

The main objective of this study is to analyse the determinants of Balance of payment in Pakistan during the period of 1981 to 2016. The variables used in the present study are FDI, Exchange rate, GDP, Inflation and Balance of payment. The data collected from World Bank's reliable source World Development Indicator economic survey of Pakistan published by ministry of finance Pakistan for the time period of 1981 to 2016. All the variables except current account have been used in log form which makes interpretation more robust and meaningful.

Model specification

In this study we start by specifying the long-run relationship between the following variables: exchange rates, FDI, GDP, inflation and balance of payment. For this purpose, a Long run relationship will be specified among the following variables: real effective exchange rate, Inflation, foreign direct investment (FDI), GDP, and Balance of payment (BOP). By keeping in view the theoretically important factors that determine bop, this paper proposes the economic model defined as



$$\mathbf{BOP}_t = f(\mathbf{REXR}_t, \mathbf{GDP}_t, \mathbf{Inf}_t, \mathbf{FDI}_t) \quad (1)$$

Econometric form of the model is:

$$\mathbf{BOP}_t = \beta_0 + \beta_1 \mathbf{GDP}_t + \beta_2 \mathbf{FDI}_t + \beta_3 \mathbf{Inf}_t + \beta_4 \mathbf{REXR}_t + \mu \quad (2)$$

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.

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

Inflation rate refers to a general rise in prices measured against a standard level of purchasing power. Inflation is also measured by comparing two sets of goods at two points in time; the most well-known measures of Inflation are the CPI which measures consumer prices. The rise in inflation will decrease the growth of economy; Inflation hurts standard of living because people have to pay more and more for the same goods and services. If income doesn't increase at the same rate as inflation, then standard of living will decline.

The balance of payments may deteriorate because domestic inflation stimulates import spending (given that imports appear relatively cheaper), and decreases export sales, as exports appear more expensive abroad. Therefore, this scenario has an adverse effect on the BOP.

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

Almost all the macroeconomic variables time series data are non-stationary at their level form and the use of nonstationary data produces empirical results spurious (Nelson and Plosser, 1982). Therefore, to ensure the data series stationary, Augmented Dickey Fuller (ADF) test is used by Dickey and Fuller (1981) and is non-parametric in nature which corrects serial correlation and heteroskedasticity in error terms. 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(INF) 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)	-4.331**	-9.130***	0	I(0)
LN(REXR)	-3.150**	-4.317***	0	I(0)
LN(GDP)	14.106	-3.417**	0	I(1)
LN(INF)	4.756	-3.821***	0	I(1)
LN(FDI)	0.728	-4.778***	0	I(1)

Source: author's own estimation.

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

In our model all the variables are mixture of integrated of order I(1) and I(0), no variable is integrated of order I(2), and the next step is to examine the lag order of the unconstrained error correction model (equ.1) on the basis of an information criterion. On the other hand, 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 reason 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.

Table 2: Estimated Unconstrained Equilibrium Correction Model

Variables	Coefficients	Std. errors	t-Statistic	Prob.
$\Delta \ln(\text{BOP})_{t-1}$	0. 216305	0. 296837	1. 112094	0. 2836
$\Delta \ln(\text{REXR})_t$	-112. 5854	74. 18752	-2. 848646	0. 0112
$\Delta \ln(\text{GDP})_{t-1}$	256. 1614	314. 4613	-1. 251231	0. 02315
$\Delta \ln(\text{INF})_{t-1}$	134. 8634	67. 28290	2. 069367	0. 0531
$\Delta \ln(\text{FDI})_{t-1}$	-6. 905036	8. 573532	-0. 799979	0. 4240
$\ln(\text{BOP})_{t-1}$	-1. 551147	0. 384501	-4. 093484	0. 0007
$\ln(\text{REXR})_{t-1}$	-74. 31186	43. 65874	-1. 623127	0. 1316
$\ln(\text{GDP})_{t-1}$	156. 6723	53. 23482	2. 931583	0. 0082
$\ln(\text{INF})_{t-1}$	-134. 3456	65. 23310	-2. 415206	0. 0246
$\ln(\text{FDI})_{t-1}$	-5. 294528	9. 545897	-0. 655471	0. 5954
C	756. 2542	736. 4482	1. 0393267	0. 3143

In table 2 the coefficients of all variables are important in the regard that their ratios could be interpreted later for long run relationship as described by Dave (2013). GDP

and INF are significant at 5%. While variables foreign direct investment and real effective exchange rate are found to be insignificant at 5% level.

R^2 has a high value which is a sign of good model fit. The value of Adjusted R^2 is also high. DW test indicates here no serial correlation exist in residuals as value is near to 2. However, additional 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 value.

Table 3 present that there is no serial correlation in the residuals of model estimated as suggested by Pasaran et al. (2001). As the existence of serial correlation in error term doesn't provide minimum variance estimated by OLS, the estimated values of t-statistic and F-statistic are invalid. ARDL bounds testing approach estimates parameter based on these values so estimated parameters will be invalid.

Breusch Godfrey LM test is applied to check the serial correlation in the residuals of equation (1). This test is applied here for it doesn't give uncertain outcomes and is suitable 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	0.0263	Prob. F-Statistics	0.8233
Obs* R-Squared	0.0455	Prob. Chi square	0.8102

Table 3 shows LM statistic that test null hypothesis of no serial correlation in the model. As the probability of F-statistic is 82.33 percent which is 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.

Bound test result

Table 4 showing results of F-statistic, as F-statistic value is (5.8599) is more than the upper bound of bounds values at 5%, which is suggesting that there is long run

relationship between propose variables. In a nutshell, the determinants of BOP move together in long run.

Table 4: Present Bound test results

F- Statistic	5.8599	
Critical values bounds		
Significance	I0 bounds (lower bounds)	I1 bounds (upper bounds)
10%	2.083	3.435
5%	2.397	3.865
1%	3.609	4.554

Estimation of Restricted Error Correction Model

In the table 5, the coefficient of FDI indicates that there is negative but insignificant relationship between Foreign Direct Investment (FDI) and Balance of payments with a coefficient of -3.57921. Hence, FDI is elastic to balance of payments. This negativity in the coefficient of Foreign Direct Investment is in conformity to the prior sign that a negative impact of Foreign Direct Investment on Balance of payments worsens the country's balance of payments deficit.

The coefficient of exchange rate is negative consistent to the theoretical expectations. It shows that a depreciation of the exchange rate causes worsening of the balance of payments. However it is found to be highly statistically significant. This supports the empirical analysis that the impact of the nominal exchange rate and the price differentials between domestic and foreign prices does not seem to play a strong role in terms of the movements in the balance of payments although the coefficient implies that exchange rate movements do have a negligible impact on balance of payments. Thus an appreciation of the real effective exchange rate is associated with loss in competitiveness. Therefore the exchange rates seem not to be playing a direct role in the determination of balance of payments in Pakistan. We attribute this to other institutional and economic factors .That

is, a fall in the real effective Exchange rate has the effect of reducing the trade deficit, though by a small amount.

The coefficient of GDP indicates that there is positive but insignificant impact on Balance of payments with a coefficient of 17.27. This positive coefficient of GDP is in conformity to the prior sign that a positive impact of GDP on Balance of payments worsens the country's balance of payments deficit.

Inflation rate has a negative impact on balance of payment in Pakistan. This finding is shown by the negative coefficient of inflation rate, -43.54. This indicates that a unit change in inflation rate, leads to -43.54 decreases in balance of payment. Therefore as inflation rate increases, balance of payment decreases. This finding is also in accordance with our a priori expectation which is based on economic theory that the inflation rate is expected to have a negative relationship with balance of payment in Pakistan.

Stability Test Results of the unrestricted Error Correction Model

Table 5. Results of Restricted Error Correction Model

Variables	Coefficients	Standard Errors	T-Statistic	Probabilities
C	6.35781	16.00380	0.572467	0.5601
$\Delta \ln(\text{BOP})_{t-1}$	-0.32935	0.17787	-1.38784	0.1414
$\Delta \ln(\text{REXR})_t$	-170.6325	83.24255	-2.485518	0.0261
$\Delta \ln(\text{GDP})_{t-1}$	17.2709	176.5115	-0.701632	0.5464
$\Delta \ln(\text{INF})_{t-1}$	-43.54323	74.60674	0.53143	0.6835
$\Delta \ln(\text{FDI})_{t-1}$	-3.57921	8.673124	-0.46714	0.6767
ECMt-1	-0.86345	0.45532	-2.14654	0.0526

For checking the stability in the model is estimated, CUSUM test is applied here. The figure 1 presents the results of CUSUM test. The straight lines are significant at 5%. As it can be seen in the figures that the movement path of the test statistics is always between the straight lines, so the model is necessary stability. 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

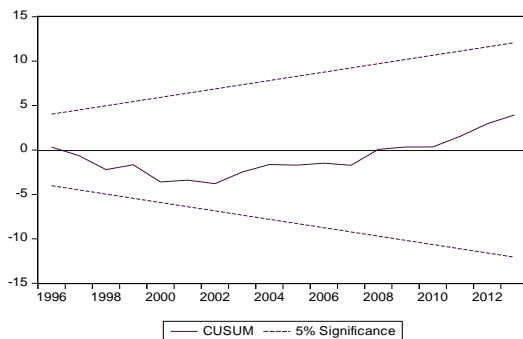
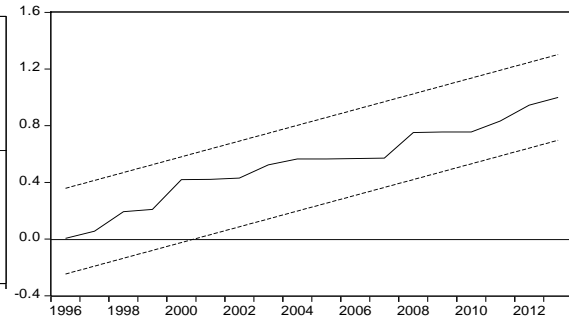


Figure 2. CUSUM Square test



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

Conclusion

This study applied ARDL bound testing technique and restricted and unrestricted ECM models to examine the impact of determinants on Balance of Payment in Pakistan for the period of 1981 to 2016. The result in general is summarized as the overall estimation findings are consistent with theoretical prediction. We investigate that exchange rate has negative impact on BOP in short run as well as in long run. Implies that Pakistan is a developing economy, so depreciation of currency makes imported goods prices higher than earlier. Thus an appreciation of the real effective exchange rate is associated with loss in competitiveness. Therefore the exchange rates seem not to be playing a direct role in the determination of balance of payments in Pakistan. We attribute this to other institutional and economic factors. That is, a fall in the real effective Exchange rate has the effect of reducing the trade deficit, though by a small amount. Pakistan cannot refuse the imports like machinery and technology that are used in industries, as these cannot be developed at home. The coefficient of FDI indicates that Foreign Direct Investment (FDI) has negative impact on Balance of payments. This negativity in the coefficient of Foreign Direct Investment is in conformity to the prior sign that a negative impact of Foreign Direct Investment on Balance of payments worsens the country's balance of payments deficit. The coefficient of GDP indicates that there is positive but insignificant impact on Balance of payments. It implies one unit increase in GDP increasing BOP 17 percent. Lastly, inflation rate has a negative impact on balance of payment in Pakistan. Inflation rate has a negative impact on balance of payment in Pakistan. This finding is shown by

the negative coefficient of inflation rate, -43.54. This indicates that a unit change in inflation rate, leads to -43.54 decreases in balance of payment. Therefore as inflation rate increases, balance of payment decreases. This finding is also in accordance with our a priori expectation which is based on economic theory that the inflation rate is expected to have a negative relationship with balance of payment in Pakistan.

Policy Recommendation

The paper therefore recommends the following based on various studies and statistical explanations of findings. In order to reduce balance of payment fluctuations, the Pakistan government has to work on both fiscal and monetary policies and structural adjustment in order to encourage and attract private investment flows, target inflation and increase trade. As depreciation of the country's currency will make exports cheaper and imports more expensive, thus, leading to a good balance payments position in the country. The government should adopt economic policies that decrease the inflation rates and generate stability in exchange rates which bring to increase the balance of payments, and subsequently improve the economic situation of Pakistan. Pakistan is therefore likely to benefit through more FDI inflows if it generates an investment climate that can attract more FDI flows to the country and employ the vision 2030 strategy effectively to attract and tap benefits from FDI. That notwithstanding, FDI can have a negative impact on the balance of payments, and even contribute to the persistent deficits due to its larger propensity to import production inputs from abroad. Therefore to minimize FDI negative effects, Pakistan should concentrate on first-class infrastructure, education and skills; focus on investment promotion; public private partnerships, decreasing bureaucratic obstacles; and restoring stability and security in the country. FDI may also mitigate the constraints imposed by balance of payments especially through outflows in terms of profit repatriation.

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