

IMPACT OF REAL EXCHANGE RATE, INFLATION AND FDI ON TRADE BALANCE; CASE STUDY OF PAKISTAN

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Abstract

The study in hand explores the impact of real exchange rate (RER), inflation and Foreign Direct Investment (FDI) on trade balance in Pakistan. The study uses the secondary data from 1980-2018. The study uses the augmented dickey fuller test for checking the stationarity of the variables and Autoregressive Distributive Lagged (ARDL) Model for exploring the relation among the variables in long run and error correction model for detecting the relation between variables in short time period. The results of ARDL suggest that real exchange rate and FDI significantly and negatively affect the Pakistan's balance of trade (BOT) and the higher inflation ends up improving the balance of trade. The results of Error Correction Model (ECM) conclude the existence of short run co-integration.

Keyword; Real Exchange Rate, Inflation, Foreign Direct Investment (FDI), Balance Of Trade

Introduction

Trade balance contributes a major part in BOP. An economy's balance of trade is calculated as the difference of its imports and exports over a specified time period. Many countries in the world including America, UK, Australia and Portugal are facing large trade deficits. But the countries like Switzerland, Austria, Finland have large trade surpluses (Martin Falk., 2008). When the goods of a country being imported become greater than the goods being exported then the country faces deficit of trade and when the commodities being exported are greater than the commodities being imported then it causes the surplus of trade. The dependency of the US on the import of oil and some other consumer related product has led US to face trade deficits.

This investigation intends to investigate the effects of the rer, inflation rate, and FDI on Pakistan's balance of trade. The balance of trade is dependent variable in this study. It measures the gap of country's imports and exports. Country like Pakistan whose imports exceed its exports faces the deficit in trade. The changes in the exports and imports causes the trade balance to increase or decrease. Anything that can directly or indirectly effect the imports or export have the same impact on trade. If the price of the commodities being exported of any country are forced to decrease due to any external pressure than there are more chances of trade deficit to happen. In doing so the terms of trade are also effected.

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In today's world the balance of trade shows the political powers balance of the authorities. There are many factors that affect the trade balance of any country these factors include the gross domestic product, plans for trade chosen by authorities, inflation and foreign reserves. The important variables affecting the trade balance are rate of exchange and inflation rate. Fixed rer and increasing inflation cause the rer to appreciate, which raises export prices and makes imports more affordable. So, imports become higher which causes the trade deficits. And a devaluation in currency can make balance of trade better. The gdp is more elastic with respect to imports so a rapid increase in GDP causes trade deficit.

The foreign direct investment inflow results in increased imports and this may be due to the appreciation of the currency. Trade balance depicts that how strong is the country's economy as compared to the others. The countries facing deficits in trade acquire money for purchasing commodities and the countries with trade surpluses are the lenders who are lending money to the countries with deficit. But these trade excess and shortage are bad indicators of the country's progress. Pakistan is consistently facing the trade deficit since 2003 and it is because of importing a high amount of energy. The major trading partner of Pakistan is China. The trade balance data of Pakistan is recorded on monthly basis. The trade balance of Pakistan was recorded at -1.5 billion US dollars (USD) in March 2020 and it was a deficit.

In June 1991, the trade balance of Pakistan reached its high value of 110.6 million USD and its lowest value was recorded at -3.8 billion USD in 2018. Economy of Pakistan is the sixty eighth biggest financial state and according to economic complexity index Pakistan is the ninety eighth most complicated economy in the world. In 2017, the exports of Pakistan were \$24.8 billion, and imports were 55.6 billion dollars. There was a shortfall in balance of trade of amount 30.9 billion dollars and the GDP of Pakistan was \$304 billion. The imports of Pakistan are increasing at 5.1% annually during the last five years.

The independent variable in the study are RER, inflation and fdi. In this study rate of real exchange is a significant variable. If the decrease in rate of real exchange, then the prices of the exported commodities for the foreigners decreases and the prices of the imports will increase causing the quantity of exported goods become higher than the quantity of imported goods. In the long time period, all of this has a favorable impact on the trade balance. Therefore, the trade balance of Pakistan is improved by the RER decline. In case of Pakistan, the economy is facing trade deficit and the depreciation in the value of money will enhance the balance of trade in Pakistan.

There are many studies that confirm that in long time period the depreciation in rer causes the balance of trade to improve. The studies conducted by (Jacob Wanjala Musila,2011); (Bedi Drama, Yao and Amzath Amed, 2010); (Hassan Shirvani and Barry Wilbratte 2006) and many other studies confirmed that decrease in RER can lead to the deficit in trade in the short run but in the long period of time it enhances the balance of trade. In short run a depreciation in RER only make trade balance worse because the quantity of imports remains same.

The other variable effecting the trade balance is inflation. An increased inflation can have worse effects on the exports of a country by increasing the prices of inputs or the raw materials. And inflation effects the imports and export through real exchange rate. Higher the inflation higher will be the interest rate, and this causes the currency of a country to depreciate. When the currency depreciates the exports, prices become low and foreign countries increase their exports and imports become expensive. So, when the exports are encouraged then the balance of trade of the country shows improvement.

FDI also effects the balance of trade. An improvement in foreign direct investment leads to an increase in demand of country's currency, which raises exchange rates. An appreciation in RER causes the exports to fall which worsens the trade balance. Many studies confirm this link of foreign direct investment and the rate of exchange like (Pacheco Lopez, 2005) and (Ali Yasin, M. Isse Ibrahim and Zahir Mohammad, 2017).

Objectives of Study

The objectives of the study are to find the effect of rer, inflation and Foreign Direct Investment on Pakistan's trade balance.

- To explore the factors' long term relationships.
- To examine whether in short time period the trade balance converges towards equilibrium.

Literature Review

In 1997, Lionel Fontagne empirically assessed how the flow of investment by the foreigners effect the trade in foreign countries and competitiveness among the commodities being exchanged between countries from the period 1984 – 1993 by using the panel data of 19 countries. The results suggest that when there are FDI outflows then there is trade surplus and when there are FDI inflows then there is trade deficit.

While in 2003, Daniele Antonucci explored the effects of changes in the RER in the magnitude of balance of trade in Italy. This study also proposed the applicability of J curve on the economy of Italy. This study used ecm and the distributive lagged structure model. The study

resulted that without being effected by short and long time periods, a decrease in rer improved the balance of trade of Italy.

Olugbenga Onafowora in 2003 studied the J curve's presence in the Asian countries and checked whether there exists any relation between balance of trade and exchange rate. VECM was employed in the study. The study resulted that there was a relation among balance of trade and rer and it also concluded that J-curve existed in short time period and in long period the marshal lerner condition was applicable.

During 2006, a study carried out by Hassan Shirvani and Barry Wilbratte empirically studied the casual relation among RER and the balance of trade between America and other countries. This study used the multivariate cointegration approach. The study was effective in determining that, while the trade balance was greatly impacted over the long term, it was not significantly impacted in the near term by the effects of the real exchange rate. The study's other finding was that the RER devaluation increased the trade balance. So, this proved the existence of Marshall lerner condition.

Irina Tochitskaya in 2007 analyzed the impact of shifts in rate of currency on Belarus's balance of trade. As stated by the results, devaluation in rate of exchange benefited the trade balance. As shown by several studies, a decline in the rate of exchange negatively affected the balance of trade, which is explained by the time it takes for customers to adapt to a new buying pattern. The study suggested that policies related to decrease in the RER will raise the balance of trade of Belarus.

Martin Falk in 2008 examined the determinants of balance of trade in industrialized countries. The data of thirty-two countries that were industrialized was used from 1990 to 2007. This study used the mixed methods of linear model and fixed effects model. The conclusion drawn from the results of this investigation were that when real rate of exchange depreciates it causes a raise in the balance of trade. Although, nations that have a trade deficit and have a positive FDI were more sensitive to the degree of change in the trade balance in reaction to declines in the real rate of exchange. The study also concluded that the balance of trade had an indirect relation with gross domestic product per capita.

Later during 2010, Bedi Guy Herve Drama, Yao Shen and Amzath Amed explored the channel through which balance of trade was affected by RER. The study used cointegration test, granger causality and var models to find out the impact. The data from 1975 – 2007 was used. The results show that rate of exchange has a considerable and favorable effect on the balance of trade

over both long and short time horizons. The j curve was employed by the IFR to examine how RER affected the balance of trade.

Gab-Je Jo in 2010 examined how Korea's trade balance and rate of exchange are linked. The bound test technique and ecm were the methodologies employed in the investigation. The study resulted as the balance of trade is mainly dependent on the nature of the commodity so, it's not a notable indicator of balance of trade. The elasticity of intermediate good is different and for the final good is different.

While study by Alex Ehimare in 2011 examined the relation among FDI and gdp of Nigeria and also how fdi is affected by rate of exchange and inflation. This study was conducted on thirty years' data using linear regression to study the effects. The study's findings showed that, in the presence of trade openness, FDI has an impact on economic growth but has no influence on inflation. And also, the rate of exchange effects the FDI.

Also Joe Muzurura and M. Sikwila in 2011 examined the effect of investment by the foreigners on export growth in Zimbabwe from 1980 to 2011. The econometric methodology of ordinary least square was used in the study. The independent variable used in the study are GDP, current FDI, lagged value of FDI and trade openness. The results concluded that the independent variables crucially and positively affected the export growth. But the only insignificant variable was gross domestic product. The study also recommended that Zimbabwe should adopt those policies that promote trade openness to increase the exports.

In 2011, Jacob Wanjala Musila studied the adjustments in the balance of trade and exchange rate in Malawi. The study used the data from 1868 to 1998. According to the study's findings, devaluation will negatively impact the balance of trade in the short term but will enhance it over the long term.

Muhammad Brian Amir and Dr. Bilal Mehmood in 2012 studied fdi and balance of payment in Pakistan. The Johansen model and ecm are included in this study to investigate both the long and short runs. This study used FDI as a chief variable responsible for growth of economy because it positively effects the economic growth and it increases the human capital productivity and physical productivity. The analysis comes to the conclusion that FDI has a favorable impact on both imports and exports. Fdi has a favorable overall effect on the balance of payments.

During 2013, a study carried out by Thi Anh-Dao and Thi Thanh investigated how trade imbalances in Asia were affected by fdi inflows. The analysis was carried out on the data from

1991 to 2011. The empirical findings concluded that FDI worsened the trade balance and it affected many other economic variables. This study also concludes, if the manufacturing division wants to improve the balance of trade then it must concentrate on higher domestic productivity.

Osama D. Sweidan in 2013 explored the impact of rate of exchange on exports and imports in case of Jordan from 1976 to 2009. This study also examined that whether the remittances of the worker affected the exports in Jordan. This study used bound test and the ecm techniques. This investigation resulted that in short run the rate of exchange effect the Jordan's exports and imports. The policies regarding the rate of exchange caused the instability in the rate of exchange in Jordan.

While in 2013 Ergin Akalpler examined how reduced currency rates and inflation affected trade in Turkey. In this study the qualitative and quantitative methods were used. The study resulted that in case of turkey there were no significant impact of higher cpi and a lower rate of exchange on trade.

Dr. A jayakumar, L Kanan and Anblagan in 2014 examined how Indian imports and exports were affected by foreign direct investment. This study also reveals the other determinants of export and imports. The study resulted that the adoption of trade oriented policies raised the fdi in India.

M. Reza Lotfalipour and Bahare Bazargan in 2014 investigated how Iran's trade balance was affected by exchange rate volatility. The paper used the data from 1993-2011. The methodologies applied in the paper were test for checking unit root presence and GARCH approach. The results suggested trade balance of Iran was not significantly affected by the real rate of rate of exchange. And the imports had a significant impact on Iran's trade balance.

Tony Matlasedi, Prof. Richard Ilorah and Stephen Zhanje in 2015 assessed the influence of the actual rate of exchange on the balance of trade of South Africa and examined the applicability of J curve and the Marshal Lerner condition in this country. The bound test for cointegration and Johansen econometric techniques were used in the study. The explanatory variables of the study are balance of trade, reserves of foreign currency, money supply and terms of trade. The findings demonstrate that the condition of Marshall Lerner held true over the long term, and that a decline in the rate of exchange worsened trade deficit of South Africa and supported the J curve effects.

Sara Rafiq and Liu Hai Yun in 2017 examined the effect of fdi on Pakistan's foreign trade. This study used Autoregressive distributive lagged model (ARDL) and the stability analysis. This study was carried out to empirically examine the economic condition of Pakistan

because Pakistan's economy faces both economic and political fluctuations. And this study concluded that FDI is an important variable that cannot be neglected while understanding the economic development of a country like Pakistan.

Thi Xuan Thom in 2017 analyzed shifts in the actual rate of exchange and balance of trade between 2001 and 2015. This study used the J curve to further assess whether devaluing the real rate of currency would enhance the balance of trade. The findings demonstrated that the actual rate of exchange decline drove the trade balance to decrease during the first 2 quarters before increasing. And the study concludes that it is possible that any fluctuation in exchange rate can cause the trade balance to follow S curve instead of J curve.

Ali Yasin, M. Isse Ibrahim and Zahir Mohamed in 2017 examined the influence of rate of exchange on FDI of Somalia. The study developed various regression models and then estimated them with OLS. The study showed an inverse relation between rate of exchange and foreign direct investment. But inflation positively affected the FDI. The study concluded that for making the RER stable, tight monetary or fiscal policies should be implemented in Somalia.

Kunofiwa Tsaurai in 2018 examined the effect of cpi on Fdi in South Africa. The study used panel data for the analysis. The methodologies used were the fixed effects and OLS. The results obtained from fixed effect showed that inflation negatively affected the FDI and the OLS results suggested that inflation significantly and positively affected the FDI. The findings suggested that for increasing FDI inflows, South Africa should adopt the contractionary policies.

Methodology

Research Model

In this study balance of trade is a function of rate of exchange (RER), inflation (CPI is being used as a representative for inflation) and inflows of Foreign Direct Investment being measured in current US Dollars. A raise in RER takes the prices of export to a high value therefore casts worst effects on balance of trade so the balance of trade is negatively impacted by the RER. Inflation has a beneficial influence on the balance of trade because it drives down real exchange rates, that further enhances the balance of trade. FDI also has a negative effect on the balance of trade. The theoretical equation of the study is:

$$TB = f(RER, CPI, F).$$

Here, TB represent trade balance, RER represents real exchange rate, cpi for consumer price index and F is for foreign direct investment. The empirical model is:

$$TB = \alpha + \beta_1 LRER + \beta_2 LCPI + \beta_3 LF + \varepsilon_t$$

The intercept term in this case is α , and the slopes of the coefficients are represented by β_1 , β_2 and β_3 . The error term is ε_t where t indicates the analysis is being performed on time series data. The linear – log model has been used in this study.

Test for Stationarity (Unit- Root Test)

With the goal of reviewing the characteristics of all explanatory variables included in empirical model, a unit root test has been performed for all predictor variables and it also determines the integration order of each variable. All I (1) variables are perceived to be integrated at first stationary difference and if the linear amalgamation happens to produce the I (0) then the

parameters are said to be co-integrated.

Autoregressive Distributive Lagged Model (ARDL)

The ARDL approach, also known as the bound cointegration technique, is employed in this study. ARDL cointegration procedure is optimal when variables that are implemented in different order such as I (0), I (1) or both I (0) AND I (1) are involved, and trustworthy when there is a distinct long-term association among the variables. F-Statistics finds the relationship between the provided variables in long time period. As far as this method is concerned, the long period link among the variables is believed to emerge when the f stats is higher than the crucial value of the bound I (1), and there will be no everlasting interaction between the variables if the f statistic is lower than the value of I (0). Results are not conclusive if the value of the F-statistic is between the I (1) and I (0). In case of I(2) this technique will not be applicable.

Error Correction Model (ECM)

The ecm term must be negative and fall between 0 and 1. When the ecm value is positive, it indicates the divergence of dependent and moving toward disequilibrium. The ECM term indicates how quickly the dependent variable is converging towards equilibrium. If the conditions of ecm are satisfied, then this means that the dependent variable is moving toward equilibrium.

Factual Results

The experimental study outcomes are shown in the section below.

Unit Root Test

Using the augmented dickey fuller test, the pattern of integration of all the study's variables is estimated. The table displays the outcomes.

- According to the null hypothesis, the variable is not stationary.

Table 1				
	Augmented Dickey- Fuller			
variables	Level stationary	1 st difference	5%	Results
TB	-2.289115	-4.654619*	-3.548490	I (1)
LRER	-1.699890	-4.892856*	-3.536601	I (1)
LCPI	-5.659174*	-2.711821	-3.536601	I (0)

LF	-3.952410	-5.036139*	-3.536601	I (1)
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Note: * displays the degree of significance at 5%, I (1) demonstrates first difference stationary behavior for the variable, and I (0) demonstrates level stationary behavior.

The table shows that trade balance, log of real rate of exchange and log of fdi have unit root but by taking first difference these variables become stationary at five percent significance level and the log of CPI is stationary at level. Because the null hypothesis is rejected when the estimated value of adf exceeds any critical value, the variable is stationary at that point. As a result, some variables are fixed at I (0) while others are stationary at I. (1). A suitable method for cointegration is hence ardl.

The Long Run Co-Integration Analysis of Function of BOT

The study used ARDL, often known as the test for bounds, for long run analysis. Below is a presentation of the ardl test result for bound.

Table 2		
test statistics	Value	k
f statistic	5.040854	3
critical bound values		
significance	bound I (0)	bound I (1)
Ten percent	2.72	3.77
Five percent	3.23	4.35

According to the Null hypothesis, there is no long term link among the variables. According to the findings of the bound technique, the estimated f statistic value (5.04) is much greater than the critical F statistic values at 10% and 5% significance levels, respectively, which are (3.77) and (4.35) respectively. As a result, the alternate hypothesis is approved and the null hypothesis is shown to be insufficient. Thus, the factors employed in the study have a long-term link.

Since there is an everlasting link between the variables. The current focus of the study is to determine whether or not the variable signs follow economic theory. The table 3 below shows the ardl results.

Table 3				
Variables	Coefficients	F statistics	R square	DW test

LRER	-0.507	93.49	0.9359	1.6214
LCPI	1.304			
LF	-0.077			
Constant	-4.403			

The above table shows the values of coefficients, their standard deviation, t- statistics and probability values. The signs of LRER, LCPI and LF are in accordance with the economic theory.

$$TB = -4.403 - 0.507 LRER + 1.304 LCPI - 0.077 LF$$

The above model is linear- log model. If real rate of exchange (RER) is increased by 1% then balance of trade (TB) will decrease by 0.507 units, keeping the other variables constant. If CPI is increased by 1% then balance of trade will increase by 1.304 units keeping all other variables constant. If foreign direct investment increase by 1% then the trade balance decreases by 0.077 units; keeping all other variables constant. This shows that in the long run a raise in the value of real rate of exchange casts negative effects on the balance of trade and the same happens when FDI increases, but in case of inflation, an increase in INF causes improvement in balance of trade.

The F- statistic (93.49) is greater than 4 that mean the model is of good fit. The Durbin Watson value (1.621) is less than 2 that means there is no autocorrelation in the data. R square value shows the explained variation of the model. The R square value is 93% which means 93% variation in balance of trade is due to RER, inflation and FDI.

Error Correction Model (ECM)

The cointegration is quickly identified by the ecm. Furthermore, it pinpoints the convergence toward equilibrium. The estimation is displayed in table 4 below.

Table 4				
Variables	Coefficients	Standard Error	T stats	DW test
D(RER)	-0.507581	0.150653	-3.369215	0.0020
D(CPI)	1.304921	0.661248	1.973423	0.0571
D(LF)	-0.077236	0.038169	-2.023548	0.0514
CointEq(-1)	-0.511862	0.139128	-3.679085	0.0009

The ECM term in the table above is CointEq (-1); it has a value between 0 and 1 and is also negative. ECM has a value of -0.51, which is multiplied by 100 to get its percentage value, which is 51%. This ECM term's probability value, which is below 0.05, adds to its significance. The ECM term demonstrates that due to shifts in the rate of exchange, inflation, and foreign direct investment, 51%, or more than half of the trade balance, converges toward equilibrium every year.

Conclusion

The results show that in long time period all the independent variables significantly affect the trade balance in case of Pakistan. The Pakistani balance of trade is impacted unfavorably by the real exchange rate, while positively by inflation. The Foreign Direct Investment also negatively effects the balance of trade in Pakistan. The negative ECM value depicts that annually 51% of the disequilibrium converges towards equilibrium. The policies that should be implemented keeping in mind the results are that the Pakistani government should take measures encourage the businesses which have export potential. The exchange rate should be lower so that it increases the competitiveness and the exports may become cheaper. And above all that the government of Pakistan should make policies to improve the economic stability in to attract the investors from foreign countries to invest in Pakistan. Because investment increases the productivity of a country and will definitely increase the export capacity. When exports will be encouraged, the trade balance will improve.

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