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Exchange rate and determinants of balance of trade, its impact on balance of payment

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Abstract
An endogenous search for the relationship between exchange rate and determinants of balance of trade and its impact on balance of payment is made. Exchange rate is affected by certain factors like balance of trade and balance of payment. Balance of trade is measured using different factors like exports, imports, capital goods, consumption level, oil prices and political uncertainty. This study is not yet been conducted in Pakistan and we have done this research to evaluate the impact of different factors on exchange rate. Exchange rates help a country while making imports and exports and balance of trade tells about the imports and exports of that country during any particular time period. The paper looks at how the exchange rate is affected by the balance of trade of a country and also explores the relationship between exchange rate and balance of payments. Balance of payment is taken as dependent variable in this paper. Both balance of trade and balance of payment affects the exchange rate and similarly manufacturing growth rate is also affected through variation in exchange rate. The results have shown that there is significant relationship between exchange rate and balance of trade and balance of payment. Both balance of trade and balance of payment have strong relationship with exchange rate.

Keywords
Exchange Rate, Balance of Trade, Balance of Payment

1. Introduction

A country's balance of payments (BOP) account keeps track of both its payment to and its receipts from other country. The BOP is a bookkeeping system for recording all payments that have a direct bearing on the movement of funds between a nation (private sector and government) and foreign countries. The BOP account uses a standard double-entry bookkeeping system much like to keep a record of payments and receipts. All transactions involving payments from foreigners to country are entered in the "Receipts" column with a plus sign (+) to reflect that they are credits; that is, they result in a flow of funds to county. Receipts include foreign purchases of country products such as computers and wheat (exports), purchases from foreign tourists (services), income earn from country investment abroad (investment income), foreign gifts and pensions paid to country (unilateral transfers), and foreign payments for country assets (capital inflows). All payments to foreigners are entered in the "Payments" column with a minus sign (-) to reflect that they are debits because they result in flows of funds to other countries. Payments include country purchases of foreign products such as machinery and cars (imports), country travel abroad (services), income earn by foreigners from investments in the country (investment income), foreign aid and gifts and pensions paid to foreigners (unilateral transfers), and country payments for foreign assets (capital outflows). Along with BOP, balance of trade (BOT) and exchange rates are amongst the most important factors that play a vital role in examining the economic equilibrium of a country. Mostly trade oriented factors affect exchange rate and devalued exchange rate lower the purchasing power of that nation. BOP also has a strong relationship with the exchange rate.

In Pakistan it is important for the investors to invest from the debt to increase the investment in the country. When the investment increases in the country, imports of that country decreases and exports tends to increase that mean a country's capital account increases and the current account decreases. Debt is important to increase the investment in the country, the production as well as exports will also increase that will reduce the balance of payment through the exports of the product. In the long run internal or external deficits have negative impact on the economic growth of the country. It will increase the future investment in the country's economic growth. It has two impacts on the debt and growth. First it is the burden of debt on the economy and second is debt is the neutral for the economy. Pakistan's external debt reached an unprecedented level during the 1990s. Growth in external debt include inept use of borrowed resources in the form of wasteful government spending, and financing of current expenditure, and investing in low priority development projects, and poor implementation of foreign aided projects. Because of an injudicious utilization of foreign loans, debt carrying capacity of the country weakened due to reduction in real revenues and exports, leading ultimately to increase real cost of government borrowing, both domestic and foreign.

2. Literature Review

The exchange rate directly affects policy making of a nation regarding the trade balance of a country with the rest of the global and policy formulation [1]. The government has been concerning on increasing exports and improving the balance of payments for the last few years; result seem to be exactly the opposite of the declared target: the gap between exports and imports has widened [2]. Rising oil prices and the import of machinery have severely troubled the balance of trade as the trade deficit reached $3.5 billion in just nine month [3]. Purchasing Power parity does not hold as a long run equilibrium relation, it is an empirical test on Australia's long run real exchange rate [4]. A monetary expansion causes long run depreciation because it is an increase in the supply of the currency, and an increase in expected inflation causes long run depreciation because it decreases the demand for the currency [5]. Short and long-run neutrality results if wealth consists only of foreign original level. However, if interest earnings on foreign securities dominate the trade balance in the expression for the exchange rate; monetary expansion leads to an appreciation of the exchange rate [6]. The real exchange rate may be an important variable through which terms of trade shocks are transmitted to the current account. Debt service on amortization and interest account reaches and exceeds the annual amount of a constant gross outflow of new capital. Foreign investment does not give rise to any problems intrinsically different from those created by domestic investment, public or private [7]. Distinct arguments link IMF programs to either higher or lower levels of FDI inflows. IMF programs may prescribe economic reform packages that are conducive to multinational investors, leading to higher levels of economic stability and strong macroeconomic performance. Countries in economic crisis that urn to the IMF for supporting habit their ability to attract multinational investors, countries weathering a financial crisis attract fewer FDI inflows if they sign IMF agreements. A second argument is that countries may sign IMF agreements because of the austerity conditions associated with IMF programs [8]. In his 1970 analysis of the world monetary crises, Harry Johnson spoke of the liquidity problem as re-emerging in the late 1960s because of the inadequacy of the IMF provisions 'to provide for growth of international liquidity at a rate adequate to meet the needs of the expanding world economy [9]. Rose estimate the effect of sovereign debt renegotiation on international trade. Sovereigns may fear the trade consequences of default; because creditors deter default, or because trade finance dries up. Those developing countries which are exposed to the trade liberalization policies have experienced rise in exports and imports but imports rose more than exports and hence imbalance the BOT and BOP [10]. Positive and significant long-run relationship exists among the exchange rate and balance of payment [11, 12]. Exports need to be higher for a balanced economic scenario for Pakistan. Economic phenomena that restrict the positive flow of exports require a revision because exchange rate depreciations cannot improve the BOP situation solely [13].

3. Variable Explanation

Balance of Trade: In Pakistan balance of trade is in deficit constantly, Pakistan is basically an agricultural country and 70% population rely on agriculture directly or indirectly. Balance of trade also affected by many other economic factors.

Manufacturing Growth Rate: The second source of export of Pakistan is manufacturing growth rate that is textile industry and sports industry. Many Multi-National Companies (MNCs); operate in Pakistan that are also source of exports but MNCs; long term effect is go beyond opposite to balance of trade.

Exports: The exports of goods play an imperative role in the economic development of a country and signify one of the most important sources of foreign exchange income. Exports not only ease the pressure on the balance of payments but also create employment opportunities. They can increase intra-industry trade, help the country to integrate in the world economy and reduce the impact of external shocks on the domestic economy increases in the volume of exports always support the current account balance. However, this increase must be greater than the volume of imports. If the volume of exports increases at the same proportion or less than imports then this increase in the exports will not support the current account balance.

Imports: Imports of a country depend upon the domestic production capacity. If the local producers are unable to produce enough to satisfy the domestic demand, then increased imports are required to fill this gap. High volume of imports as well as concentration of imports on capital products are some of the main causes for current account deficit.

Capital goods: In the economic realm, "capital goods" is a specialized term which refers to real objects owned by individuals, organizations, or governments to be used in the production of other goods or commodities. Capital goods include factories, machinery, tools, equipment, and various buildings which are used to produce other products for consumption. The growth in capital goods industry in Pakistan has more merits and it would be a reflective of business confidence on the dynamic economic performance. The State Bank in its annual report for the year 2007-08 said that in Pakistan, the correlation of GDP growth was highest with capital goods manufacturing compared with the production of intermediate and consumer goods.

Consumption Level: Total consumption is the factor that has a negative sign, points out that an increase in the consumption level will decrease country’s exchange rate and fall in the consumption will enhance the exchange rate. Therefore it is hypothesized that consumption of the country has a negative relationship with exchange rate.

Oil Prices: Oil prices have a significant contribution in the country exchange rate. It will affect both positively and negatively on the current account balance. Therefore it is hypothesized that Oil prices has a relationship with exchange rate of the country.

Exchange rate: The exchange rates (also known as the foreign-exchange rate, forex rate or FX rate) between two currencies specify how much one currency is worth in terms of the other. It is the value of a foreign nation’s currency in terms of the home nation’s currency. The exchange rate of Pakistan as compared to other currencies fluctuated with the passage of time due to different political, economical and other factors.

Balance of Payments: In economics, the balance of payments (or BOP) measures the payments that flow between any individual country and all other countries. It is used to summarize all international economic transactions for that country during a specific time period, usually a year. The BOP is determined by the country's exports and imports of goods, services, and financial capital, as well as financial transfers. It reflects all payments and liabilities to foreigners (debits) and all payments and obligations received from foreigners (credits). Balance of payments is one of the major indicators of a country's status in international trade, with net capital outflow.

4. Methodology

Theoretical framework of this study in the form of a flow chart is given in figure 1.

Objective of research can be achieved with the help of econometric technique which is used to test the existence of a long run association among the time series of data. In detail review of literature of exchange rate relationship, the BOT has significant positive relationship and economic growth i.e. industrial growth, capital goods and consumption level has strong negative relationship and oil prices has positive/negative relationship with exchange rate as its sign depends upon oil production at national level and its import from other countries. A general form of linear relationship of exchange rate with defined variables is presented in the following regression equation.

$$\text{Exchange rate} = \beta0 + \beta1\ (\text{Exports}) - \beta2\ (\text{Imports}) - \beta3\ (\text{Capital goods}) - \beta4\ (\text{industrial growth}) - \beta6\ (\text{Consumption level}) + \beta7\ (\text{Oil prices}) + \text{error} \qquad (1)$$

The coefficient of each variable in the left hand side generally called independent variable, measures the impact of that respective variable on the right hand variable known as dependent variable assuming the impact of every other variable held constant. To have valid results the error term is assumed to be distributed normally with zero mean and constant variance.

With the help of literature, we concluded that BOP and exchange rate has significant relationship with each other. Role of government is very significant in making advantage from this variation with the help of devising country favorable policies for boosting exports and reducing imports helps in their trade reforms, and eventually constructs a strong positive impact on BOP. The mathematical relationship among exchange rate and BOP is provided in equation 2.

$$\text{BOP} = \beta0 + \beta1\ (\text{exchange rate}) + \text{error} \qquad (2)$$

Slope coefficient of exchange rate measures its impact on BOP and the error term is assumed to be normally distributed with zero mean and constant variance.

Data of defined variables is collected on annual basis for Pakistan. The data of exchange rate (ER) and BOP is collected from International Financial Statistics (IFS). The data for imports (IM), exports (EX), capital goods (CG) and industrial growth (IG) are taken from World Data Bank indicators. Furthermore, Oil prices (OP) (US $ per barrel) are taken from OANDA forex. All the data are collected in same measuring unit as billion United States dollars.

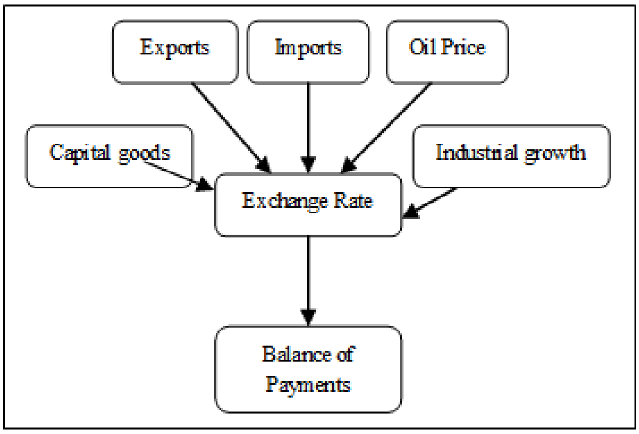

Figure 1. *Theoretical Framework*

5. Data Analysis

The regression equation explained through equation 1 is estimated using the most common statistical method; the ordinary least square method and the estimated results are provided in table 1.

Table 1. *Result of Linear regression of Model-1*

Variable	Coefficients	t-value	p-value
constant	12.55	1.01	0.334
EX	0.010842	3.34	0.007
IM	-0.005869	-2.35	0.038
CG	0.001212	1.08	0.304
OP	0.002600	0.39	0.704
CL	-0.001030	-0.61	0.552
IG	-0.0000598	-1.08	0.302
R-Sq(adj) = 83.9%		R-Sq = 89.6%	

The estimated regression equation is given below.

ER = 12.6 + 0.0108 EX - 0.00587 IM+ 0.00121 CG + 0.00260 OP- 0.0 0103 CL -0.000060 IG

It is quite clear from the values of the regression coefficient R^2= 0.89 and adjusted R^2= 0.839 that equation 1 well capture the relationship among the exchange rate and its under study determinants. From the results it can be inferred that 1 billion dollars rise in exports for Pakistan will boost the exchange rate by 0.01 units as exports positively determine exchange rate. Imports, government consumption level and industrial goods show negative impact on the determination of the exchange rate of Pakistan. These factors force to fall the exchange rate by 0.01, 0.001 and 0.0001 units respectively upon a rise of their level by 1 billion dollars. Capital goods and oil price on a rise in their value also affect exchange rate to rise by 0.001 and 0.002 units respectively. The impact of factors other than exports and imports are found to be very negligible which can be clearly noted from the p values corresponding to each variable. Exports and imports make significant impact in determining exchange rate for Pakistan.

The equation 2 is also estimated using the least square method and the estimated regression results are provided in table 2 and the estimated regression equation is

BOP = 522 + 58.2 ER

Table 2. *Result of Linear regression of Model-2*

Variable	Coefficient	StDev	t-value	p-value
constant	522	1508	0.35	0.734
ER	58.16	32.09	1.81	0.089
R-Sq = 17.0%		R-Sq (adj) = 11.8%		

1 unit change in the exchange rate will bring a positive change of 58.2 units in the BOP. The p-value corresponding to the exchange rate shows its significant impact on the BOP at 10% significance level. The above results show that there exist a relationship among the variables in the two models but the magnitude and intensity is different. However BOP is not strongly determined solely by the exchange rate as visible from the values of R^2 and adjusted R^2.

6. Conclusion

This paper finds the relationship between the exchange rate balance of trade and balance of payment. Export, import, capital goods, consumption level, oil prices and political uncertainty are used for measuring the impact on exchange rate. Exchange rates help a country while making import and export. Balance of trade of a country tells about the imports and exports of a country during any particular time period. This study had tried to reveal the relationship between the exchange rate and balance of trade and balance of payment. The results showed that there is 89.6% strong and significant relationship between exchange rate and balance of trade, export, import, capital goods, consumption level, oil prices and political uncertainty. The study also supports the past findings for Pakistan that a rise in exports is needed in order to attain economic balance and assure the economic growth of the country. The results have also shown that statistically there is significant relationship between exchange rate and balance of payment. The hypothesis of strong and positive relationship between the growth rate, BOT and BOP remains valid in the case of Pakistan and these factors affect the exchange rate.

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