



ROLE OF FOREIGN INVESTMENT AND EXTERNAL DEBT IN DETERMINATION OF EXCHANGE RATE

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ABSTRACT

The purpose of study is to observe importance and impact of the external debt and foreign investment in exchange rate of Pakistan. Ordinary Least Square and Exact Maximum Likelihood methods have been used for estimating the models. Cost of foreign debt has the significant relationship with the exchange rate and it has inverse relationship. Cost of foreign investment has also significant relationship with the exchange rate of Pakistan. The direction of relationship is same in both estimation methods but the significance level of the variables are different in both cases. It is also observed that the first lagged of exchange rate is also playing an important role for determination of exchange rate model.

Keywords: External debt, Foreign investment, Ordinary least square, Exact maximum.

Contribution/ Originality

This study is one of very few studies which have investigated the relationship between the inflow/outflow of foreign currencies and the exchange rate.

1. INTRODUCTION

World is the global village and every country connected with each other. Every country has its own needs and they fulfil their needs by trading each other. In the early, countries fulfil their needs using barter system which is exchange of goods & services. Later on barter system demolished and changed into financial/monetary system. Monetary or financial system is based on the values of goods and services.

Each country has its own monetary and financial system. Monetary value means the price/amount in terms of currency. There are a lot of countries in the world and each country has its own currency. For the international trade of goods & services, currency should pay in international mode of currency e.g. US\$, Euro, British Pound and many others. As world is the

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global village, there are different type of countries that are developed countries and developing countries. Mostly developed country fulfils their needs from less developed countries using the international trade. The term international trade is based on exports and imports of goods services.

Now the main issue is that how a country can pay or receive the amount in its own currency? For this issue, researchers and economist introduced the concept of exchange rate. The simple description of exchange rate is; selling or buying of one currency in terms of any other currency. High exchange rate is a serious issue for the less developed countries rather than the developed countries. The mode of international transactions is mostly in US\$, Euro and British Pound.

Less developed countries (LDCs) receive the foreign currencies in different modes. They receive in terms of foreign investment, receipt of exports, external loans, remittances and many other ways. As well as when they received the foreign currency; they try to pay the imports payment, interest payment and investment payment.

In LDCs external debt, foreign investment, exports, imports and remittances are having significant position in domestic economy. On the other side less developed countries facing the influence of appreciation/depreciation of local currency against the foreign currencies. This study is based on the three sectors relationship which is external debt burden, investment burden and exchange rate. In this study we want to investigate the role of external debt and foreign investment for determination of exchange rate; and considering Pakistan as a case study. In this study different variable has been used for the model building. These variables are exchange rate, external debt, and cost of external debt, remittances and foreign investment. This study is based on the times series for the period 1980-2012.

For the model building, first we check the unit root of the variables and then estimate the model using least square method and exact maximum likelihood method.

Exchange Rate has the importance for the compilation of Balance of Payment (BoP) of any country". "Exchange rate" has the key role in BoP especially in less developed countries (LDCs). Current account of BoP of LDCs mostly shows the deficit trend and this leads to the depreciation of the domestic currency. The importance of the study is, to find the impact of external debt and foreign investment in the appreciation/depreciation of local currency (Pak Rs.).

In this paper, section 2 describes the review of literature, section 3 is based on graphical representation & Methodology, section 4 covers the analysis and discussion of the study and section 5 covers the conclusion of the study.

2. REVIEW OF LITERATURE

Depreciation in local currency is a major issue in less developed economies. For solving this issue; researchers have been used the different statistical tools and econometric models.

Agene (1991), studied the relationship between international trade and Nigerian exchange rate. In this study he describes the linkages among exchange rate & exports, imports & exchange rate, investment & exchange rate, and remittances & exchange rate.

Flood and Rose (1995), studied the floating and fixed exchange rate. In this study structural equation has been used and found that macroeconomic fundamentals are unlikely playing successful role in the determination of exchange rate.

Bruce (1997), studied the association between FDI and exchange rate. In his study maximum likelihood estimation has been used for estimating the coefficient of the model. The researcher argues on the result basis, that acquisition of FDI and exchange rate has the strong relationship.

Zahang (2001), describes the link or association between growth of less developed countries and foreign investment. In this study he used the data of different countries of Latin America and East Asia. He used the time series model Error Correction Model (ECM) and found that increase in inflow of foreign investment has the promoting impact on economic growth of the country.

Ndikumana and James (2003), studied the capital flight, public debt and private asset of the thirty sub-Saharan African countries. In this study they create the linkages among the capital flight, public debt, private asset, exchange rate, fiscal policy, inflation and interest rate.

Chinedu and Michael (2006), studied the relationship among the exchange rate, foreign debt and foreign investment. In this study they developed a regression model, OLS method and exact maximum likelihood method has been used for the estimation.

Donneil (2010), developed a long run unrestricted ECM model for the foreign debt. They developed a function for the foreign debt. They used the real and monetary sector variables which are GDP, consumption, broad money, exchange rate and international reserves. They found the direct association between external debt and exchange rate in short run but there is negative association in the long run.

Hasan (1999), studied the relationship of external debt burden, Current Account Deficit (CAD) and financing. The finding of the study shows that CAD and financing are playing progressive role in the increase of external debt burden of Pakistan.

Ishfaq and Chaudhary (1999), studied the fiscal deficit and external debt relationship. The results of the study show that the continuity of the fiscal deficit is the major factor for increase of external debt burden. They found that external debt and fiscal deficit has the causal relationship.

Kemal (2001), describes the main factors which are playing an important role in the external debt burden. He found that fiscal deficit and BOP are the causal factors of foreign debt burden.

Bilquees (2003), studied the linkages among the budget deficit, exchange rate, foreign debt and interest rate. She found that volatility in exchange rate, interest rate and continuity in budget deficit are the responsible of the increase in foreign debt.

Mohey-ud-Din (2005), discuss the importance of the foreign aid for external debt and economic growth. He concludes that domestic savings of Pakistan and foreign aid are the substitutes of each other.

Shamshad (2009), studied the influential factors of Pakistan's economy. They used the principal component analysis and found that foreign Direct Investment is influential factor of the economy.

Asma (2011), studied linkages of fiscal balance, foreign debt, terms of trade and exchange rate. In this study they used the VECM model. In the short run there is no connection but there is a connection in long run; is the finding of the study.

Shabana (2012), examined the relationship among the exchange rate of Pakistan, international trade, growth rate and inflation. They used the simple linear regression and found that inflation and growth rate has the strong impact in the volatility of exchange rate. International trade(Exports, Imports) has also impact on variability of exchange rate but it is lesser than the growth rate and inflation impacts.

The above existing literature explained the relationship among the economic growth, exchange rate, foreign investment, external debt, inflation, CAD, fiscal balance and interest rate of the country. In the literature, ECM, unrestricted ECM, long run, short run dynamics has been discussed in the case of Pakistan. There is a need to develop a simple linear and lag model for the exchange rate of Pakistan. We used Chinedu and Michael (2006) regression models to identify the links among the foreign investment burden, exchange rate and external debt.

3. FOREIGN INVESTMENT AND EXTERNAL DEBT OF PAKISTAN

Literature shows that foreign investment and external debt have the significant role in the economy. The concept of external/foreign debt and foreign investment are describing in the following sections.

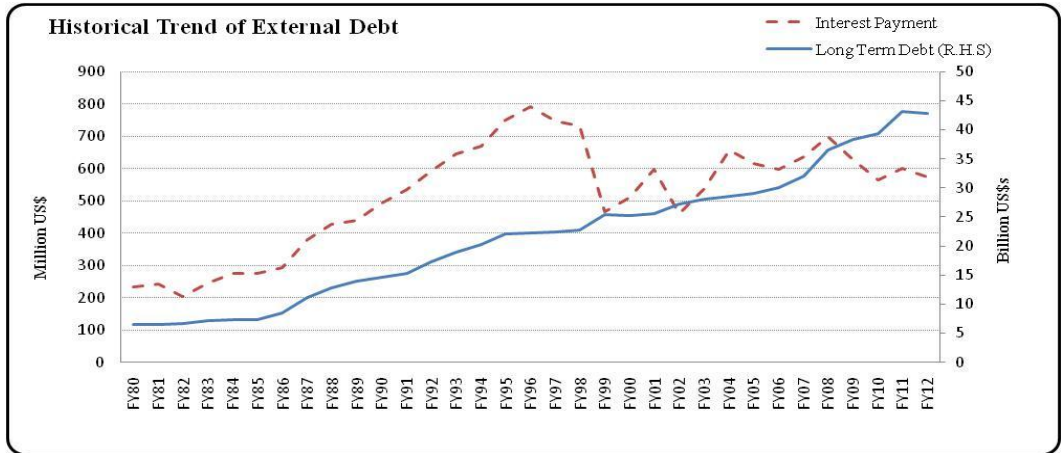
3.1. External Debt

A country borrows the money from the foreign countries on some interest rate is called the external or foreign debt of country. The lender of money can be government of any country, IMF, Asian Development Bank, World Bank or any other private corporation. External debt of a county includes the public debt, public sector enterprise (PSEs), banks, private sector and direct investor (intercompany debt).

In case of Pakistan, outstanding external debt of the government is US\$ 46 billion and it is 83% of the total public debt. In this study we used government debt as external debt because it covers more than 80% of the total public debt. In the government debt more than 93% is based on Paris club, multilateral and bilateral debt.

External debt is playing an important role in less developed countries. External debt is a very common problem for the LDCs because they don't have enough resources for achieving the basic necessities. So they borrow the loan from the other countries and pay high interest rate. Pakistan is also facing the same problem.

Cost of external debt is describing as; total interest payment on external debt. In other words additional payment on the external debt is called the total cost on external debt. The aggregate of the principal amount and interest amount is called the debt servicing.

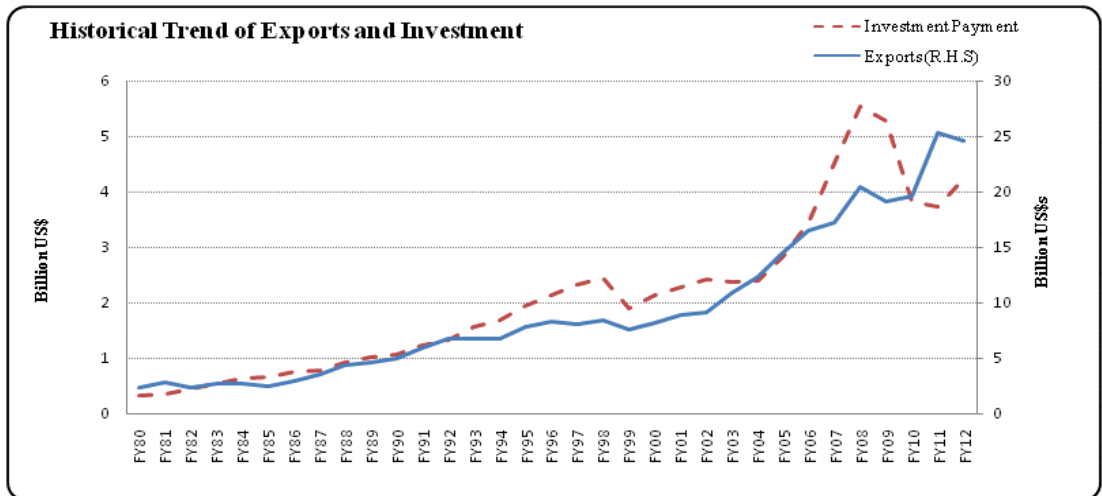


3.2. Foreign Investment

Foreign Investment is the capital inflow of one country from another country. Foreign investor can be government, private institution or any individual. There are two types of investment, private investment and public investment. Further classification of the private investment is foreign direct investment and portfolio investment. Similarly foreign public investment includes on only portfolio investment. Literature indicates that inflow of foreign investment in less developed countries is also a burden. In other words, a foreign investor invest his money in any other LDC and want the remittance or repatriation amount in foreign currency, at that time country facing the more foreign burden in the shape of remittance payment.

So repatriation on foreign investment has been used in the study.

In this study, annual average exchange rate (Pak Rs/US\$) has been used for the period FY-80to FY-12. As the literature review concludes that exchange rate has the significant importance in the country’s growth, so we should choose the exchange rate against the most and easily tradable currency likes US\$, Euro, British pound and Yen.



4. REGRESSION MODELS

This study is based on the Chinedu and Michael (2006) regression models. In the models, exchange rate is the dependent variable, cost of debt, outflow of foreign investment income and international oil prices are the exogenous variables. These models are:

$$LY = \alpha + \beta_1 LCoD + \beta_2 LRX + \epsilon \tag{1}$$

$$LY = \alpha + \beta_1 LCoD + \beta_2 LRX + \beta_3 LOil + \epsilon \tag{2}$$

$$LY = \alpha + \beta_1 LCoD + \beta_2 LRX + \beta_2 LY_{-1} + \epsilon \tag{3}$$

Where:

LY: Log of Annual Average Exchange Rate (RS/US\$)

LCoD: Log of Cost of Debt(interest payment/external debt*100)

LRx: Log of Investment Burden (repatriation/exports*100)

LOil: Log of International Oil Prices

LY-1: Lag of Exchange Rate

€: Error term

For the estimation of above models (1,2,3) ordinary least square method and exact maximum likelihood has been performed in EVIEWS and Microfit software.

4.1. Estimation Methods

Ordinary least square and exact maximum likelihood method has been performed for the estimation of regression models. The coefficients of model 1,2 and 3 is estimating using the OLS method are

$$LY = 2.20 - 1.82 LCoD + 0.97 LRx \tag{1}$$

$$LY = 2.64 - 1.80 LCoD + 0.92 LRx + 0.05 Loil \tag{2}$$

$$LY = -0.19 - 0.088 LCoD + 0.177 LRx + 0.939 LY(-1) \tag{3}$$

The sign of the coefficient of LCoD is negative in all models. This means that there is inverse relationship between the cost of debt and exchange rate. The sign of the LRx is positive in all models. This means that LRx has the direct relationship with exchange rate.

Table-1. Summary of Regression Models (OLS)

Variables	Eq.1	Eq.2	Eq.3
C	2.1997 [0.0120]	2.6385 [0.0742]	-0.1892 [0.3008]
LCoD	-1.8165 [0.0000]	-1.8869 [0.0000]	-0.0878 [0.1742]
LRx	0.9759 [0.0008]	0.9162 [0.0061]	0.1769 [0.0037]
LOIL	-	-0.0548 [0.7067]	-
LY(-1)	-	-	0.9393 [0.0000]
Adj. R ²	0.8131	0.8076	0.9938
DW	0.8990	0.9382	2.04
Model P-value	0.0000	0.0000	0.0000

P-Values shows in []

Table 1 shows the summary of the regression model with their significance. Cost of debt (COD) is playing significant role in model 1 & 2. In model 3, COD is insignificant but the sign (+,-) of the coefficient is remain negative. Outflow of foreign investment income or cost of foreign investment (LRx) is playing significant role in all models and the sign(+,-) of the coefficient is positive. In model 2, an international oil price has the negative sign but it is insignificant. This means that there is inverse relation but it is insignificant. In model 3, lag of exchange rate has the positive sign with the high significance in the model. The adjusted R² of the models are over the 80% and Durban Watson statistic of model 3 is significant.

4.2. Exact Maximum Likelihood Method

In OLS estimation, 1st lag of exchange rate in eq.3 is affecting the significance of the variable ‘cost of debt’ and intercept. Now we use the EMLE for estimating the coefficient of the said models.

Table-2. Summary of Regression Models (EML)

	Eq.1	Eq.2	Eq.3
C	3.3369 [0.003]	3.5783 [0.004]	-0.1892 [0.296]
LCOD	-0.2218 [0.058]	-0.2246 [0.058]	-0.0846 [0.191]
LRx	0.0856 [0.447]	0.0663 [0.571]	0.1738 [0.005]
LOIL	-	-0.0452 [0.503]	-
LY(-1)	-	-	0.9412 [0.000]
Adj. R ²	0.9831	0.9849	0.9933
DW	0.9881	0.9391	1.97
P-Value	0.000	0.000	0.000

Table 2 shows the summary of models using the exact maximum likelihood method. Here is the same situation regarding the intercept significance. It is significant in first two models and insignificant in model 3. The sign of the cost of debt is negative in the models and it is significant at 10% of level of significance in model 1 and model 2. Foreign investment is showing the insignificant result in model 1 and model 2 but it is significant in model 3. On the other hand foreign investment has the significant relationship in OLS estimation. Durbin Watson of the model 3 is 1.97, and other two models have DW less than 1.

5. DISCUSSION

Graphical representation of the external debt, interest payment, exports, exchange rate and Investment payment shows the increasing trend from FY - 80 to FY - 98. After the FY-98 there is irregular pattern in interest payment. Figure 1 and 2 shows increasing phenomena of external debt, foreign investment and exports.

In Ordinary least square method, cost of debt and exchange rate has the inverse and significant relation in model 1 and model 2. But it is insignificant in model 3. The sign of the coefficient is negative in all the models. Foreign investment has the positive and significant relationship with exchange rate in all models. International oil price has no significant relationship with the exchange rate of Pakistan. First lag of exchange rate is shows the highly significance in model 3.

In exact maximum likelihood method, the behavior of intercept is same as the OLS method. It is significant in model 1 and 2, but insignificant in model 3. Cost of debt has the same behavior of significance. OLS and EML has only the difference of magnitude of the coefficient.

The result of the fitted models gives very interesting picture. As we know that, in normal phenomena cost of debt and exchange rate has the positive relationship but here it is opposite or inverse. The major reason of the inverse relationship is the inconsistency of the loan policy. As Pakistan showed their nuclear power in 1998; due to that IMF impose international sanctions on Pakistan. At that time Pakistan is in-short of foreign currency and re-schedules their foreign loan in 1998-1999 (Figure 1). In model 1 and model 2 foreign investments shows the insignificance in EML method. On the other side it shows the significance in all models but now it shows the significance only in Model 3.

6. CONCLUSION

From the above data analysis and discussion, we conclude that cost of debt and cost of foreign investment has the significant relationship. Cost of debt has the inverse relation with the exchange rate and cost of foreign investment has the direct relationship with the exchange rate. First lag of exchange rate has the significant role to determine the future exchange rate of the country. Exact maximum likelihood estimation is suitable for the lag distributed models. These models can help us in determining the future exchange rate. As the schedule of re-payment of loan and repatriation is already decided, so we can predict the future exchange rate using the schedule of payment and the above models.

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