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Impact of Exchange Rate on Stock Market

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ABSTRACT

The exchange rate and stock market are the two fundamental financial markets in the world. These two markets are playing key role in an international business all over the world. It is necessary to understand the relationship between the both markets so that the investors may be able to invest in a better way by taking the minimum risk. This paper investigates the relationship between the stock market and exchange market of Pakistan. KSE-100 index is used as a substitute of Stock Prices while currency rate of Pak Rupee against US Dollar (Rs/US$) is taken for exchange rate exposure. The data is on monthly basis and the time period is from January 2004 to December 2009. The findings of the study indicate that there is no relationship exists between exchange rate and stock price and both the variables are independent of each other.

Keywords: Fundamental Financial Markets, Exchange Rates, Stock Market
JEL Classifications: F31, O16

1. INTRODUCTION

The market value of firms and the stock prices can be significantly affected by multiple factors out of which exchange rate fluctuations is an important one. There is still no consensus on the relationship between stock market and exchange rate although the topic has been widely discussed. Financial theory explains that the value of firm should be influenced by exchange rates and interest rates. The upward and downward exchange rate movements may determine the stock prices of the firms. In Pakistan, foreign direct investment (FDI) is an important element of stock prices and the trend of FDI may considerably be affected by changes in exchange rate either depreciating or appreciating. Similarly, the exchange rates are affected by the movements in stock prices.

Domestic investors invest more in domestic market when there is an increase in prices of assets which in turn increase the demand for local currency and also increase the behavior of selling the foreign assets. The increase in demand of local currency will force the interest rates to become higher which will ultimately attract the foreign investors to invest and gain maximum benefit. The exchange rate of local currency will appreciate against that of foreign currency and shows negative relationship as also suggested by Portfolio Balance approach. While, Traditional approach advocates that there is a positive relationship between stock market and exchange market and the causality runs from exchange rate to stock market. It suggested that a positive relationship between stock prices and exchange rates exists when local currency depreciates and local firms become more competitive which leads to an increase in their exports. This will result in an ultimate increase in stock prices. In addition to above two approaches, there exists another approach i.e., Asset Market approach which propose that there is no interaction or very weak association between the exchange rate and stock market. This is due to the reason that both the variables may be driven by different factors. The current international financial system and its ever increasing importance with the passage of time have brought many researchers to study the relationship between stock market and exchange rate. Mishra (2004) studied that the Asian financial crisis, advent of floating exchange rate in early 1970's and financial market reforms in early 1990's have brought the researchers to determine the relationship between the both variables.

Karachi stock exchange (KSE), founded in 1947, is the biggest

and leading liquid exchange in Pakistan. It was declared the best performing stock market of the World for the year 2002. 654 companies were listed as on 8th December, 2009 with a market capitalization of Rs. 2.561 trillion (US$ 30.5 billion) having listed capital of Rs. 705.873 billion (US$ 10.615 billion). KSE began with a 50 shares index. As the market grew a representative index was needed. On November 1, 1991 the KSE-100 was introduced and remains to this day the most generally accepted measure of the exchange. Since 1991, KSE has provided an equal opportunity to foreign investors together with local investors to operate in the secondary capital market. The establishment of the new policy for foreign investors and initiated privatization in Pakistan has accelerated the development of the KSE.

The purpose of the study is to further investigate the relationship between stock prices and exchange rate in Pakistan as the issue still has no consensus. In this paper, the current scenario is tried to analyze by using the latest data available. The awareness about the relationship between the both markets would facilitate to take precautionary measures before the spread of a crisis. Next the related literature is reviewed while in Section III data and methodology is discussed. Findings and results are analyzed in Section IV of this paper. Section V consists of summary and conclusion.

2. LITERATURE REVIEW

According to the study of Franck and Young (1972), there is no significant interaction between the stock market and exchange rate. An association was examined by Bhattacharya and Mukherjee (2003) between the stock prices and financial sector of currency exchange in India and found no significant integration. Nonlinear Least Square method used by Ong and Izan (1999) to find the relationship between stock prices and exchange rates. They found a very weak association between the US stock market and exchange rates. While, Soenen and Henniger (1988) found a significantly negative relationship between the value of US dollar and stock prices by using monthly data on stock prices and effective exchange rates for the period 1980-1986. Jorion (1990) determines significant differences across industries by considering the impact of exchange rate on US multinational firms. The developed countries have experienced less exposure of exchange rate movements as compared to developing or emerging countries.

A bidirectional relationship exists between the two variables. Both variables have little or more impact on each other. Yu (1997) conducted the study by using daily data for the period 1983-1994 on three Asian countries Hong Kong, Tokyo and Singapore. He brought the facts that a bidirectional relationship exists in Tokyo while Singapore market has unidirectional relationship i.e., changes in exchange rate to changes in stock prices. Abdalla and Murinde (1997) investigated the relationship between the two variables in four Asian countries for the period 1985-1994 by using co integration approach in the long run and come up with the conclusion that no causality exists in Pakistan and Korea while supported its presence in India and Philippines. Ajayi et al. (1998) found a unidirectional relationship from stock

market to foreign exchange market on developed economies and no consistent relationship in developing economies. Pan et al. (2001) examined that exchange rates are significantly correlated with stock markets in seven Asian countries by using the data for the period 1988-98.

Nydahl (1999) presented the evidences from Sweden that industries in small open economies face significant exchange rate exposure. This study was also supported by Kiymaz (2003) from the evidences of Turkey. Griffin and Stulz (2001) examined that the stock market of developed countries have less impact of changes in weekly exchange rates. Kiymaz (2003) find out that Turkish firms are highly affected by exchange rate fluctuations. Daniel Stavarek (2004) investigate the relationship between stock prices and exchange rates by using the monthly data of four old and four new EU member countries in both long and short run. He found on the basis of evidences that more powerful long run as well as short run relationship exist in the period 1993-2003 than during 1970-1992. Giovannini and Jorion found the same behavior between the both variables in USA with the help of the empirical study. Phylaktis and Ravazzolo (2000) study the long and short term dynamics and conduct the research on Pacific Basin countries over the period 1980-1988 with the conclusion that exchange rate and stock markets are positively correlated.

The relationship between exchange rate and stock market may vary. It may be different depend upon the geographical area, economic conditions, relations with international world, domestic conditions etc. The inconsistency in the results between the different countries might be due to the trade volume, equity, economic relations, risk assessment etc. The direction of the impact of both variables may not be estimated as it may be unidirectional, bidirectional or multidirectional. Rittenberg (1993) investigated the relationship between stock price and exchange rate in Turkey by applying Granger causality tests and found that there is a unidirectional relationship that runs from price level changes to change rate changes but there is no reverse relation exists. Bahmani-Oskooee and Sohrabian (1992) also apply Granger causality tests to find the relationship between stock market and exchange rate for the period 1973-1988. They investigated that a dual and bidirectional relationship exists between stock prices and exchange rates in the short run without further examining it in the long run. Granger et al., (2000) found that there is a strong relation between the two variables and in some case, it was unidirectional with negative interaction while bidirectional in the others.

Ali Kemal and Haider (2005) conduct the study on Pakistani data in short run to find the movements of exchange rate with the changes in prices, interest rates, foreign reserves and trade balances. They find the facts that changes in real exchange rate and nominal exchange rates are highly correlated and no significant correlation exist between relative prices and nominal exchange rate. Co-integration and Granger Causality test was performed by Muhammad and Rasheed in 2002 to find out the causality between the stock price and the exchange rate in four Asian countries for the period from 1994 to 2000. His study showed that the both

variables are independent of each other in Asia. Bhattacharya and Mukherjee (2003) also support the findings that there is no interaction between stock price and exchange rate.

3. DATA AND METHODOLOGY

3.1. Data
The data on stock prices are collected from KSE-100 index on monthly basis for the period from January 2004 to December 2009 while data on exchange rate of Pak rupee against US dollar is obtained from State Bank of Pakistan and Forex. The returns of the variables are used to test the viability of the data.

RER = Return of exchange rate Pak rupee/US dollar
RSP = Return of stock price of KSE-100 index

3.2. Methodology
In order to check the interaction between stock price and exchange rate, firstly it is essential to determine whether the data collected is stationary or not. A time series data can be either stationary or non stationary. Augmented Dickey Fuller (ADF) test is applied to check the unit roots/stationarity of the data at level. The ADF test is based on the following equation:

$$\varepsilon = \alpha + \beta \left(1 \text{ x } -\varepsilon \right)$$

If the series is non-stationary then co integration test will be applied to check the causality and the integration between the variables but in this study the series is stationary, so Granger Causality test will be applied to check whether these financial variables affect each other or not. The Granger Causality test depends upon the following two equations at first difference:

$$\Delta X_t = \alpha_1 + \sum_{i=1}^{m} \beta_i \Delta X_{t-i} + \sum_{j=1}^{n} \delta_i \Delta Y_{t-j} + \varepsilon 1t$$

$$\Delta Y_t = \alpha_2 + \sum_{i=1}^{m} \gamma_i \Delta X_{t-i} + \sum_{j=1}^{n} \phi_i \ \Delta Y_{t-j} + \varepsilon 1t$$

Further, regression analysis test is also performed to confirm the results of Granger Causality test. The method used for this test is least square method while taking the stock price as dependent variable Y and exchange rate as an independent variable X. The regression model used for the study is as follows:

$$Y = \alpha + \beta X + error$$

4. RESULTS AND ANALYSIS

In this study, ADF test is performed to check the unit roots and stationarity of the time series data. The results of the ADF test are shown in Table 1 which indicates that null hypothesis is rejected at level and the data is stationary. So, instead of applying the test at first difference I have continued the study at level.

As the data is stationary, instead of using co integration I have

applied Granger Causality test to determine whether the both variables are independent or affect each other. The results of Granger Causality test is shown in Table 2 i.e., both financial variables RSP and RER does not Granger Cause each other. We can say that there is no relationship exists between the both variables. They do not affect each other and there is no interaction in between them. The research of Muhammad and Rasheed (2002) also has the same findings on four South Asian Countries. Bhattacharya and Mukherjee (2003) also support the findings of the study that there is no integration in stock price and exchange rate by conducting the research in India.

Furthermore, regression analysis test is applied to check the authenticity of the results of Granger Causality test. In regression analysis, stock price is taken as a dependent variable while exchange rate is independent variables. Least square method is used to perform the regression analysis. The results of the regression analysis are mentioned in Table 3 which also support the findings of Granger causality test that there is no interaction or relationship between the exchange rate and the stock price.

4.1. Discussion of Results
The findings that there is no relationship between the exchange rate and stock price in Pakistan during January 2004 to December 2009 may be due to multiple reasons. In Pakistan, the brokers have the monopoly on stock prices and they run the stock market according to their own utility. They speculate the market and get the maximum benefits while the investors gain ultimate loss. The phenomena of determining the price is demand and supply. The movements/fluctuations in demand and supply determine the price so exchange rate may not be able to impact the price strongly.

5. SUMMARY AND CONCLUSION

This study investigates the relationship between the stock market and the exchange market in Pakistan by taking the data for the

Table 1: Unit root test (ADF test)

Variable	Level	R²	Adjusted R²
RER	−3.18982	0.336283	0.305172
RSP	−7.84432	0.781441	0.771196

ADF: Augmented dickey fuller, RSP: Return of stock price, RER: Return of exchange rate

Table 2: Granger causality tests results of exchange rate (Rs/US$) and stock prices (at first difference)

Null hypothesis	Lags	F-statistics	Probability
DRSP does not granger cause DRER	2	0.15146	0.85976
DRER does not granger cause DRSP	2	0.06226	0.93969

Table 3: Regression analysis test (least square method)

Variable	Coefficient	SE	t-statistic	Probability
RER	−1.46481	4.842447	0.30249	0.7632

R²: 0.001035, Adjusted R²: 0.001035, SE: Standard error, RER: Return of exchange rate

period from January 2004 to December 2009. KSE-100 index is used as means of stock prices and exchange rate of Pak rupee against US dollar is taken for manipulation. ADF test is used to check the unit roots and to reach at the conclusion whether the data is stationary or not. Further, Granger Causality test is applied to determine the relationship between the both variables, whether they affect each other or not and reach at the conclusion that they are independent of each other without having any interaction. Regression Analysis test is also performed to check the authenticity of the results of Granger Causality which also supports that there is no relationship exist between exchange rate and stock price.

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