NUST Business School

Financial Markets and Institutions

Term Research Paper:

Stock Market Index and Exchange Rate Fluctuation: Is There Any Link?

Submitted to:

Mr. Haroon Rashid

Submitted by:

Shaheer Khan

Faez Fayaz Siddiqui

BBA 2k5 (A)

Stock Market Index and Exchange Rates Fluctuation: Is There Any Link?

By Shaheer Khan and Faez Fayaz Siddiqui

Executive Summary

The world economies are often measured by how much their stock exchanges have gained or lost. Sometimes, another indicator of economic growth involves the usage of currency rates between two different countries. This research paper has attempted to find out whether there is any link between the exchange rate of a country (with respect to another country's), and the country's stock exchange index. In this specific test, the month-end values of the Karachi Stock Exchange index has been taken into account in tandem with the Rupee-Dollar rate. The research showed that while there wasn't any direct link, the confidence level in the research may be increased by eliminating any extraneous variables (such as political instability) in order to obtain a more transparent result.

Introduction

A stock market, also referred to as an equity market, serves the function of trading – in stocks or shares – of various corporations. A country can have more than one exchange. Many are familiar with the New York Stock Exchange (NYSE), NASDAQ, London Stock Exchange or even the XETRA DAX, as these are part of the largest stock exchanges of the world. Each stock on the exchange is valued by the market forces that prevail. Stocks that are booming will generally have a higher price, reflecting the success (or anticipated success) of a company, whereas stocks that aren't performing as well have a lower price. With day-to-day operations, the prices of stock rise and fall,

each underscored by a reason or another, and this serves as a guide for investors or companies alike who wish to invest.

Historically, the price of shares is an indicator of economic activity, and can influence the “bearish” or “bullish” mood of investors. The stock market, in some cases, is considered as a primary indicator of a country’s economic strength and development, with increasing shares’ prices revealing a positive outlook for investment and business. Moreover, share prices also indicate the wealth of companies and stock holders, and this is also where central banks intervene to control the flow of wealth from one party to another, in order to prevent the accumulation of wealth and ensure stability (which has its own implications). The movements of a stock price in a (section of the) market are recorded in the index of the stock exchange, reflecting an overall upward or downward trend for the day

Practically every country in the world has an exchange rate (interchangeably used with foreign exchange rate or forex rate) vis-à-vis another country; after all, it is vital for each country to maintain an appropriate exchange rate in order to facilitate trade and ease. Exchange rates are categorized into two different types: the spot exchange rate, which is the current (prevailing) exchange rate in the market, and the forward exchange rate, which is quoted at the present day’s rate, traded at that rate, but the delivery and the payment is made at a future date. This research paper is restricted towards the spot exchange rate for matters of simplicity.

Research Objectives

This paper intends to determine whether there is a strong link between the spot rate of the rupee and the dollar in Pakistan with the Karachi Stock Exchange’s index price.

Literature review

Foreign exchange rates have been very volatile after the fixed exchange rate was abandoned in 1973 due to the dollar devaluation, and studies by Choudhury (1993), Cushman (1988), Thursby and Thursby (1987, and Kensen and Rodick (1986) have concluded that exchange rate volatility generally inhibits the growth of foreign trade, especially for developed markets such as the US, the UK, Canada, Germany etc. Studies regarding less-developed countries are little, and therefore, an appropriate conclusion has not been reached due to lack of resources and data availability.

Hooper and Kohlhaagen (1978) studied a relationship between exchange rate volatility and international trade transactions, and the argument posed Arize, Osang and Slottje (2000) was that “higher exchange rate volatility leads to higher cost for risk-averse traders and to less foreign trade”. As per their reasoning, it is because the exchange rate is agreed upon the time of the trade contract, however, payment isn’t made until a future date. It was also stated by them that if the exchange rate fluctuates, this creates an opportunity of profit.

There are theories suggesting that the volatility in exchange rates could have a positive or negative effect on trade volume. Baldwin and Krugman (1989) and Dixit (1989) have shown that an increase in uncertainty in foreign exchange rates and their volatility can influence foreign trade, especially if large amounts of sunk costs are involved.

Investment and government deficit goes hand-in-hand. Reducing the government deficit by 10% requires a large reduction in public investment (Haque, Montiel 1993). This will have large reductions in real output, because of low public capital stock and because of the induced decrease in private capital stock.

It has been discussed that with disinflation introduced in the stock market will have an effect on the profits received by stockholders after discounting, and it will alter the discount rate per se (Henry, 2002). With contractionary measures, the discount rate may rise in spite of a decreasing inflationary pressure, and this may reduce the profits in

the short run, but from another point of view, this may increase the profits in the long run and reduce the discount rates. Stock markets appreciate when countries try to stabilize inflation that is high (in excess of 40%), whereas if the inflation level is below 40%, the response is nil. The stock market changes may also help predict the change the change in inflation after a stabilizing effort.

There is literature demonstrating the effect on exchange rate-based stabilizers on the stock market (non-IMF based stabilizers) and those by the IMF-based stabilizers (Végh, 1992; Calvo and Végh, 1998; Fischer et al, 2002).

McKinnon (1973) and Shaw (1973) have taken studies in order to determine the relationship between economic growth and financial development. Cho (1986) had introduced the element of the stock market to the McKinnon and Shaw framework by applying the theory of credit rationing, which was proposed by Stiglitz and Weiss (1981). The theory, in short, had stated that (a) banks suffer from the problem of imperfect information and therefore, can't always achieve efficient capital allocation, (b) that equity finance is moral hazard-free, and so, the IRR of a project will equal the expected rate of return to the investor, and (c) the development of an equity market is required for "complete financial liberation". The World Bank Group had also researched into the stock market development and economic growth (Levine et al, 1996).

Hypothesis

The hypothesis of the research paper is to determine whether there is a strong link between fluctuations in Pakistan's Rupee exchange rate with respect to the US dollar, with the variation in the stock market's index. The KSE index will be considered for the analysis.

The dependent variable would be the stock prices, and the exchange rates will be the independent variable.

Assumptions, constraints and limitations of this research

In order to obtain a relationship between the two variables (the exchange rate and the stock market index), it is mandatory that we leave out external influences and assume the stock market operates efficiently. By “external influences”, the regulatory body’s forces will not be considered, nor is it assumed that the government had placed any regulations on the stock market by any way, or anything similar to non-stock market-related forces. By not including these extraneous elements will help simplify the analysis.

Another issue with the stock market and the exchange rate data is the lack of availability of consistent data: certain days’ (and in some cases, months) stock market values nor their exchange rate values aren‘t available; therefore, the accuracy of the data may not be very high compared with if the data were available. This has to be kept in mind while determining the correlation between the two variables. In order to make the analysis as consistent as possible, the monthly values of the exchange rates and the stock market index have been used. Moreover, as the stock market remained suspended for a few months in late 2008, the exchange rate for the corresponding period has not been considered either.

Research methodoology

The research was conducted by obtaining the spot exchange rate of the rupee vis-à-vis the dollar from a local financial daily, Business Recorder. Moreover, the stock market index was taken from the same source.

The decision to take a monthly interval rather than a daily or yearly interval is for the following reason: on a daily basis, an accurate result may not have been obtainable, and if the values are taken on a daily basis, the complexity of the research may increase. As far as taking yearly values are concerned, it would be too far an interval between values, and therefore, the analysis would be too spread out. It was intended

that the values change gradually throughout the data so that regression can be performed easily, and without any hitches.

Keeping all this in mind, the value of the 30th day of the month (except February) has been taken in order to maintain consistency. For days where there was no report for the 30th of the month, the last available day's data was chosen instead. This helped maintain uniformity in the data.

Data analysis

Presented below is a small summary of the exchange rates and the corresponding date. While effort has been taken to use the currency rate at the 30th of each month in order to maintain consistency throughout the results (except February), the data are not available for the specified date and so, to counter that issue, the last available figure (and corresponding date) has been used. Refer to figure 1.

Note that the exchange rate has remained stable over the period, and only near June 2008 did it weaken, then strengthen, and then weaken again.

Figure 1

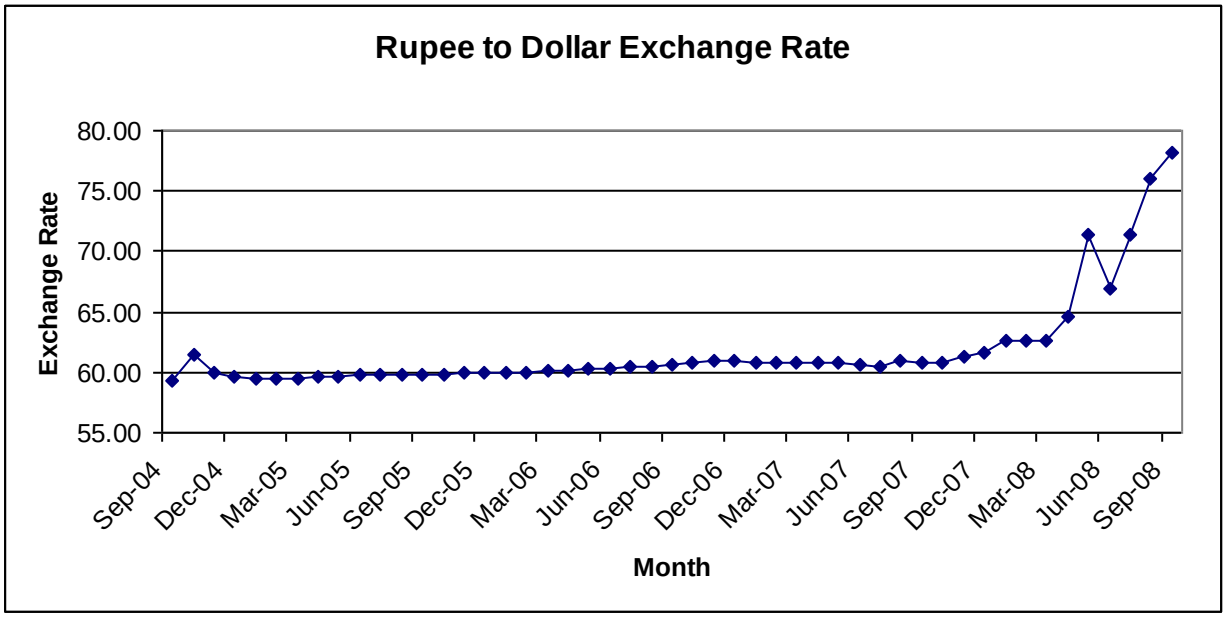
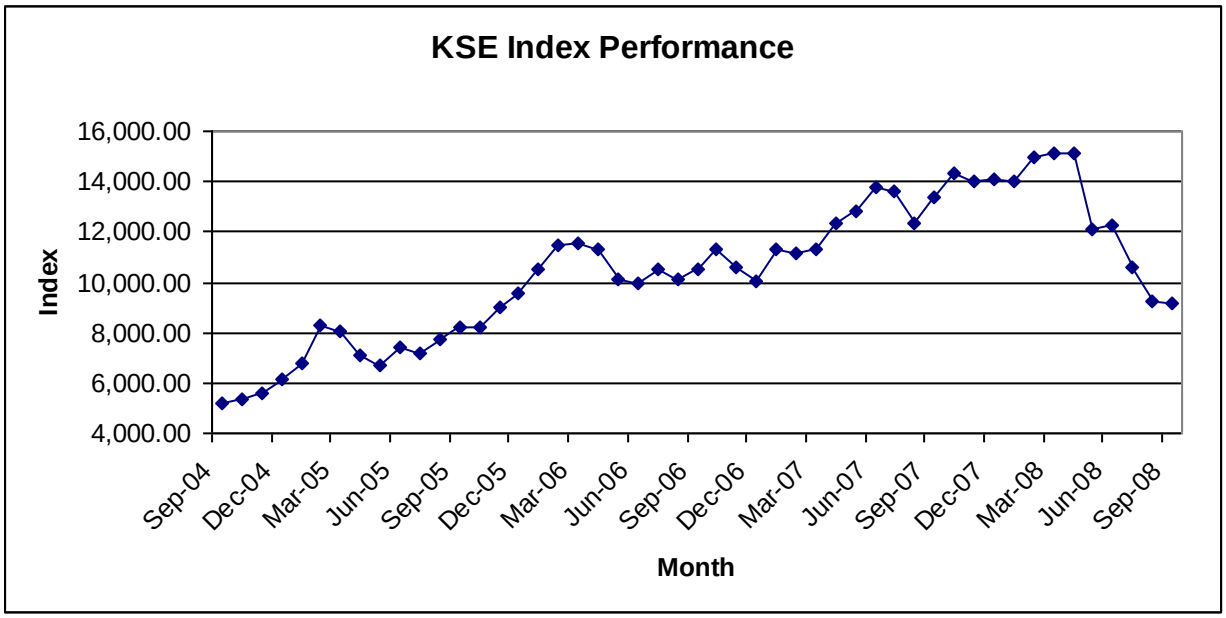


Figure 2



For the above diagram (figure 2), note how the fluctuation in the stock indices. Till March 2008, the stock index had a bullish trend, but it falls sharply after that. Ironically, the general elections took place on February 18th 2008, and the Pakistan People's Party had a sweeping win, and instead of going further up (based on expectations), the trend went further down afterwards.

Statistical analysis was performed on the two variables using regression analysis, with the results (as shown in the figure below).

Figure 3

Regression Statistics	
Multiple R	0.149261
R Square	0.022279
Adjusted R Square	0.001476
Standard Error	4.056562
Observations	49

ANOVA

	df	*SS*	*MS*	*F*	*Sig. F*
Regression	1	17.62358	17.62358	1.070971	0.30602171
Residual	47	773.4176	16.45569		
Total	48	791.0412			

	Coeff.	Std. Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	59.50897	2.304478	25.82319	2.05E-29	54.8729586	64.1449827	54.8729586	64.14498271
X Variable 1	0.000221	0.000214	1.034877	0.306022	-0.0002087	0.00065074	-0.00020865	0.000650744

Equation for the above regression: y = 0.000221x + 59.50897

There are important points to be taken from this analysis. First of all, the Pakistani Rupee was "fixed" by the Musharraf regime. Historical data shows that for the last several years, the rupee had maintained it's parity with the US around the figure of Rs. 60 to $1. The motives for performing this stability are out of the scope of this research paper, but it is important to note nevertheless. Secondly, the stock market was in a constant boom during the period, especially during Musharraf's last years as President. A lot of foreign investment (portfolio as well as physical) took place in the country, which should have revalued (and possibly, strengthened) the exchange rate. But it wasn't.

Another regression analysis was performed, but this time, the last few values were not taken into account (where the stock prices plunged and the exchange rate weakened considerably i.e. the data was taken up till April 2008). The output of that analysis is as follows, and seems to be a better match (figure 4).

Figure 4

Regression Statistics	
Multiple R	0.714221
R Square	0.510112
Adjusted R Square	0.498448
Standard Error	2024.126
Observations	44

ANOVA

	df	SS	MS	F	Sig. F
Regression	1	1.79E+08	1.79E+08	43.73387	5.211E-08
Residual	42	1.72E+08	4097085		
Total	43	3.51E+08			

	Coeff.	*Std. Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	-111164	18386.96	-6.04579	3.41E-07	-148270.08	-74057.297	-148270.081	-74057.2967
X Variable 1	2007.235	303.5214	6.613159	5.21E-08	1394.7043	2619.7663	1394.70429	2619.766308

Equation for the above regression: y = 2007.235x – 111164

Analysis of the data

Apart from the points noted above, the stock market has its own issues to deal with. With collective euphoria (or depression), the prices of stocks can increase (or decrease) by large amounts if it is believed to perform well in the future, and with this, the exchange rate may not have a direct role to play. This can meddle with the real indicators of economic development when the argument present above is held true. This, along with other incidents, questions the **Efficient Market Hypothesis**, which states that the prices of stocks will fluctuate based on the profits or dividends received.

Another issue that is prevalent with the stock market is that the market performance can be affected by economic or political events. Only last year (2008) did the stock market gain approximately 500 points because the former President Musharraf announced his resignation, which, again, defeats the Efficient Market Hypothesis. From a psychological viewpoint, it is believed that investors are rational, but it is not always the case. Behaviorists argue that investors often behave irrationally, especially when making investment decisions, thereby altering the price of the stock and introducing market inefficiencies, and this brings an opportunity to profit from the situation[1].

And as stated earlier, an artificially-held exchange rate will not help a lot in the analysis, as shown in this research. The fact that the exchange rate was not able to

[1] Sergey Perminov, Trendocracy and Stock Market Manipulations (2008, ISBN 9781435752443)

freely fluctuate does signal a number of issues: for starters, forcing an exchange rate on a specific level is not going to help the country in the long run (as can be seen by the rapid inflation that has taken place in the country, as of 2008 and 2009), and secondly, while it may help import goods in the short run, it won't be beneficial in the long run because the real value of the currency would have depreciated (a lesser amount of dollars would be in the country, thereby making the rupee weaker). And only recently did Pakistan obtain a loan from the IMF – as their foreign currency reserves were severely depleted.

By taking all these facts together, it explains why there isn't a strong relationship between the two variables as far as Pakistan is concerned. The first analysis (which takes into consideration all of the data) showed that there is no relationship between the stock index and the exchange rate, however, when these extreme alterations were excluded from the analysis (figure 4's results table), we can see that there is some relation between the stock market's index and the foreign exchange value. To begin with, an interpretation can be that with a stable foreign exchange rate (vis-à-vis the dollar), the stock market index may grow over time. Secondly, if the adjusted R-square value is noted, we can see that there is almost a 50% confidence level between the two currency values.

One reason why the R-square value may not have been very high is due to the intentional stabilization of the exchange rate. This would have its own implications, as highlighted previously.

Areas of further research

While the above research does show some signs between a relationship between the two variables, further research ought to take place, not only between the rupee and the dollar, but with other currencies as well, in a cross-sectional analysis. This will hopefully provide a holistic view of whether currencies' exchange values can help determine a trend with their respective country's stock exchange. Moreover, currencies that are

stable over time (and not artificially controlled) and a stable economy ought to be taken so that the least number of extraneous factors are involved in the analysis, thereby making the research more authentic.

Conclusion

The above analyses shows that, excluding economic slumps, the stock market's index will gradually improve provided the exchange rate between the Pakistani rupee and the dollar retain a "good value". A "good value" is rather subjective, and it may not be achievable in all circumstances, especially when the market forces are left to determine the exchange rate between countries. In the above analysis, the exchange rate between the rupee and the dollar remained near 60 rupees to a dollar, and with the passage of time, the stock market had increased its index progressively. In spite of the foreign investment and the inflow of dollars, the rupee did not appreciate, which may have had positive effects on the country's economy for the interim period.

It was also noted that with the political events taking place, the stock market swayed considerably, and the exchange rate worsened considerably as well. But for the period when the exchange rate remained stable, there was a relationship, albeit not very clear, between the two factors in question. Therefore, countries may want to keep their exchange rate stable (or "improve" it) in order to have a well-performing stock exchange.

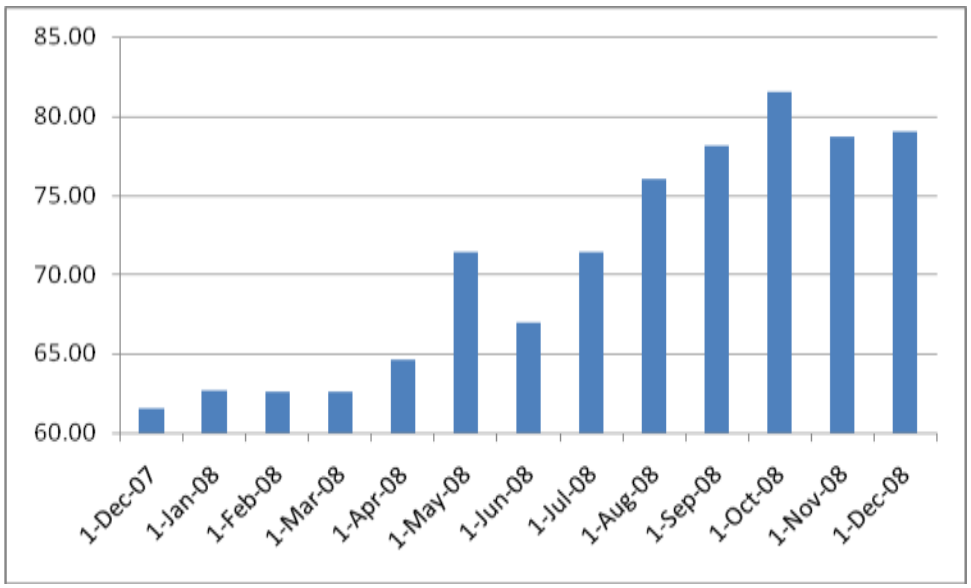
Appendix

Date	Rupee-Dollar rate	KSE Stock Index
30-Sep-04	59.37	5,217.65
29-Oct-04	61.40	5,332.24
30-Nov-04	59.95	5,567.79
30-Dec-04	59.68	6,106.93
31-Jan-05	59.48	6,747.39
28-Feb-05	59.40	8,260.06
30-Mar-05	59.50	8,085.56
29-Apr-05	59.58	7,104.65
30-May-05	59.70	6,707.56
30-Jun-05	59.88	7,450.12
29-Jul-05	59.75	7,178.93
30-Aug-05	59.80	7,744.19
30-Sep-05	59.85	8,225.66
31-Oct-05	59.85	8,247.34
30-Nov-05	59.90	9,025.93
30-Dec-05	59.96	9,556.61
30-Jan-06	59.98	10,527.85
28-Feb-06	59.98	11,456.27
30-Mar-06	60.08	11,568.64
28-Apr-06	60.20	11,342.17
30-May-06	60.35	10,118.73
30-Jun-06	60.35	9,989.41
31-Jul-06	60.48	10,497.63
30-Aug-06	60.48	10,086.15

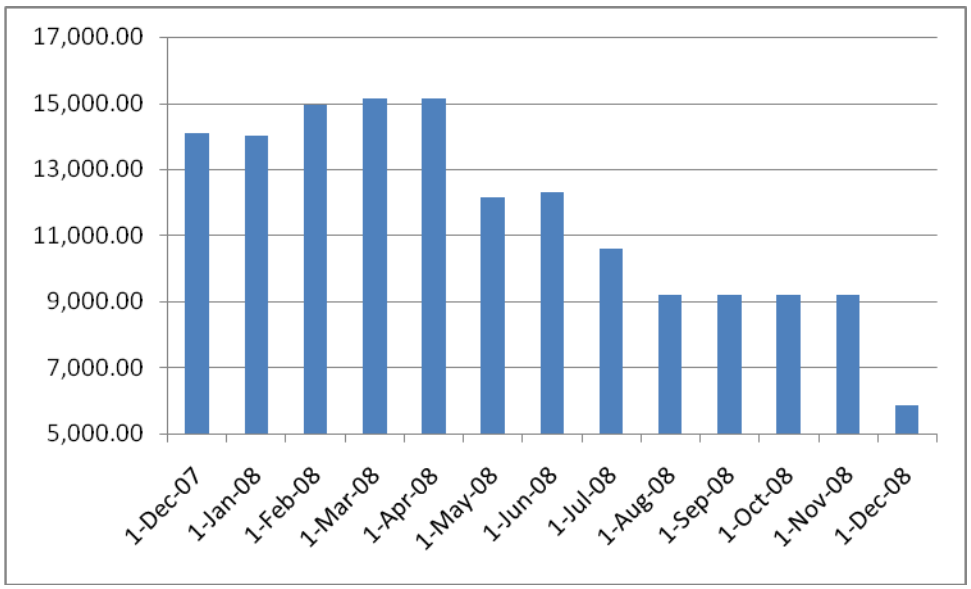
Date	Rupee-Dollar Rate	KSE Stock Index
29-Sep-06	60.68	10,512.48
30-Oct-06	60.72	11,327.71
30-Nov-06	60.95	10,618.75
30-Dec-06	60.98	10,058.46
31-Jan-07	60.80	11,272.33
28-Feb-07	60.80	11,179.97
30-Mar-07	60.75	11,271.59
30-Apr-07	60.80	12,369.70
30-May-07	60.83	12,806.93
29-Jun-07	60.65	13,772.46
30-Jul-07	60.50	13,634.08
30-Aug-07	60.88	12,365.94
28-Sep-07	60.80	13,351.79
30-Oct-07	60.80	14,319.42
30-Nov-07	61.23	13,998.52
31-Dec-07	61.55	14,075.83
30-Jan-08	62.65	14,017.01
29-Feb-08	62.60	14,934.30
31-Mar-08	62.58	15,125.29
30-Apr-08	64.60	15,122.47
30-May-08	71.40	12,130.51
30-Jun-08	67.00	12,289.03
30-Jul-08	71.40	10,583.58
30-Aug-08	76.00	9,208.26
30-Sep-08	78.14	9,179.68

The data was obtained from Business Recorder's website (available at www.brecorder.com) and the selling rate was used for the exchange rate. For the rate of 31st March 2008, the selling rate was not available and the data from XE's historical archive (available at www.xe.com) was obtained.

Rupee's exchange rate vis-à-vis the dollar (from the period of December 2007 till December 2008)



Stock market performance (from the period of December 2007 till December 2008)



Bibliography

Arize, A., Osang, T., Slottje, D., 2000, “Exchange-Rate Volatility and Foreign Trade: Evidence from Thirteen LDC’s”, Journal of Business and Economic Statistics, Vol 18, No. 1, 10-17

Baldwin, R., Krugman, P., 1989, "Persistent Trade Effects of Large Exchange Rate Shocks", Quarterly Journal of Economics, Vol 104, 635-665

Cho. Y. J., 1986, “Inefficiencies from Financial Markets in the Absence of Well Functioning Equity Markets”, Journal of Money: Credit and Banking, Vol 18

Chowdhury, A. R., 1993, "Doe sExchange Rate Volatility Depress Trade Flows? Evidence From Error-Correction Model", Review of Economics and Statistics, Vol 75, 700-706.

Cushman, D. O., 1988, "U.S. Bilateral Trade Flows and Exchange Risk During the Floating Period", Journal of International Economics, Vol 25, 317-330

Dixit, A., 1989," Hysteresis, Import Penetration, and Exchange-Rate Pass- Through", Quarterly Journal of Economics, Vol 104, 205-227

Haque, N. U., Montiel, P. J., 1993, "Fiscal Adjustment in Pakistan: Some Simulation Results", International Monetary Fund, Vol 40, No, 2, 471-480

Henry, P. B., 2002, “Is Disinflation Good for the Stock Market?”, The Journal of Finance, Vol. 57, No, 4, 1617-1648

Henry, P. B., 2000, “Stock Market Liberalization, Economic Reform, and Emerging Market Equity Prices”, Journal of Finance, Vol 55, 529-564

Hooper, P., Kohlhagen, S. W., 1978, "The Effect of Exchange Rate Uncertainty on the Prices and Volume of International Trade", Journal of International Economics, Vol 8, 483-511.

McKinnon, R. I., 1973, “Money and Capital in Economic Development”, Brookings Institution

Nagaishi, M., 1999, “Stock Market Development and Economic Growth: Dubious Relationship”, Economic and Political Weekly, Vol 34, No 29, 2004-2012

Sergey Perminov, Trendocracy and Stock Market Manipulations (2008, ISBN 9781435752443)

Shaw, E. S., 1973, “Financial Deepening in Economic Development, Oxford University Press

Stiglitz, J and Weiss, A., 1981, “Credit Rationing in Markets with Imperfect Information', American Economic Review, Vol 71

Thursby, M. C., Thursby, J. G., 1987, "Bilateral Trade Flows, Lender Hypothesis, and Exchange Risk", Review of Economics and Statistics, Vol 69, 488-495

Végh, Carlos A., 1992, “Stopping High Inflation: An Analytical Overview”, International Monetary Fund Staff Papers Vol 39, 626-695