

Impact of Systematic Risk Factors on Stock Prices in Pakistan: Explanatory Power and Moderating Role of Political Risk

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Abstract

Political uncertainty role to determine stock prices is an important construct in the contemporary dynamic world. The study has addressed two main objectives. First it has evaluated the direct impact of political uncertainty on stock prices. Secondly it has examined the moderating effect of political uncertainty in the relationship of systematic risk factors on equity securities prices in Pakistan. Sample data for the systematic risk factors including exchange rates, inflation rates, interest rates, economic growth rates and stock prices from July 1998 to June 2018 is analyzed. Results showed the significant direct relationship exists in case of political uncertainty and systematic risk factors on stock prices in Pakistan. Political risk has significantly moderated the causal relationship for exchange rate, inflation rate, economic growth rate with stock price. Interest rate and stock price relationship is not found significant in Pakistan. Currency value, inflation and Political risk are found to be the major factors that need to be addressed by the policy makers for the good performance of the equity markets.

Keywords: *Political Risk, Systematic Risk, Macroeconomic Variables, Stock Price, Moderation effect*

I. Introduction

Stock markets are an important part of the economic system of contemporary world economies. Behavior of prices in the stock markets signals the economic situation prevailing in the country. It reflects the sentiments of the investors in an economy. The behavior of equity instruments' prices is very dynamic and volatile. Comprehension of complex relationships between systematic risk factors has importance for researchers, equity instruments investors and regulators [1]. Systematic risk is related to the equity securities prices. Main source of systematic risk factors are macroeconomic variables. The behavior of prices in the securities exchanges is dynamic, unstable, unpredictable and uncertain. Understanding about the behavior and need of stock market prices for investors and regulators of financial markets, it is evident that stock markets are related to other financial markets and political circumstances in the country. Stock price relation with currency value, interest rates, commodity prices, economic growth is reported in empirical studies. The effect of country political risk ratings on equity instruments' prices attracted the attention of researchers [2].

Empirical evidence on behavior of emerging equity markets and country risk ratings is growing [3]. The behavior of the financial market significantly depends on the political situation in addition to the other financial and nonfinancial factors that need to be empirically tested. The political risk might influence the strength of relationship between the financial markets. Understanding the role of country risk is important, due to the rising trend of international investments in financial assets. Many studies provided evidence of major impact of political risk on stock market [4].

Observed evidence for the influence of political uncertainty and economic factors on the equity securities values in Pakistan is collected by different researchers. [5] Reported that systematic risk factors have significant effect on equity instruments values in Pakistan. Their study also founded the significant relationship of macroeconomic variables with stock prices is significantly related to the financial crisis. Systematic risk factors result is asymmetric in the short run but symmetric in the long run. [6] Collected the empirical evidence that the terrorism and political instability impact significantly and negatively to equity instruments values. Study found that the improvement in the law and order situation has a significant and positive effect on equity securities. Political uncertainty impacts the equity securities returns in Pakistan.

Empirical research about the moderating role of political uncertainty on equity securities' prices is not founded in literature. The objective of this study is to collect empirical evidence of direct and moderating effect of political uncertainty factor on equity instruments' prices in Pakistan. The study investigated the explanatory power of currency value, inflation, interest, economic growth and political risk towards the stock market prices. The study further investigated the moderating role of political risk in the determination of linkage between macroeconomic factors and equity instruments market values in Pakistan? It helps in understanding the dynamics of equity markets.

Following are the objectives of the study:

1. To examine the effect of systematic risk factors on stock market prices in Pakistan.
2. To estimate the moderating impact of political risk factors between systematic risk factors and stock prices, in addition to its direct impact on equity instruments prices.
3. To give some policy recommendations for participants of the equity market.

The novel contribution of the study is that the study has supplemented the literature by providing empirical evidence about the moderating impact of country specific political risk situation in the relationship of systematic risk and political risk. Understanding about the impact of political uncertainty on equity securities market prices and its role as moderator between systematic risk sources and equity instruments prices is very vital for researchers, capitalists and regulatory bodies.

II. Literature Review

Arbitrage pricing theory (APT) was developed by Stephen A. Ross in 1976. It extended the single risk factor introduced by the capital asset pricing theory to multiple risk factors theory for the securities risk premium component of securities returns and prices. Capital market theory asserted that the equity risk premium component of stock returns depends on systematic risk factors. According to the capital asset pricing theory systematic risk factor is the market risk. Market risk premium is the part of every risky asset return. Arbitrage pricing theory generalized the capital asset pricing theory by highlighting the other systematic risk factors. Macroeconomic variables mainly constitute the systematic factors affecting the equity securities returns and prices. Arbitrage opportunities arise temporarily in the equity markets due to the variations in the macro-economic variables. Theory implies that the securities prices depend on inflation, economic growth, interest rate and exchange rate etc. Returns of the equity securities can be predicted using macro-economic variables. Risk premium part of the equity instruments returns is linearly related to the systematic risk factors. Many researchers investigated the influence of systematic sources of risk and political risk on equity securities price behavior [7]. [8] Examined the impact of systematic risk factors including exchange rate, gross domestic product, consumer price index and money supply on equity instruments prices in the Nigerian equity market. The study found support for the existence of co-integration between the macroeconomic factors and equity securities market values. [9] Reported the evidence of a long-run relationship between systematic risk sources and equity instruments returns. The estimates of the study showed significant negative coefficient value of the error correction term as an evidence for the correction of disequilibrium in the long run.

Researchers analyzed the impact of currency values and market values of equity securities relationships in Nigeria and found the absence of significant relationships.[10] Analyzed the France, Netherland, Germany and Portugal equity market markets and rejected the existence of a significant cause effect linkage between interest rate and equity securities prices. The study found that interaction of money supply with interest rate was a significant factor which causes equity securities' market values. The effect of inflation on securities prices depicted negative relations in the short run by many studies whereas few studies reported the positive effect in the long run.

[11] Indicated a significant negative linkage between rates of inflation on the equity market activity and banking sector development. [12] Reported the evidence for the significant relation between the inflation and equity instruments returns in the SAARC economies both in case of long run and short run. Inflation exerted pressure on stock prices volatility and returns in Nigeria and Ghana; weak support for leverage effect was found in Nigeria but a strong support for the leverage effect was found in Ghana. Stock price and commodity prices are based on future expected performances and are co-integrated.[13] Showed that economic growth significantly relates to the real values of the equity instruments prices in G-7 countries.

[14] Provided empirical evidence of the US economy and the study estimates supported the inverse relation of political news factor and equity returns but positive relationship of political news with volatility in equity instruments market values, from analysis of the US economy. [15] Examined the effect of geopolitical uncertainty on equity instruments return and volatility dynamics from Brazilian, Russian, Indian, Chinese and South African Markets (BRICS). Nonparametric causality-in-quantiles test was employed. Empirical analysis of BRICS equity exchange showed the effect of geopolitical risk was not uniform across the stock markets. Russia and China found to be more significantly affected by the geopolitical news whereas Indian stock markets were the least affected by it. South African and Brazilian stock exchanges were found partially affected by the geopolitical risk factor. Geo Political Risk impact was more consistent on market volatility measures as compared to returns. Evidence of volatility spillover due to the Geopolitical risk was observed.

[16] Evaluated the relevance of political uncertainty on the equity instruments market price behavior in Egypt and found that equity securities returns and equity securities volatilities are significantly related to the political situation in the country. [17] reported that the political uncertainty significantly related to the stock prices in the United Kingdom. Some other researchers also tested the impact of country political risk ratings on the equity market return of frontier, developed and emerging types of equity securities markets. Panel data of 64 countries consisting all three categories of stock market were taken from 1990 to 2013. International country risk guide data was used as a measure of country risk. Fixed effect regression model was used to obtain the estimates of parameters. Results of study found that the composite political risk significantly explains the return of in all categories of the equity markets.

[18] Collected the empirical evidence about the significant negative impact of political risk, economic and financial risk on Borsa Istanbul 100 index based on the analysis of monthly frequency data samples from 1999 to 2013. Estimates obtained on the basis of Johansen co-integration and Vector Error Correction model confirmed the existence of both long run and short relationship between country risk ratings and securities price behavior. Political risk is the part of securities risk premium.

[19] Evaluated the impact of country political uncertainty on the investment flows in real and paper assets. Political risk rating published by a political risk group in the international country risk guide was used. Panel data of fifty-five countries of the world from 1987 to 1995 was used to obtain the parameters fixed effect regression. Results of the study found that the political risk significantly explained the investment flows in developing economies. [20] Studied the impact of international country risk guide (ICRG) composite, political, financial, and economic risk indices of the institutional investor's countries credit ratings on stock market performance of 117 developed and emerging markets. Empirical estimates of the analysis showed that the ICRG composite index significantly explains the stock market return of developed as well as developing stock markets. Study showed that the expected equity returns have significant and positive relation to the components of country risk ratings.

Based on review of the literature and relevant theories following are the hypotheses to be tested.

- H₁ Exchange rate relationship is positive and significant to equity securities prices.
- H₂ Interest rate relationship is negative and significant to the equity securities prices.
- H₃ Inflation rate relationship is negative and significant to the equity securities prices.
- H₄ Economic growth rate relationship is positive and significant to the equity securities prices.
- H₅ Political risk relationship is negative and significant to the equity securities prices.
- H₆ Moderation of Political risk is negative and significant between exchange rates and equity securities prices
- H₇ Moderation of Political risk is negative and significant between interest rates and equity securities prices.
- H₈ Moderation of Political risk is negative and significant between inflation rates and equity securities prices.
- H₉ Moderation of Political risk is negative and significant between economic growth rates and equity securities prices.

III. Empirical Model

The study is based on the concept of arbitrage pricing theory. Systematic risk factors included in the analysis are currency value, money market interest rate, inflation and economic growth. Explanation and responsiveness of stock prices due to change in these systematic risk factors and political risk rating of a country is modeled in this study. The proposed model depicted the effect of the political risk as a moderator in the relationship between the systematic risk factors and equity securities market prices. Study investigated the hypotheses about the significance of currency market value, money market interest rate, price level and economic growth rates in relation to the stock market prices by incorporating the political situation in the country as a moderator.

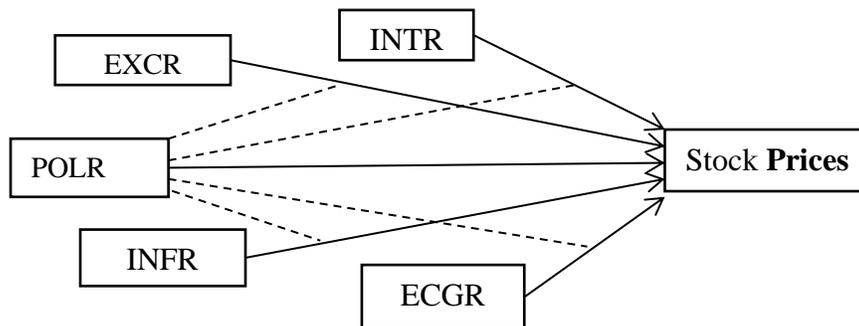


Figure 1: Conceptual Framework

Political risk ratings issued by International Country Risk Guide (ICRG), Political Risk Group are used for estimation of direct and moderation impact on equities securities market price behavior. Country risk ratings' political risk index is composed of twelve dimensions of country political risk ratings including stability of government, social and economic conditions, internal conflict, profile for investment, external conflict, military involvement in politics, corruption, tensions about religious issues, country' law and order situation, tensions about ethnicity, accountability process and quality of bureaucracy.

Figure 1 depicts the graphical view of the model analyzed. The solid lines showed the impact of each of the systematic risk factors (exchange rate, interest rate, inflation rate, economic growth rate, political risk) on equity securities prices. Dotted lines in the figure above represent the moderating effect of political uncertainty in determining the relationship between systematic risk sources and equity instruments market prices. Empirical testing of the moderation effect between systematic risk factors and equity securities prices is the gap which this study has addressed.

IV. Data and Methodology

Sample data consists of data in monthly frequency from July 1998 to June 2018 of Pakistan. Data of securities prices, macroeconomic variables and political risk index of Pakistan is used for the conduct of analysis. Systematic risk factors included in the analysis are interest rates, inflation rates, economic growth, rupee-dollar exchange rate and political risk. Standardized value for each of the variables was obtained using SPSS software. PSX KSE100 index was taken as a proxy for the equity securities prices variable. End of month value of the stock market price index was used as values of the variable price index. Dataset used for the analysis was taken from the State Bank of Pakistan, International Country Risk Guide and Pakistan Stock Exchange' websites. Interaction term of political risk with each of the four macroeconomic variables was obtained by taking the product of standardized values of the variables with standardized value of political risk. Coefficients of the model were estimated by the ordinary least square method.

Data of International Country Risk Guide published by Political Risk Service International is used as a proxy for political risk. Political risk service composite rating of a particular country consists of political risk, financial risk and economic risk. Present study uses the political risk index into the analysis. Political risk index covers the 12 dimensions of political risk including government stability, socioeconomic conditions, investment profile, internal conflict, external conflict, corruption, military in politics, religious tensions, ethnic tensions, law and order, democratic accountability, bureaucracy quality. Total points of political risk index are 100, first five dimensions have 12 points each, next 6 dimensions carries 6 points each and last dimension has 4 points in the index. Higher value of political risk index represented the lower political risk and vice versa. Inverse values of political risk were used in the conduct of analysis.

Following is the specification of the model:

$$SPI_t = \alpha + \beta_1(EXCR)_t + \beta_2(INTR)_t + \beta_3(INFR)_t + \beta_4(ECGR)_t + b_5(POLR)_t + \varepsilon_t \quad (1)$$

$$SPI_t = \alpha + \beta_1(EXCR)_t + \beta_2(INTR)_t + \beta_3(INFR)_t + \beta_4(ECGR)_t + b_5(POLR)_t + \delta_1(EXCR * POLR) + \delta_2(INTR * POLR) + \delta_3(INFR * POLR) + \delta_4(ECGR * POLR) + \varepsilon_t \quad (2)$$

Where

SPI = KSE100 stock price index month end values

EXCR = PKR/USD nominal exchange rate end of month values

INTR= Money market interest rate value

INFR= Inflation rate

ECGR = Economic growth rate

POLR = Political risk

EXCR*POLR = Interaction term of exchange rate and political risk.

INTR*POLR = Interaction term of interest rate and political risk.

INF*POLR = Interaction term of inflation rate and political risk.

ECGR*POLR = Interaction term of economic growth rate and political risk.

V. Results and Discussion

Descriptive estimates of variables included in the present study are presented in table 1. Stock price index has a mean value of 14570, standard deviation of 13658, skewness of 1.06, and Kurtosis of 2.96 and significant Jarque bera statistic of 45.53. Exchange rate has mean value of 76.68, standard deviation of 20.67, skewness of 0.25, and kurtosis of 1.53 and significant Jarque Bera statistic of 24.02. Interest rate has mean value of 8.18, standard deviation of 3.225, skewness of 3.225, and Kurtosis of 3.04 and insignificant Jarque Bera statistic of 0.364. Inflation rate has mean value of 7.53, standard deviation of 4.778, skewness of 1.579, kurtosis of 5.736 and significant Jarque Bera statistic of 6.36. Economic growth rate has mean value of 4.27, standard deviation of 1.69, skewness of 0.242, Kurtosis of 2.365 and significant Jarque Bera statistic of 6.36. Political risk has mean value of 47.81, standard deviation of 2.56, skewness of 0.47, Kurtosis of 2.99 and significant Jarque bera statistic of 9.07.

Table 1:

Descriptive statistics for the data of stock prices, exchange rates, interest rates, inflation rates, economic growth rates, Political risk.

Variable	Mean	Med.	Max.	Min	S.D.	Skewness	Kurtosis	J.B.
PI	14,570	10505	50,59	841	13,658	1.060	2.960	45.53*
EXCR	76.680	69.090	118.9	46.1	20.670	0.250	1.530	24.02*
INTR	8.180	8.670	20.03	0.74	3.225	-0.092	3.040	0.364
INFR	7.530	6.060	25.3	1.30	4.778	1.579	5.736	174.6*
ECGR	4.270	4.390	7.66	1.60	1.690	0.242	2.365	6.36*
POLR	47.810	48.540	55.41	44.2	2.560	0.470	2.990	9.07*

Results of correlation coefficients are presented in table 2. Correlation coefficient for the price index was positive and significant with exchange rates and economic growth rates. Stock Price had negative and significant association with the country's political risk ratings. Exchange rate was found to have a significant and positive coefficient of correlation with interest rates and it was found to be negatively correlated with political risk. Interest rates were positively correlated with inflation rates and political risk but negatively and significantly correlated with economic growth rate.

Table 2:
Correlation matrix

Variable	PI	EXCR	INTR	INFR	ECGR
PI	1.0				
EXCR	+ 0.863*	1.0			
INTR	- 0.102	0.145*	1.0		
INFR	- 0.190*	0.039	0.639**	1.0	
ECGR	+ 0.295*	0.014	-0.568**	-0.402**	1.0
POLR	- 0.387*	-0.200**	0.485**	0.566**	-0.183**

Note: *significant at 1% and **significant at 5% level.

Inflation rate was found to be negatively and significantly correlated with economic growth and positively correlated with political risk. Economic growth rate was negatively and significantly related to political risk. Table 4, 5 and 6 reported the empirical results for the moderation of political uncertainty between systematic risk factors (exchange rate, interest rate, inflation rate and economic growth rate) and equity securities market price behavior. Correlation coefficient of the exchange rate was positive and significant with equity securities market prices. Political risk was found to be significantly and negatively related to the stock prices. Interaction of Political risk and exchange rate was negatively and significantly related to the stock price.

Table 4:
Results of the Base Model without Moderation Terms

Factors	Coefficients	Std. Error	t-statistic	Prob. Value
Constant	1.536E-15	.025	.000	1.000
ZEXCR	.824	.027	30.649	.000
ZINTR	.033	.039	.852	.395
ZINFR	-.048	.035	-1.374	.171
ZECGR	.253	.031	8.123	.000
ZPOLR	-.164	.033	-4.960	.000

Estimates of the base model without involving the moderation terms reflect that the exchange rates and economic growth rates were found positively and significantly related to stock prices in Pakistan stock exchange. Political risk was found to be negatively and significantly related to the stock price behavior. Constant term, interest rate and inflation rate was not found significantly related to stock prices. Results of the base model were significantly improved with the introduction of moderation terms in the mode. Table 5 reported the results of the main model with moderation terms. Exchange rate, interest rate, and economic growth rate was found to be positive and significant at one percent significance level. Inflation rate and Political risk found negatively and significantly related to the stock price behavior.

Table 5:
Results with Model with Moderation Terms

Regressors	Coefficient	Std. Error	t-statistic	Prob. Value
Constant	-0.172	0.027	-6.395	0.000
ZEXCR	0.642	0.028	23.319	0.000
ZINTR	0.103	0.032	3.26	0.001
ZINFR	-0.183	0.041	-4.56	0.000
ZECGR	0.213	0.029	7.249	0.000
ZPOLR	-0.220	0.031	-7.057	0.000
ZEXCR*ZPOLR	-0.230	0.027	-8.643	0.000
ZINTR*ZPOLR	0.020	0.027	0.724	0.470
ZINFR*ZPOLR	0.198	0.033	5.935	0.000
ZECGR*ZPOLR	-0.026	0.028	-0.943	0.347

Interaction of political risk with the exchange rate negatively and significantly related with stock price. It means that an increase in political risk causes the increase in the foreign currency value against the domestic currency and decreases the equity securities prices. Whereas the direct relationship of foreign currency value on stock prices in Pakistan is positive. An increase in foreign currency value attracts more foreign investment depicting a positive direct relationship. Interaction of political risk with inflation is positively and significantly related to stock prices. Increase in the political uncertainty is the cause of increase in commodity prices and decrease in securities prices. It further strengthens the direct negative relationship between the inflation and equity securities prices. Sign of coefficient of interaction term of political risk with interest rate is positive but insignificant. Sign of coefficient of the interaction term of political risk with economic growth is positive and insignificant. The Positive value of change in R-square is an evidence for the significance of moderation impact. R² increases with introduction of moderation terms in the model. political risk significantly moderates the relation of macroeconomic variables with stock prices.

Table 6:
Change in R² of the Model with and without Moderation

Model Summary	R-Square	Change in R-Square	F-statistic	Probability
1	.856	.856	277.353	0.000
2	.916	.060	278.823	0.000

VI. Conclusions and Recommendations

Findings of the study are consistent with the existing literature. Study found that the significant dependence of stock prices on the exchange rate, inflation rate, economic growth rate and political uncertainty systemic risk factors. These factors are the important constituents of equity securities risk premium. Political risk significantly

moderates the impact of macroeconomic variables on equity instruments values. Political stability, exchange rate, inflation and economic growth are found the important determinants for the stock market performance in Pakistan. Measures for political stability are very important ones. The reduction in political risk boosts the investor confidence and attracts investment in equity markets. Other than political risk the exchange rate, inflation rate and economic growth rate are the significant fundamental factors affecting the stock market performance. Stable currency value, low inflation rate and high economic growth are other factors needed for the good performance of capital markets.

The results of the study are based on the analysis of Pakistan Stock Exchange, panel data analysis involving the data of other developing countries equity markets can be conducted to have more depth understanding of the phenomenon.

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