# Macro-Economic Factors and Firm Downside Systematic Risk: Socio-Political index as Moderation

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**Abstract**

*The study examines the effect of macro-economic factors on downside systematic risk with moderating role of socio-political index. The Macro-economic factors cover keys aspect such as monetary policy, fiscal policy and international activities. The research used two proxies like terrorism and assassination to construct socio-political index. Further, the research used DCAPM of Estrada (2002) to estimate the downside systematic risk. The study considered a sample size of 250 non-financial firms from 2003-214.The study results reveal that macro-economic factors such as gross domestic product, interest rate, money supply, inflation , terms spread, government budget deficit as percentage of GDP, current account, foreign reserves, foreign exchange rate significantly affect the downside systematic risk. The study also confirms the moderating role of socio-political index.*

**Keywords:** Macro-Economic Factors, Socio-Political Index, Downside Systematic risk

## Introduction

Financial analysts, government and funds managers are persistently conscious to the puzzle of resources mobilization in the economy. The dependency of remarkable economic development is based on effective and efficient utilization of the resources (Osinubi & Amaghionyeodiwe, 2010). Otherwise, the economy would be at the verge of ignominious failure. Therefore, employment of resources through optimal fiscal and monetary policy would spur the economic growth under the stable socio-political circumstances.

In addition, in the last few decades, the stock markets also grabbed considerable attention with respect to efficient allocation and formation of the capital. In this regard, the emerging economies are consistently striving toward the development of financial sectors to promote market efficiency. Moreover, Capital market acts as a pulse for

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the economic growth. Thus, policy makers rely on the fluctuations of stock market to assess the fragility of financial system (Mala & Reddy, 2007). Nevertheless, under the occurrence of extreme anomalies, the stock prices departure from their intrinsic value is inevitable. As a sequel, the stock market "signal" undermines its true worth as a barometer of economic condition. This shattered the core paradigm of market efficiency (Karolyi, 2001).

Moreover, literature evident that previous constructed models under performed in terms of predicting expected returns. Particularly, under performance of these models in semi-strong efficient market is subject to severe criticism (Malkiel & Fama, 1970). Previous various studies such as Chen, Roll, and Ross (1986), Fama and French (1989), Glosten, Jagannathan, and Runkle (1993) argued that stock returns can be predict through economic factors.

The current study contributed to literature through several methods. The measure value at risk measure for estimation of downside risk is criticized by the Artzner, Delbaen, Eber, and Heath (1997). Similary, Hogan and Warren (1974), Bawa and Lindenberg (1977), Harlow and Rao (1989) argued that investor are more concerned with downdside risk. However, the traditional capital asset pricing model(CAPM) have several discprencies to capture the downside risk.Therefore, the current research used the D-CAPM of estrada(2002) for the estimation of downside sytematic risk.

Secondly, the emerging economies have greater exposure to extreme abnormal volatility. The extreme level of volatility is attributed to low liquidity, poor governance, asymmetric information, and unstable macro-economic condition (Bekaert & Harvey, 2003)(Lesmond, 2005). Empirically, Lim and Brooks (2011) argued that understanding volatility in emerging markets has greater importance. Thus, the research unearth the causal relationship of macro-economic factor with downside risk.

Thirdly, social and political factors have instable role in shaping the economic development. The socio-political instability fetches extreme volatility in capital market and makes the financial system at the verge of financial disaster (Julio & Yook, 2012). Thus, the current research investigates the moderating effect of socio-political factors between macro-economic and downside risk.

**Literature Review**

According to Arbitrage Pricing Theory, macro economic factors like interest rate, money supply, economic growth, Gross national product (GNP), Gross domestic product (GDP) affect the stock prices. Several studies had analyzed the relationship between various economic aggregates and stock prices like Keran (1971), Homa and Jaffee (1971),

Malkiel and Quandt (1972) had examined the relationship between the Standard and Poor's 500 stock price index (Hereafter S&P 500) macro economic factors. Keran (1971) explained the stock prices level with the help of expected rate of inflation, the real growth rate and change in real money. Homa and Jaffee (1971) explained the S&P 500 prices level with money supply, its growth. Malkiel and Quandt (1972) forecasted the S&P 500 prices through gross national product. Fanning (1971) used the term spread, difference between long terms and short term interest rates, and budget deficit to explain the S & P 500 index movements, nevertheless the study did not examine the magnitude of the S &P 500 index movements. Just like other empirical studies Nishat, Shaheen, and Hijazi (2004) and Modigliani (1971) have also found a significance relationship between the stock price and change in money supply. Budd and Litzenberger (1973) explained the stock prices and required rate of return on equity with help of change in money supply in a comparative static theoretical frame work. Brunie, Hamburger, and Kochin (1972) analyzed the impact of instability in macroeconomic factors on risk premium of the stock market. According to the study the variability in inflation, money supply and real corporate profits have inverse relationship with the equity prices.

**The Economics Growth and Firm Risk:**

Economic condition plays a vital role in economic growth. Economic condition is the true reflection of economic activities and income level of general public. Economic condition can be measured through various proxies, which include the growth in gross domestic product (hereafter GDP), industrial production, employment rate and Gross domestic savings. Hess (2003) examined the long term relationship between the gross domestic product and Swiss stock market through co integration. This study revealed the impact of GDP on stock prices, especially pronounced more in cyclical sectors. Industrial production index is another proxy used for economic condition measurement (N.-F. Chen, Roll, & Ross, 1986).The industrial production is empirically tested by the Humpe and Macmillan (2009) and they proved a significant positive relationship between the stock price and industrial production index in Japan and US. Several studies used Employment rate as proxy economic condition. Boyd, Hu, and Jagannathan (2005) analyzed the impact of unemployment announcement on stock market and they found that heavy magnitude of unemployment announcement significantly affect the stock market. Flannery and Protopapadakis (2002) concluded that employment announcements affect the variability in stock market, while the GNP and industrial production announcements impact is insignificant.

In contrast to the above two conclusions Singh et al. (2011) conducted a study in Taiwan to analyze the impact of GDP and employment rate on stock returns. The study found no significant relationship between the employment rate and stock returns. While on other hand the study revealed the impact of gross domestic product on stock returns. Various studies like Brooks and Tsolacos (1999) and N.-F. Chen et al. (1986) suggested that industrial production index is better proxy to capture the complexity of economic conditions. However the employment rate as a proxy for economic condition is more suitable in case of real estate sector's stock returns. The last proxy is gross domestic saving, which is also used as proxy to capture economic conditions. Pal and Mittal (2011) concluded that gross domestic savings has no impact on Indian capital market after analyzing the macroeconomic variables impact on stock market.

**The Monetary Policy and Firm Risk:**

The substance of monetary policy such as Inflation, Interest rates have critical role due to combination internal factors. Most likely, the upward steadily rising of inflation would be curtail though high interest rate. As a consequence, the bonds would looks more attractive to investors. The situation would fetch urgency for the market participants to move from equity market to bond market (Olweny & Omondi, 2011). Empirical study such as Li et al. (2010) examined the impact of the federal funds rate of US and overnight rate of Canada. The study found a significant influence of monetary policy shocks on stock returns. However the magnitude of impact was more in the US than Canada due to stock market openness. Durham (2003) found contradictory empirical evidences as compare to the former conclusion; this study argued that monetary policy impact on stock returns was either weak or insignificant in different countries. This study had taken a sample of 16 countries.

Moreover, Hussain, Lal, and Mubin (2009) studied the long term relationship of different macroeconomic variables. The result of the study indicates the exchange rate and exchange reserves does effects the stock market, while gross fixed capital formation possess a positive and whole sale price index had a negative effect on the stock prices. In contradiction, Akbar, Ali, and Khan (2012) concluded there is positive impact of money supply and interest rate on trading volume and a destructive effect on the stock return.

Chang et al. (2011) explained the relationship between the federal funds rate and stock returns. The study concluded that federal funds rate had little effect on stock returns in general. Although the impact of monetary policy on stock returns was observed more in REIT industry. Gregoriou et al. (2009) used 3 month London interbank offer

rate ( LIBBOR) futures as proxy for monetary policy to examine its impact on stock returns. The study found a negative relationship between the interest rate and stock returns in pre credit crises and found a positive relationship during the credit crises. S. S. Chen (2007) used money supply(M2) and federal funds rate as proxy to measure the impact of monetary policy on stock returns.Chancharat et al. (2007) used money supply (M2) to study the impact of macroeconomics factors on stock return in Thailand. The study revealed the result monetary policy has no impact on stock returns.

Moreover, Prather and Bertin (1999) have concluded that discount rate change can forecast stock returns. Many researchers like Czaja and Scholz (2007), N.-F. Chen et al. (1986) measure the interest rate through term spread and default spread. Term structure is measured by the difference between the long term and short term yield. While on other hand the default spread measures through the difference between the high grad bond and low grade bond yield. Czaja and Scholz (2007) used the term structure model as proxy to analyze the impact of interest rate on stock returns. The study found a significant relationship between the term structure and stock returns. N.-F. Chen et al. (1986) documented a positive relationship between the default spread and stock returns. General Price level is another key macroeconomic indicator, which is being measured through consumer price index (hereafter CPI), oil prices, gold prices in the literature. N.-F. Chen et al. (1986) examined the price level through unexpected inflation and expected inflation. Unexpected inflation is further quantified through spread between the actual and expected inflation rates. While on the other hand, the actual inflation is measured as percentage change in CPI. Moreover, Geske and Roll (1983) argued that unexpected and expected inflation rate are inversely proportion to the stock market returns in Korea. In contrast, the empirical results of Kutan and Aksoy (2003) found positive impact of inflation on stock returns in Korea; however the study documented the change in inflation at higher rate than the change in stock returns. Another empirical study conducted by Kolluri and Wahab (2008) had experienced different results. They documented a negative relationship between the inflation and stock returns during low inflation regime, while found opposite of it in high inflation regime. Faff and Brailsford (1999) conducted a study to examine the relationship between the stock returns and oil price. The study found a direct relationship between the oil prices and returns of oil and gas industries, while found a negative relationship among the said variables in case of paper, packaging and transport industries. Another study Fedorova and Pankratov (2010) concluded that oil prices affect the stock returns in Russia. Büyükşalvarcı (2010)

suggested an insignificant impact of gold prices on stock returns. N.-F. Chen et al. (1986) empirical tested and found a significant impact of macroeconomic aggregates like industrial production index, inflation, default spread and term spread, apart from the market premium, on stock returns. Monetary and fiscal policies are important pillars of a state, which help in gearing up the economic growth of a country. Patelis (1997)tested the forecasting power of monitory policy, which include federal fund rate and default spread, on stock returns and found significant impact of monitory policy on stock returns in short horizon as well as long horizon.

**The Fiscal Policy and Firm Risk:**

Fiscal policy is related to the revenue and expenditure of the government. Government generates revenue in form of taxes and spends it on development projects. If the government spending is more than revenue that is called budget surplus and when government spending is more than the revenue is called budget deficit. In general budget deficit has an adverse impact on stock prices. Because larger budget deficit leads increase the funds requirements of the government that would have otherwise available to the investors. The shortage of funds with central bank leads to increase in the interest rate. The interest rate increase the cost of borrowing and investor feel hesitate to borrow more funds, which ultimately undermine the real economic growth and affect the financial markets to a large extend (Darrat & Brocato, 1994; Rogalski & Vinso, 1977).

Likewise, Engen and Hubbard (2005) document the relationship between the fiscal policy and stock returns. These studies argued that sustainable long term budget deficit adversely affect the national savings, external account and interest rate as result the investor would be more inclined toward the investment in foreign than local assets. The inclination would put a downward pressure on the currency, which could limit the ability of country to finance its debt and at the same time increase the country's exposure to foreign exchange rate fluctuations. This situation, in turn, could undermine capital spending and ignite a drop in asset prices which would further restrain real economic activity. Likewise, another empirical study examined the relationship highlighted the impact of money growth and budget deficit on stock returns. Thus there is strong positive linkage between the Fiscal policy (budget deficit) and stock returns (Blanchard, 1981; Shah, 1984; Tobin, 1969).In contrast, there another school of thought believers argued that budget deficit increase uncertainty around the investors and at the same time increase the money supply, which in turn decrease the interest rate (De Leeuw & Holloway, 1985; Geske & Roll, 1983). Nevertheless, Allen and

Smith (1983) documented a inverse relationship between the budget deficit and money supply.

**The International-Economic Activities and Firm Risk:**

Economic interdependency, competitive environment have made it difficult for investor to ignore the impact of international forces or activities on rate of return. Specially, greater international activities impact is being observed for high import or export dependent countries. Maysami, Howe, and Hamzah (2004) examined the impact of foreign exchange rate on stock returns. The study concluded a positive relationship between the stock returns and exchange rate. Few studies in literature used other variable like foreign exchange reserve or foreign direct investment or foreign indirect investment to analyze the impact of international factors on stock returns like Adam and Tweneboah (2008) examined the impact of the macroeconomic factors in stock market. The study argued that foreign direct investment and foreign reserve affect the stock returns in short horizon, although the in long horizon some other economic variables like inflation and interest rate play a key impact on stock returns in Ghana . Another study like Muhammad, Hussain, Ali, and Jalil (2009) conducted a study in Pakistan and concluded that foreign exchange rate and foreign exchange reserve affect the stock returns.

**Socio-Political Factors and Firm Risk:**

Socio-Political factors has phenomenal role in shaping the economic growth. The favorable Socio-Political circumstance laid down a strong foundation strong economic and financial system. Nevertheless, Socio-Political instability would make the system more fragile. Resultant, the stock prices extreme fluctuations in capital market(Julio & Yook, 2012).

The literature suggested two approached for the measurement of Socio-Political instability. The first approach is based on the assumption that leadership has a greater role in making Fiscal and monetary policy. Therefore, this approach focuses on the instability of executives or government. In other words, frequently change in government unconstitutionally pushes the country toward chaos. This would break the consistency of policies which is so critical to spur economic growth (Hussain et al., 2017).

On the other hand, the second political instability measure approach focuses on socio- political instability. For this purpose, the constructed political index model is based on various social unrest events like the number of political motivated assassinations, the number of people killed in conjunction with of domestic mass violence, the number of successful coups, the number of attempted but unsuccessful coups, democracy, semi democracies and dictatorships(Ali, 2001). In addition,

another study by Asteriou and Price (2001) constructed the political instability index based on TERROR, the number of terrorist incidents, STRIK, the number of strikes ELECT, an election dummy, REGIME, a dummy variable for War, 1982,GULF, a dummy variable for the period of Gulf War. Similarly, Hussain et al. (2017) securatize the affect of Socio-Political factors on Systematic risk in pakistan Stock exchange(PSX). The study used four variable like Terrorism, Assassination, Riot and General strike. The further breakdown these variable in two kind of Event i.e., No person killed and No of Event. The study suggested No of events instead of No of person killed are better measured for Terrorism and Assassination with exception to Riots. The study observed insignificant effect of General Strikes.

**Methodology**

The study examined the individual effect nine Macro-Economic factors such as Gross domestic product, Interest rate, Money Supply, Inflation, Terms Spread, Government budget deficit as percentage of DGP, current Account, foreign reserves, and foreign exchange rate on downside systematic risk. The socio-political factors such as Number of killed in terrorism and number of killed in Assassination are considered for examining the moderation effect of socio-political index. The study adopted the Estarada (2002) methodology for the estimation of downside risk.

In addition, the study used four regression technique such as ordinary least square, fixed effect regression, random effect regression, GLS-fixed effect to in-depth understand the relationship between Macro-Economic factors and downside systematic risk. The primary benefit of advance statistical technique such as GLS-fixed effect is to cater the problem of heterogeneity. In addition, the study analyzed socio-political index as moderating variable with each macro-economic Factors. The socio-political index constructed through Principal component analysis (PCA).

| Macro-Economic Factors & Socio-Political Factors | | |
|---|---|---|
| Variable | Symbol | Measurement |
| Macro-Economic Factors | | |
| 1.GDP | GDP | Growth rate of GDP Ülkü and Baker (2014) |
| 2.Interest rate | INT | Federal Funds rate( Discount rate) Thorbecke (1997) |
| 3.Money Supply | MS | Log(M2) Ahmad, and Siddiqui (1995) |
| 4.Inflation rate | INFL | The rate of change in Consumer price index Robichek and Cohn (1974) |
| 5.Term spread | TS | Difference of Long Bond interest rate-Short term bond interest rate Aslanidis and Christiansen (2014) |
| 6.GBD | GBD | Government deficit as percentage of Gross domestic product Laopodis (2007) |
| 7.Current Account | CA | Current account as percentage of GDP Wald, and Wu (2002) |
| 8.Foreign Reserve | FR | Foreign Reserve Durham (2004) |
| 9.Foreign exchange rate | FER | Worth of Ruppee(Rs) against Dollar($)Griffin and Stulz (2001) |
| Socio-Political Factors | | |
| 10.Assassinations | Assas | Political assassinations (Hussain et al., 2017) |
| 11.Terrorism | Terror | The No of terrorist incidents((Hussain et al., 2017) |
| Control Variables | | |
| 11.Firm SIZE | SIZE | Log of Total Assets |
| 12.Financial Leverage | Debt_Asset | Total Debt divided by Total Assets |
| 13.Profitability | ROE | Net Income divided by Equity |

**Downside Systematic risk:**

The research used downside capital asset pricing model of Estarada (2002) to estimate the downside systematic risk.

$$\beta_i^{E} = \frac{Cov\left[\min\left(R_{it}-\mu_i,0\right).\min\left(R_{Mt}-\mu_M,0\right)\right]}{Var\left[\min\left(R_{Mt}-\mu_M,0\right)\right]} \quad \ldots\ldots\ldots\ldots\ldots\ldots 3.1$$

The downside beta of any asset i can be estimated using regression analysis, although this estimation is a bit tricky for the following reason. Let $y_t = Min[(R_{it}-\mu_i,0)]$ and $X_t = Min[(R_{Mt}-\mu_M,0)]$ and let $\mu_y$ and $\mu_x$ be the mean of $y_t$ and $x_t$, respectively (Estrada, 2002).

**Econometric Model**

The study used the below regression equation by applying various statistical techniques such as OLS, Random-Effect, Fixed –Effect, GLS-Fixed

$$\beta_{it}^{E} = \alpha_o + \beta_t GDP_t + \beta_t Int + \beta_t MS_t + \beta INF_t + \beta_t TS_t + \beta_t GBD_t + \beta_t CA_t + \beta_t FR_t + \beta_t FER + \varepsilon_{it} \quad .3.2$$

Where βit is downside Systematic risk for cross i and time i using Estrada (2002), αitis intercept of regression equation, GDPt is Gross Domestic product, Intt is Interest rate, MSt is Money supply for time t. further, INFt is used for Inflation, TSt stands for Terms Spread, GBDt is Gross domestic product as percentage of GDP, CAt is Current Account,

FRt stands for Foreign reserve, FERt is Foreign exchange rate.where εit= μi +Uit. μi stands for unobserved firm specific effect and Uit denotes random error that varies across firms.

$$\beta_{it}^{E} = \alpha_o + \beta_t GDP_t + \beta_t Int + \beta_t TS_t + \beta_t GBD_t + \beta_t CA_t + \beta_t FR_t + \beta_t FER$$

$$+ \beta_t SPI_t*GDP_t + \beta_t SPI_t*Int_t + \beta_t SPI_t*TS_t + \beta_t SPI_t*GBD + \beta_t SPI_t*CA_t + \beta_t SPI_t*FR_t + \beta_t SPI_t*FER + \varepsilon_{it}$$

Therefore, Interaction terms with independent variable is constructed such as SPIt*GDPt is interaction term of Socio-political index with GDP. Similarly pattern for interaction is follow the remaining aforementioned proxies.

**Sample Size Detail:**

**Sample Size (Industry Wise Firm Distribution)**

| S.No | Industry Name | Firms |
|---|---|---|
| **1** | Textile industry | 67 |
| **2** | Miscellaneous | 34 |
| **3** | Oil and Gas | 20 |
| **4** | Transport, Technology and Communication | 8 |
| **5** | Engineering and Allied industries | 12 |
| **6** | Fertilizer | 6 |
| **7** | Glass & Ceramics | 6 |
| **8** | Paper & Board | 6 |
| **9** | Automobile Parts & Accessories | 16 |
| **10** | Pharmaceuticals | 7 |
| **11** | Food & Personal Care Products | 29 |
| **12** | Cement | 18 |
| **13** | Chemical | 21 |
| **Total** | | 250 |

## Results Analysis

### Descriptive statistics and Correlation Matrix

The DS-SR has means distribution range from 0 to 4097 with mean value of 14.49. The value of standard deviation value of 115.5 that shows much higher variations in data set. Further, higher kurtosis value of 687 depicts that leptokurticdistribution and the Skewness value of 23.4 suggests a positive skewness of the data.

**Table 01: Descriptive Statistics**

| S.No | Variable | Mean | Median | Maximum | Minimum | SD | Skewness | Kurtosis |
|---|---|---|---|---|---|---|---|---|
| **1** | DS-SR | 14.49 | 2.195 | 4097 | 0 | 115.5 | 23.4 | 687 |
| **2** | Socio-Pol-Index | 0.08 | 0.284 | 2.53 | -1.61 | 1.33 | 0.24 | 1.98 |
| **3** | GDP | 4.37 | 4.41 | 7.67 | 1.61 | 1.92 | 0.2 | 1.99 |
| **4** | INT | 10.56 | 10 | 15 | 7.5 | 2.25 | 0.59 | 2.32 |
| **5** | MS | 12.66 | 12.5 | 12.9 | 12.38 | 12.26 | -0.23 | 0.31 |
| **6** | INFL | 9.99 | 8.67 | 18.47 | 6.94 | 3.41 | 1.25 | 3.7 |
| **7** | TS | 24.67 | 22 | 53 | 5 | 15.52 | 0.68 | 2.45 |
| **8** | GBD | -5.24 | -4.9 | -1.95 | -8.01 | 1.71 | 0.08 | 2.25 |
| **9** | CA | -0.08 | -0.076 | 0 | -0.17 | 0.04 | -0.17 | 3.73 |
| **10** | FR | 21.37 | 21.66 | 21.8 | 20.65 | 0.41 | -0.59 | 1.8 |
| **11** | FER | 79.59 | 84.07 | 107.04 | 57.39 | 17.43 | 0.06 | 1.53 |
| **12** | ROE | 0.1 | 0.2 | 10.6 | -32.6 | 1.1 | -17.1 | 491.7 |
| **13** | SIZE | 15.4 | 15.2 | 20.0 | 8.8 | 1.6 | 0.0 | 3.3 |
| **14** | Debt_asset | 0.6 | 0.6 | 9.8 | 0.0 | 0.5 | 8.4 | 117.0 |

**Downside Systematic risk(DS-SR),Socio-Pol is socio-political index Gross domestic product(GDP), Interest rate(Int), Money Supply(MS), Inflation(Infl) , Terms Spread(TS), Government budget deficit as percentage of DGP(GBD), current Account(CA), Foreign reserves(FR), Foreign exchange rate(FER), ROE is return on equity, SIZE is equal firm size and Debt_asset is equal to debt to asset ratio**

Further, GDP has means value range from 1.61 to 7.67 with means value of 4.37. The GDP has standard deviation value of 1.92. The data is closer to normality as the Skewness value of 0.20.The value kurtosis i.e., 1.99 also reveals that data set is normal. Likewise, Interest rate has value range from 15.0 to 7.50 with means value of 10.56. The Interest rate has standard deviation value of 2.25. The data is closer to normality as the Skewness value of 0.59. The value kurtosis i.e., 2.32 also reveals that data set is normal.Money Supply has value range from 12.9 to 12.38 with means value of 12.66. The Money Supply has standard deviation value of 2.25. The data slightly negatively Skewed as per the Skewness value of -0.23. The value kurtosis i.e., 0.31 also reveals that data set is normal.Further, there correlation values indicate that either moderate or strong correlation among the variable. However, the socio-political index has strong association.

**Table 02: Correlation**

| Variable | DS-SR | Soc-Pol | GDP | INT | MS | INF | TS | GBD | CA | FR | FER | ROE | SIZE | Debt_Asset |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **DS-SR** | 1 | | | | | | | | | | | | | |
| **Socio-Pol** | -0.0401 | 1 | | | | | | | | | | | | |
| **GDP** | 0.008 | -0.3567 | 1 | | | | | | | | | | | |
| **INT** | -0.0018 | -0.0023 | -0.6621 | 1 | | | | | | | | | | |
| **MS** | -0.0225 | 0.5215 | -0.1051 | -0.2325 | 1 | | | | | | | | | |
| **INF** | -0.0049 | -0.1346 | -0.7559 | 0.9289 | -0.3473 | 1 | | | | | | | | |
| **TS** | -0.0168 | 0.4412 | 0.2089 | -0.5158 | 0.4563 | -0.3915 | 1 | | | | | | | |
| **GBD** | 0.0108 | -0.5347 | 0.5346 | -0.2591 | -0.533 | -0.3458 | -0.418 | 1 | | | | | | |
| **CA** | -0.004 | 0.5759 | 0.0092 | -0.2959 | 0.6275 | -0.4356 | 0.1553 | 0.0001 | 1 | | | | | |
| **FR** | -0.0276 | 0.5241 | -0.4529 | 0.0859 | 0.6701 | 0.0241 | 0.4304 | -0.7616 | 0.1387 | 1 | | | | |
| **FER** | 0.0233 | 0.5965 | -0.4043 | 0.0704 | 0.611 | -0.0168 | 0.4323 | -0.6329 | 0.6099 | 0.6697 | 1 | | | |
| **ROE** | -0.0094 | -0.035 | 0.0488 | -0.0254 | -0.0281 | -0.0161 | -0.0019 | 0.0439 | -0.0036 | -0.0573 | -0.0343 | 1 | | |
| **SIZE** | -0.134 | 0.1847 | -0.0787 | 0.0052 | 0.1854 | -0.0184 | 0.0778 | -0.1335 | 0.1202 | 0.1521 | 0.1899 | -0.02 | 1 | |
| **Debt_Asset** | 0.0892 | 0.0079 | -0.0292 | 0.0283 | 0.001 | 0.0209 | -0.0205 | -0.0106 | -0.0155 | 0.0142 | 0.0047 | -0.02 | -0.222 | 1 |

**Downside Systematic risk(DS-SR),Socio-Pol is socio-political index Gross domestic product(GDP), Interest rate(Int), Money Supply(MS), Inflation(Infl) , Terms Spread(TS), Government budget deficit as percentage of DGP(GBD), current Account(CA), Foreign reserves(FR), Foreign exchange rate(FER).**

| Table 03: Macro-Economic factors and Downside systematic risk: | | | | |
|---|---|---|---|---|
| **Variable** | OLS | Fixed Effect | Random Effect | GLS-Fixed |
| **GDP** | -3.601*** | -3.597*** | -3.602*** | -51.48*** |
| | (-0.614) | (-0.520) | (-0.524) | (-11.48) |
| **INT** | 4.883*** | 4.754*** | 4.860*** | 139.6*** |
| | (-0.826) | (-0.700) | (-0.704) | (-36.14) |
| **MS** | -0.0002* | -0.0007* | -0.0001* | -0.0012* |
| | (-1.25E-10) | (-1.25E-10) | (-1.25E-10) | (-1.25E-10) |
| **INFL** | 3.772*** | 3.671*** | 3.759*** | 290.2*** |
| | (-0.531) | (-0.451) | (-0.453) | (-63.03) |
| **TS** | 0.225*** | 0.223*** | 0.226*** | 20.59*** |
| | (-0.035) | (-0.030) | (-0.030) | (-4.307) |
| **GBD** | 5.442*** | 5.347*** | 5.437*** | 216.6*** |
| | (-0.582) | (-0.494) | (-0.496) | (-50.06) |
| **CA** | 30.82** | 31.40** | 30.99** | 10,952*** |
| | (-14.98) | (-12.70) | (-12.78) | (-2,199) |
| **FR** | -2.472** | -2.457** | -2.530** | -84.79*** |
| | (-1.250) | (-1.060) | (-1.066) | (-20.67) |
| **FER** | -0.760*** | -0.748*** | -0.764*** | -67.57*** |
| | (-0.131) | (-0.111) | (-0.112) | (-14.41) |
| **Debt_asset** | 2.482*** | -0.46 | 1.244*** | -3.851 |
| | (-0.303) | (-0.533) | (-0.397) | (-11.32) |
| **Size** | -1.467*** | -0.503 | -1.481*** | -3.451 |
| | (-0.102) | (-0.479) | (-0.173) | (-11.20) |
| **ROE** | -0.0677 | -0.0216 | -0.0263 | -0.746 |
| | (-0.059) | (-0.053) | (-0.053) | (-2.365) |
| **Constant** | -100.7*** | -111.4*** | -101.0*** | 4,381*** |
| | (-32.97) | (-28.37) | (-28.16) | (-955.6) |
| **F( 12, 2235)** | 42.33*** | | | |
| **F(12,1760)** | | 19.18*** | 0.000*** | 3.80*** |
| **Observations** | 2,248 | 2,248 | 2,248 | 2,009 |
| **R-squared** | 0.185 | 0.103 | | |
| **Number of id** | | 239 | 239 | 237 |

**Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1,Downside Systematic risk(DS-SR) and Macro-Economic factors like Gross domestic product(GDP), Interest rate(Int), Money Supply(MS), Inflation(Infl) , Terms Spread(TS), Government budget deficit as percentage of DGP(GBD), current Account(CA), Foreign reserves(FR), Foreign exchange rate(FER).**

**Regression Analysis**

The research used three estimations techniques such as ordinary least square, fixed effect, random effect and GLS-fixed to examine the effect macro-economic factors over the downside systematic risk. The OLS estimation results reveal that GDP has negative coeffecient value of 3.601. The coefficient value depicts that economic growth reduces the firm downside risk. The results are robust with Ülkü and Baker (2014).Similarly, money supply has coefficient value of -0.0002 suggested that money supply minimize the firm risk. However, the magnitude of impact is weak as compare to gross domestic product. Likewise, foreign reserves and foreign exchange reduces the firm downside risk as per their respective coefficient values of -2.472, -0.760. However, interest rate has positive coefficient value of 4.883, which suggests that increase interest rate would increase the downside risk. The interest rate results are robust with Thorbecke (1997). In similar way, inflation, term spread and budget deficit as percentage of GDP increase the investor exposure toward downside risk. Moreover, the fixed-effect and random-effect regression estimation also suggested gross domestic product reduces the downside volatility. Likewise, the foreign reserve and foreign exchange rate have coefficient values of -2.457 and -0.748 in fixed effect. Similarly, the coefficient values are negative in random effect estimation. The results depict that increase in foreign reserves and foreign exchange rate would considerably reduce the firm downside systematic risk. However, the remaining economic factors in the model increase the firm downside risk

Withal, in case of GLS-fixed, the research revealed gross domestic product, foreign reserves and money supply reduce the firm downside volatility. However, inflation, term spread, gross domestic product as percentage of GDP and interest rate increase the firm downside systematic risk.

**Table 04: Macro-Economic, Socio-Political & Downside Systematic risk through GLS-fixed:**

| Variable | Model 01 | Model 02 | Model 03 | Model 04 | Model 05 | Model 06 | Model 07 |
|---|---|---|---|---|---|---|---|
| **GDP** | -73.81*** | -396.9*** | -1,987*** | -5.887 | -861.3*** | -648.4*** | -1,069*** |
| | (-18.68) | (-730) | (-371.5) | (-16.20) | (-159.7) | (-119.8) | (-198.7) |
| **INT** | 118.7*** | 482.4*** | 1,527*** | -88.82*** | 644.8*** | 301.8*** | 755.2*** |
| | (-24.57) | (-89.15) | (-285.3) | (-25.09) | (-119.4) | (-55.90) | (-140.1) |
| **TS** | 13.45*** | 20.21*** | -92.39*** | -1.596** | 34.80*** | 38.92*** | 55.44*** |
| | (-2.472) | (-3.722) | (-17.57) | (-0.738) | (-6.453) | (-7.227) | (-10.34) |
| **GBD** | -67.71*** | -163.4*** | -1,749*** | -191.0*** | -155.1*** | -38.08*** | 35.81*** |
| | (-14.32) | (-30.65) | (-328.5) | (-35.68) | (-29.16) | (-10.48) | (-12.00) |
| **CA** | 7,490*** | 21,452*** | 70,913*** | 2,403*** | 11,933*** | 3,876*** | 10,169*** |
| | (-1,385) | (-3,945) | (-13,246) | (-627.8) | (-2,181) | (-803.9) | (-1,861) |
| **FR** | -543.4*** | -605.8*** | -999.1*** | -493.5*** | -914.9*** | -969.3*** | -1,002*** |
| | (-101.7) | (-113.2) | (-186.7) | (-92.49) | (-170.9) | (-181.1) | (-187.2) |
| **FER** | -21.83*** | -63.61*** | -203.6*** | -12.60*** | -34.79*** | -35.57*** | -30.78*** |
| | (-4.535) | (-12.07) | (-38.34) | (-3.111) | (-6.787) | (-7.157) | (-6.074) |
| **Socio-Pol_index** | -525.9*** | 2,914*** | -1,730*** | 858.2*** | -2,056*** | 59,762*** | 4,637*** |
| | (-99.22) | (-551.6) | (-325.0) | (-164.7) | (-386.5) | (-11,27) | (-876.4) |
| **GDP*Socio-Pol index** | 132.7*** | | | | | | |
| | -25.03 | | | | | | |
| **INT*Socio-Pol index** | | -248.6*** | | | | | |
| | | (-46.88) | | | | | |
| **TS*Socio-Pol index** | | | 98.28*** | | | | |
| | | | (-18.53) | | | | |
| **GBD*Socio-Pol index** | | | | 145.4*** | | | |
| | | | | (-27.42) | | | |
| **CA*Socio-Pol index** | | | | | -26,772*** | | |
| | | | | | (-5,049) | | |
| **FR*Socio-Pol index** | | | | | | -2,795*** | |
| | | | | | | (-527.1) | |
| **FER*Socio-Pol index** | | | | | | | -47.19*** |
| | | | | | | | (-8.900) |
| **Constant** | 11,400*** | 11,400*** | 11,400*** | 11,400*** | 11,400*** | 11,400*** | 11,400*** |
| | (-2,221) | (-2,221) | (-2,221) | (-2,221) | (-2,221) | (-2,221) | (-2,221) |
| **F(9,1909)** | 5.48 | 5.48 | 5.48 | 5.48 | 5.48 | 5.48 | 5.48 |
| **Observations** | 2,168 | 2,168 | 2,168 | 2,168 | 2,168 | 2,168 | 2,168 |
| **Number of id** | 250 | 250 | 250 | 250 | 250 | 250 | 250 |

**Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1, The multiplicative terms depict the interaction of of Gross domestic product(GDP), Interest rate(Int), Money Supply(MS), Inflation(Infl) , Terms Spread(TS), Government budget deficit as percentage of DGP(GBD), current Account(CA), Foreign reserves(FR), Foreign exchange rate(FER) with Socio-Political**

Further, the GLS fixed estimation also used to scrutinize the moderation effect of socio-political index of macro-economic factors with downside risk except money supply& inflation. The multiplicative term of GDP*Socio-Pol index has coefficient value of 132.7. The statistically significant coefficient value suggests that socio-pol moderates the relationship between GDP and downside systematic risk. Similarly, INT*Socio-Pol index has coefficient value of -248.6. This coefficient value also supported the moderation effect. Moreover, TS*Socio-Pol index, GBD*Socio-Pol index, CA*Socio-Pol index have also statistically significant coefficient values of 98.28, 145.4, -26,772. Similarly, Socio-Political index also moderate the relationship between foreign Reserve and downside risk as per its coefficient value of -2,795 and same pattern is observed in case of foreign exchange rate.

## 5. Conclusion

The research examined the macro-economic factors over the downside systematic risk. The study considered gross domestic product, interest rate, money supply, inflation, terms spread, government budget deficit as percentage of GDP, current account, foreign reserves, foreign exchange rate. The research also analyzed the moderating role of socio-political. The study considered two proxies of Socio-Political such as number killed in terrorism and number of killed in assassination for construction of socio-political index.

The study results reveal that gross domestic product, money supply, foreign reserve and foreign exchange rate reduced the firm downside risk. Whereas, the interest rate, inflation, government budget deficit as percentage of GDP, current account increase the firm downside risk. Moreover, the results also depict that socio-political factor moderate relation of macro-economic factors and downside risk.

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