Downside Systematic Risk in Pakistani Stock Market: Role of Corporate Governance, Financial Liberalization and Investor Sentiment

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Abstract

Purpose –We examine the impact of corporate governance, investor sentiment and financial liberalization on downside systematic risk and the interplay of socio-political turbulence on this relationship through static and dynamic panel estimation models.

Design/methodology/approach – Our evidence is based on a sample of 230 publicly listed non-financial firms from Pakistan Stock Exchange (PSX) over the period 2008-2018. Furthermore, we analyze the data through Blundell and Bond (1998) technique in full sample as well sub-samples (Big & Small Firms).

Findings –We document that corporate governance mechanism reduces the downside risk, whereas, investor sentiment and financial liberalization increase the investors' exposure toward downside risk. Particularly, the results provide some new insights that the socio-political turbulence as a moderator weakens the impact of corporate governance and strengthens the effect of investor sentiment and financial liberalization on downside risk. Consistent with prior studies, the analysis of sub-samples reveal some statistical variations in large and small-size sampled firms. Theoretically, the findings mainly support agency theory, noise trader theory and the Keynesians hypothesis.

Originality/value –Stock market volatility has become a prime area of concern for investors, policy makers and regulators in emerging economies. Primarily, the existence of market volatility is attributed to weak governance, irrational behavior of market participants, liberation of financial policies and sociopolitical turbulence. Therefore, the present study provides simultaneous empirical evidence to determine whether corporate governance, investor sentiment and financial liberalization hinder or spur downside risk in an emerging economy. Furthermore, our work relates to a small number of studies that examine the role of socio-political turbulence as a moderator on the relationship of corporate governance, investor sentiment and financial liberalization with downside systematic risk.

Keywords Downside Risk, Socio-political turbulence, Corporate Governance, Investor Sentiment, Financial Liberalization

Paper type Research Paper

1. Introduction

Market participants are more conscious of the cataclysmic causes and consequences of stock market volatility (Dai et al., 2020; Liang et al., 2020) as these deter investors' participation, risk sharing and distorts investment decisions (Fang et al., 2020). The presence of persistent market volatility is detrimental for the smooth functioning of stock market thereby raising the required rate of return for bearing higher systematic risk and discouraging firms from capital expansion, which in turn thwarts productive investment and impedes economic growth (Maitra et al., 2017; Mathew et al., 2018; Wang et al., 2020). Theoretically, conflicting views exist in literature regarding the accurate methodology for the estimation of required rate of returns since the seminal work of Markowitz (1952). Research studies in the strand of mean-variance behavior (MVB) hypothesis advocate the suitability and reliability of variance for the measurement of volatility of returns for any asset. Based on the MVB, Sharpe (1964) outlined beta as a measure of systematic risk for any asset in the capital asset pricing model (CAPM). However, due to poor empirical evidence the original CAPM framework has been extended and other models that incorporate lower partial moments have been introduced based on Prospect Theory[1]. Prospect Theory postulates that investors generally feel stronger impulse to avoid losses than to acquire gains (Tversky and Kahneman, 1979). Hence investors are concerned with downside risk; both downside total risk and downside systematic risk based on mean semi-variance behavior (MSB) framework. The MSB risk measures are considered more suitable in accurate estimation of the required rate of return (Mitra, 2020; Harris, et al., 2019; Atilgan, et al., 2019; Rashid & Hamid, 2015; Estrada, 2002). The most prominent of these MSB based alternative models is the downside risk capital asset pricing model (DCAPM) of Estrada (2002), where downside systematic risk is defined as the ratio of the covariance of the downside (below mean) variations in stock and market returns and the semi-variance of market returns.

Weak corporate governance mechanism is one of the main contributor to excessive market volatility (Mathew et al., 2018). The agency theory of Jensen and Meckling (1976) posits that the seperation of ownership and control creates problem of asymmetric information that enables managers to divert available resources to serve personal interests (Malik et al., 2021). Compliance with code of corporate governance reduces the problem of information asymmetry thereby ensuring effective and transparent managerial decision making (Akbar et al., 2019; Ali et al., 2018; Hussain & Shah, 2017). Further, there is a plethora of empirical research on the theoretical notion of the role of investor sentiment in shaping capital market volatility (see e.g. Audrino et al., 2020; Hussain & Shah, 2017; Kumari, 2019; Maitra & Dash, 2017; Pandey & Sehgal, 2019; Seok et al., 2019; Shahzad et al., 2017). Mispricing of securities triggered disproportionate volatility during the financial crises of 2007-08 that reinforced the considerable influence of emotional aspects on investment decisions (Fang et al., 2020). Persistent mispricing of assets vis-à-vis their fundamental

[1] See the early work of Roy (1952), Hogan and Warren (1974), Harlow and Rao (1989), Estrada (2002) and Rashid and Hamid (2015)

values induces excessive market volatility. Contrary to efficient market hypothesis, the noise trader theory attributes the mispricing of stocks to the presence of irrational investors i.e. noise traders.

Excessive market volatility has also been associate with the financial liberalization in developing and emerging countries in the 1990s (Gaies et al., 2020; Kassimatis, 2002). Stiglitz (2004) argued that liberation of financial system substantially increases the volatility in the consumption and output level due to the presence of pro-cyclical nature of foreign capital flows that impairs financial and economic development. On the contrary, the investor-base broadening hypothesis imply that financial liberalization attract foreign investors which in turn provides stability to the financial markets (Wang, 2007). However, the empirical evidence is inconclusive on the liberalization and volatility relationship (Gaies et al., 2020; Li, et al., 2020; Umutlu, et al., 2010; Hamdaoui & Maktouf, 2020; Li, et al., 2020; Bekaert & Harvey, 1997) and the extant literature in the context of Pakistan offers no empirical evidence on the relationship at firm level.

The present study contributes to the existing literature in several ways. *Firstly*, it covers the gap in extant literature in the context of Pakistan by empirically investigating the relationship between financial liberalization and downside risk. *Secondly*, it provides simultaneous empirical evidence to determine whether corporate governance, investor sentiment and financial liberalization hinder or spur downside risk for listed firms in Pakistani equity market. Emerging markets such as Pakistan exhibit extreme market volatility as well as suffer from socio-political turbulence. There are several factors that contribute towards the prevalence of hostile market conditions. The existence of excessive volatility is attributed to fragile governance mechanism (Mathew et al., 2018; Claessens, et al., 2000), the irrational behavior of investors (Audrino et al., 2020; Lesmond, 2005) and financial liberalization (Hamdaoui & Maktouf, 2020; Umutlu et al., 2010). Therefore, the present study provides empirical evidence to evaluate if compliance with code of corporate governance, existence of noise traders and liberation of financial policies hinder or spur downside risk for listed firms in Pakistani equity market. *Finally*, it contributes to the existing literature on the role of socio-political turbulence as a moderator of the relationship of corporate governance, investor sentiment and financial liberalization with downside risk. Socio-political turbulence creates an uncertain environment where rational investors hesitate to trade and shift their businesses to safer countries in order to minimize the future losses (Aisen & Veiga, 2013). Though extant literature provides empirical evidence on the role of socio-political turbulence based on social unrest in shaping economic development (Ribes, et al., 2019; Yu & Richard, 2020), the same has not been investigated in the context of downside risk at firm level particularly in the context of Pakistan.

Our choice of Pakistan is based on several factors; (i) it has a strategically distinct geographic location that is considered politically unstable (Khan & Ahmed,2019), (ii) it is surrounded by hostile neighbors (MengYun et al., 2018), (iii) political unrest and peace within Pakistan and across the region remain particularly aggravated since 9/11 with significant increase in terrorist attacks, protests as well as upheavals leading to deteriorated economic conditions (Zakaria, Jun, & Ahmed, 2019), (vi) as per the World Governance Indicators developed by the World Bank in 2019, it

occupies the 3.3th percentile (where 0 corresponds to the lowest and 100 to the highest rank) of the "political stability/absence of violence and terrorism" and score of -2.25 (-2.5 (weak) and 2.5 (strong)) political stability/absence of violence and (v) it had been ranked 25th out of 178 countries according to the Fragile State Index. These recent statistics are also reflecting the increased fragility and accordingly the existence of socio-political turbulence in Pakistan. Keeping in view the above discussion, this study focuses on Pakistan, because the socio-political unrest have shaken the very basic structure of socio-political landscape in Pakistan.

We have organized the remainder of the paper into **Section 2** that provides a review of the literature and articulation of the research hypotheses; **Section 3** that describes the empirical methods; **Section 4** that presents results and their discussions and **Section 5** that provides conclusions.

2. Literature Review

2.1. Downside Systematic risk

The emergence of modern portfolio theory provided a solid foundation to price investor's exposure toward market risk. The hallmark studies of Markowitz (1952) and Sharpe (1964) proposed the estimation of total and systematic risk based on mean-variance behavior (MVB) hypothesis. The MVB and the CAPM imply that standard deviation and beta are adequate measures to capture investors' concern about total risk and systematic risk respectively. Nonetheless, the Prospect Theory supports the notion that investors are more conscious about the downside risk and hence are loss averse than risk averse (Kahneman and Tversky, 1979). The disappointment aversion theory also complement the claim that investors have greater inclination to minimize losses than to maximize gains (Gul, 1991). It may cause investors to be too conservative in their investment choices due to excessive volatility. Following this line of reasoning, empirical studies such as Harlow and Rao (1989), Estrada (2002) and Rashid and Hamid (2015) supported the downside risk estimation based on MSB hypothesis as more suitable. It is not affected by the distribution of returns as well as combine the information of variance and skewness (Hogan & Warren, 1974).

A plethora of empirical studies suggest the disastrous causes and consequences of stock market volatility. For instance, several studies argue that weak corporate governance, investor sentiment, financial liberalization and socio-political instability are the most predominant factors, among many others, that induced market risk (Atilgan et al., 2019; Fang et al., 2020; Gaies et al., 2020; Gregory, 2020; Harris et al., 2019; Mathew et al., 2018). Moreover, the following section presents the theoretical and empirical underpinning of risk with aforementioned factors in order to provide solid grounds for the articulation and empirical testing of our hypotheses.

2.2. Corporate Governance, Investor Sentiment, Financial liberalization and Firm Risk

Agency theory considers asymmetric information as a source of principal-agent conflict that creates problem of moral hazard thereby enabling management to divert available resources to serve their own interests at the expense of external stakeholders (Jensen & Mackling 1976; Akbar et al., 2019). This opportunistic behavior induces expected cash flows volatility which further exacerbate the agency risk and increase required rate of returns (Rehman et al., 2021). The management disciplining' hypothesis states that the existence of strong corporate governance

mechanism curtails management's opportunistic behavior through effective monitoring and ensure better decision making so firms with strict observance of code of corporate governance have lesser chances of default risk (Ali et al., 2018; Mathew et al., 2018; Sayari & Marcum, 2018). Some of the most recent research studies have investigated the relationship of corporate governance mechanism with corporate performance (Shu & Chiang, 2020), sustainability performance (Naciti, 2019), firm performance (Bhagat & Bolton, 2019), reporting quality (Correa-Garcia, Garcia-Benau, & Garcia-Meca, 2020), dividend payout ratio (Kim, Kiymaz, & Oh, 2020), and climate change (Hargrove, Qandeel, & Sommer, 2019).

The extant literature has covered the relationship of essential aspects of corporate governance such as board composition and ownership structure and audit quality with firm risk (Ali et al., 2018; Christy, et al., 2013; Djerbi & Anis, 2015; Hussain & Shah, 2017; Lewellyn & Muller, 2012; Mathew et al., 2018; Sayari & Marcum, 2018). Mathew et al. (2018) found a negative association between board attributes and firm risk based on 268 UK firms from the FTSE 350. Sayari and Marcum (2018) provided empirical support in favor of the notion that the existence of strong governance system reduces firm risk. A study by Ali et al. (2018) based on a large panel of 1,086 non-financial firms in Australia revealed strong negative relationship between corporate governance and firm risk. They observed that the relationship has been further strengthened in firms with higher growth opportunities. Similarly, Wang et al. (2015) reported negative impacts of independent directors and managerial ownership on firm risk in china. Cheng (2008), on the other hand, reported for a sample of US firms that board size reduced firm risk. Christy (2013) reported that board characteristic such as independent directors and professional experience of directors have negative impact on the stock returns volatility in Australia. On the contrary, based on empirical analysis of a sample of 212 US bank over 1997-2004, Pathan (2009) suggested that risk is positively associated with board independence, board size, CEO power and managerial ownership. Mathew et al. (2016) also found a positive impact of managerial ownership, institutional ownership and small board size on firm risk.

Quality of audit committee is one way among many others to ensure transparent financial disclosure and curtail the managers' opportunistic behavior (Hsu & Wu ,2014). Prior literature assert that audit committee must consist of independent directors in order to avoid fraudulent activities and reduce agency risk (Borlea et al., 2017). Lin & Chang (2012) support the notion that the presence of independent directors in audit committee minimized economic risk. The presence of higher quality of auditors (such as the big 4 auditors) restrain managerial opportunistic behavior and ensure transparency in financial disclosure leading to credible positive signal boosting investors' confidence (Dasilas & Papasyriopoulos, 2015). Higher quality of auditors reveal positive signals to the market and investors respond accordingly (Kitching, 2009). Lin and Chang (2012) argued that the large number of independent directors on audit committee magnify performance and reduce agency risk.

In the context of Pakistan, Hussain and Shah (2017) analyzed a sample of 201 non-financial firms over 2004-2014. They found that corporate governance mechanism is negatively associated with

firm risk. Similarly Hassan et al. (2018) reported a negative relationship between corporate governance proxies and downside risk CAPM. Based on the empirical findings, they recommend the use of DCAPM i.e. downside risk beta as a measure of risk for the Pakistani equity market. However, these studies used different proxy variables of corporate governance mechanisms and did not construct a corporate governance index. In addition, there have been revisions to the code of corporate governance in 2012 and 2017[2] that warrant a fresh investigation to empirically test the following hypothesis:

H_1: Corporate governance quality has a significant positive impact on downside systematic risk.

The efficient market hypothesis (EMH) postulates that stock prices are based on publically available information (Malkiel & Fama, 1970). The EMH hypothesizes that stock market participants are generally rational and avoid unnecessary risk. However, the mispricing of securities during the financial crises of 2007-2008 supported the substantial influence of emotional aspects on investment decisions. The noise trader theory attributes the mispricing of stocks to the presence of noise traders. Securities become undervalued (overvalued) in bearish (bullish) markets due to their substantial deviation from intrinsic values and consequently persistent mispricing of assets induce excessive market volatility (Audrino et al., 2020; Fang et al., 2020a; Kumari, 2019; De Long, Shleifer, Summers, & Waldmann, 1990).

Investor sentiment is a set of emotions, feelings and expectations of investors towards risk and return associated with their investment. Hence, positive (negative) perception contributes toward the overvaluation (undervaluation) of securities (Maitra & Dash, 2017). Baker and Wurgler (2006; 2007) are considered land mark studies on the topic. They constructed investor sentiment through six proxies; initial public offering, first day return on IPOs, shares turnover, dividend premium, closed-end mutual funds discount and equity share and reported significant relationship between investor sentiment and stock returns. Shu and Chang (2015) found a positive relationship between investor sentiment and market volatility. Similarly, Lao et al. (2018) reported two-way causality between investor sentiment and stock returns. Maitra and Dash (2017) also reported a positive relatiosnhip between market voliltality and investor sentiment in India. Recently, Audrino et al. (2020) report that investor sentiment and attention are positively related to stock returns volatility.

For the Pakistani equity market, Hussain and Shah (2017) as well as Hussain et al. (2017) established the detrimental effect of investor sentiment on firm risk measured as downside risk beta from DCAPM. Hussain et al. (2017) also observe that corporate governance weakens the relationship between investor sentiment and downside risk consistent with agency theory. Previously Rehman (2013) also reported positive association between total risk and investor sentiment in the Karachi stock exchange. Using the same proxies of Baker and Wurgler (2006),

[2] https://www.manifest.co.uk/pakistan-adopts-new-corporate-governance-rules/

Rehman and Shahzad (2016) reported that investor sentiment and industry returns are related in Pakistani equity market. However, these studies used nearly identical datasets and empirical procedures that lacked robustness. Therefore, we articulate and empirically test the following hypothesis using more recent data as well as robust empirical tests and procedures:

H_2: Investor sentiment has a significant positive impact on downside systematic risk.

Renowned theorists McKinnon (1973) and Shaw (1973) support the notion that liberation of financial policies fosters stock market expansion and lowers cost of capital which in turn leads to economic development. Similarly, the investor-base broadening hypothesis of Merton (1987) states that financial liberalization causes a substantial reduction in market volatility thereby reducing the problem of asymmetric information due to the presence of large number of foreign investors (Wang, 2007). On the contrary, Keynesians challenge the traditional view of the benefits of liberalization. They argue that although liberation of financial policies quickly lead to expansion of equity markets, quicker pace of transactions induces market volatility which in turn lead to destabilization of real economy (Gaies et al., 2020; Hamdaoui & Maktouf, 2020; Kassimatis, 2002).

The positive role of financial liberalization is supported by number of studies such as Chu (2020), Gaies et al. (2020), Wu et al. (2017) and Kassimatis (2002) that examined the impact of market liberalization on economic and financial development. Quinn and Toyoda (2008) reported that liberalization of capital account fostered economic growth. Similarly, Law et al. (2014) found that the development of financial markets in domestic markets are closely related to liberalization. Quinn (2003) observed that in greater depression, economies with liberalized policy related to financial markets recovered more instantly in comparison to economies with high level of barriers for capital mobility.

A large number of empirical studies claim that the impact of financial liberalization varies due to the imbedded characteristics of an economy. Bekaert, et al. (2006) and Broner and Rigobon (2004) observed that financial liberalization has an adverse effect in countries with weak financial institutions and domestic stock market. In the same manner, Arestis and Demetriades (1999), Hamdaoui and Maktouf (2020) and Li et al. (2020) argued that financial liberalization trigger financial destabilization due to weak financial institutions. Thomas (2010) opined that in economies with strong financial institutions market liberalization may spur economic growth while for others it would have an adverse impact.

Also there are abundant studies on the relationship of market liberalization and stock returns volatility such as Hamdaoui and Maktouf (2020) and Shahzad et al. (2017). Supporting the investor-bases boarding hypothesis of Merton (1987), Wang (2007) revealed that the increase in FDI as a result of financial liberalization reduces stock market volatility, where sophisticated investors have enough information regarding the subset of available financial assets. Kwan and Reyes (1997) reported that broadening of the investor base in presence of heterogeneous

expectations lead to the reduction in overall stock market volatility. On the contrary, Stiglitz (2004) investigated the relationship between level of stock market volatility and financial liberalization. He reported a direct impact of financial liberalization on stock price fluctuations in presence of asymmetric information.

Kassimatis (2002) found that volatility fell in the Pakistani equity market after financial liberalization. More recent investigation by Roy and Shijin (2020) supported the Keynesian hypothesis of increasing volatility during the liberalization process but a fall in volatility in post liberalization period for emerging countries including Pakistan. Earlier Navaz et al. (2018) reported that the positive liberalization and efficiency relationship across countries in their sample that included Pakistan depended on the level of institutional development. Though Waliullah (2010) did study financial liberalization and stock market behavior in Pakistan, the extant literature bears a gap in testing the relationship of financial liberalization and volatility measured as downside risk as per the MSB framework. Also the review of extant literature in the context of Pakistan reveal that the relationship of financial liberalization and volatility has not been investigated at frim level. Therefore, given the above theoretical and empirical review of extant literature, we postulate and empirically test the following hypothesis:

H_3: Financial liberalization has a significant positive impact on downside systematic risk.

2.3. Socio-Political Turbulence and Firm Risk

Socio-political turbulence has devastating implications for the economic development (Gregory, 2020). Extant literature reveals two approaches to measure the socio-political turbulence. The first approach is based on the propensity for a change in executive power. The second approach is based on social unrest. In this approach, a composite index is constructed based on various variables capturing phenomena of social unrest (Alesina & Perotti, 1996). Hibbs (1973) proposed six broader categories of social unrest variables such as riots, armed attacks events, political strikes, assassinations, deaths due to political violence and demonstrations against government based on three principles. *First*, the event must manifest anti-system character thereby being at odd with the existing political system. *Second*, it must have substantial immediate political significance in such a way that it becomes an imminent threat to the normal operation of the political system. *Finally*, the event must involve collective or mass activity. This definition has been used for the construction of political turbulence as exogenous variable in different studies (e.g. Venieris & Gupta, 1986; Alesina & Perotti, 1996).

Primarily, the prevailing social unrest has been attributed to worldwide terrorist attacks and terrorism is considered as a type of politically motivated crime (Brunt & Cousins, 2002). Recent studies have found empirical evidence on the impact of terrorism on stock returns. These include Gok et al. (2020) in Turkey, Khan and Ahmed (2019) in Pakistan, Bevilacqua et al. (2019) in developed countries, Chaudhry et al. (2018) in SAARC region and Corbet et al. (2018) in Europe. These studies reported adverse impacts of terrorist attacks on financial market and economic development for their respective sample countries. Furthermore, empirical research has also supported the relationship between terrorist attacks and market volatility. Charles and Darné (2006) found that US capital markets were less affected than European and Tokyo stock markets

due to deadly 9/11 terrorist attacks. This was attributed to the closure of the US stock markets for four days while the other markets kept open. The findings of Kollias et al. (2011) suggest that the Athens stock market was more fragile to deadly terrorist attacks than London stock exchange. They argued that the fragility is primarily attributed to the market's size and maturity. Goel et al. (2017) find persistent negative effects of 9/11 attacks on S&P500 index during the scrutiny of 49 terrorist attacks worldwide.

2.4. Theoretical Perspective of Socio-political Turbulence as a Moderator between Corporate Governance and Downside Risk

Edwards and Tabellini (1992) and Dalyop (2019) argue that governments in politically unstable and polarized countries are more likely to adopt inefficient governance related policies including the maintenance of inefficient tax systems, higher current government consumption, or the accumulation of larger external debts, which, in turn create market volatility and thus adversely affect long-run economic growth. It is also known that politically unstable and polarized countries find it difficult to undertake necessary reforms related to governance structure or to implement them in order to create a good economic and stable political environment (Ali, 2001). Similarly, Svensson (1998) claims that governments in politically unstable and polarized societies tend to provide weak property rights. This may be the rational choice of policy makers maximizing the individual welfare of their social or ethnic group, as opposed to maximizing social welfare. Therefore, we empirically test the following hypothesis:

H_4: Socio-political turbulence weakens the relationship of corporate governance and downside risk.

2.5. Theoretical Perspective of Socio-political Turbulence as Moderator between Investor Sentiment and Downside Risk

The extant literature also argue that sociopolitical turbulence affect financial development through accumulation of capital (Butkiewicz & Yanikkaya, 2005). It is argued that incentives to invest or disinvest depends on the likelihood that policies of regime and regime itself remain stable in the foreseeable future. Foreign investors are unlikely to commit their capital into unstable political environment (An, Chen, Luo, & Zhang, 2016). Thus political instability reduces the flow of foreign capital because of uncertainties associated with constantly changing regimes. Socio-political instability is caused by income inequality that leads to uncertainty in the political and economic environment. Therefore, socio-political instability reduces growth by discouraging domestic investment and shifting savings towards non-marketable production or capital flight (Zouhaier & Karim, 2012). In such chaotic environment, irrational investors undermine the positive mean-variance trade-off (Yu & Yuan, 2011) and influence equity prices in equilibrium through price pressure and hold-more effect (Fang et al., 2020). Consequently, financial securities become mispriced (Hussain and Shah, 2017). Mispricing of stocks with respect to their fundamental values induces stock return volatility and inefficient allocation of resource in financial markets (Pandey & Sehgal, 2019; Seok et al., 2019; Shahzad et al., 2017). Therefore, we empirically test the following hypothesis in the context of Pakistan:

H_5: Socio-political turbulence strengthens the relationship of investor sentiment and downside risk.

2.6. Theoretical Perspective of Socio-political Turbulence as Moderator between Financial Liberalization and Downside Risk

Socio-political instability, in general, is likely to shorten the planning horizon of policymakers leading to greater likelihood towards sub-optimal short-term monetary and fiscal policies. Frequent switching of policies negatively affect economic performance and leads to higher volatility (Aisen & Veiga, 2006). Consequently, there is an expectation that the level of economic growth will decline in the future. Acemoglu et al. (2003) argue that large budget deficits and high inflation are an indication of weak institutions due to presence of socio-political turmoil. It is the weak institutions that bring about distortionary macroeconomic policies that result not only in slower growth over the long run but also induce greater volatility and deteriorate macroeconomic outcomes (Dalyop, 2019). Therefore, in the context of the present study we empirically test the following hypothesis:

H_6: Socio-political turbulence strengthens the relationship between financial liberalization and downside risk.

3. Research Methodology

3.1 Sample Details

There were 580 listed firms in Pakistan stock exchange (PSX) over the sample period 2008 to 2018. We excluded 140 financial firms from our sample due to different regulatory framework. Subsequently, 230 non- financial firms were considered through proportionate stratified random sampling technique out of the remaining 440 non-financial firms presented sector-wise in **Table I**. We collected the data from companies' annual reports, balance sheet Analysis (BSA) published by State Bank of Pakistan (SBP), website of Pakistan stock exchange (PSX) and global terrorism database (GTB).

Table I The Details of Sample Size

Target Population	No. of firms	No. of firms in Stratified sample	% of Target Population	% of Total Population
Automobile & Parts	15	8	1.8	1.4
Beverages	3	2	0.4	0.3
Electricity	19	10	2.3	1.7
Electronic Goods	3	2	0.4	0.3
Chemicals	34	18	4	3.1
Cement	36	19	4.3	3.2
Food Producers	53	28	6.3	4.8
Paper & Board	4	2	0.5	0.4
General Industrials	14	7	1.7	1.3
Health Care	2	1	0.2	0.2
Metals and Mining	10	5	1.2	0.9
Transportation	4	2	0.5	0.4
Oil & Gas	13	7	1.5	1.2
Textile	178	93	21	16
Household Goods	13	7	1.5	1.2
Media	2	1	0.2	0.2
Multi-utilities	2	1	0.2	0.2
Telecommunication	4	2	0.5	0.4
Engineering	10	5	1.2	0.9
Hardware and Equipment	2	1	0.2	0.2
Computer Services	2	1	0.2	0.2
Tobacco	3	2	0.4	0.3
Travel and Leisure	5	3	0.6	0.5
Pharma and Bio Tech	9	5	1.1	0.8
Total target Population	440	230	52.3	39.7

3.2 Operationalization of Variables

We categorized the variables into independent variables (Corporate Governance Index, Investor Sentiment Index and financial liberalization Index), Moderating variables (Socio-political turbulence), dependent variable (downside risk) and control variables (Return on Equity, Debt to Total Assets and Size) for empirical analysis. These are described in **Table II.** We construct the composite indicator of Corporate Governance based on ten proxies that covers the key aspects of corporate governance including board composition, structure of ownership and audit quality (See **Table II**). Furthermore, we develop Investor Sentiment index based on six proxies including number of IPOs, average first day returns on IPO, average daily turnover in millions , equity share, close end funds discount and dividend premium of Baker and Wurgler (2006; 2007). Likewise, we construct the Financial Liberalization index based on trade openness, deposit rate, lending rate,

private sector borrowing, foreign portfolio investment and broad money supply[3]. Whereas, fatalities in assassination and terrorist attacks are used for the construction of socio-political turbulence index based on social unrest[4].

We use principal component analysis (PCA) procedure to construct the indices. PCA is the most widely used technique in the literature to create an index for several reasons. It is a widely known standard technique that extracts data for relationships and hidden features. It removes data with too much information to reduce dimensionality and create a composite indicator (Radovanović, Filipović, & Golušin, 2018). Unlike other linear transformation techniques with a fixed set of basis vectors, the PCA basis vectors depend on the dataset. We applied two tests; Bartlett's test and Kaiser-Meyer-Olkin test (hereafter KMO) before the estimation of PCA to determine the appropriateness of the proxies for the construction of each respective index. Bartlett's test of sphericity evaluates whether the correlation matrix is an identity matrix (Le et al., 2019). Factor analysis is considered more suitable in the case of significant Bartlett's test ($P< 0.05$). Whereas, the KMO test reveals the proportionate change in common variance due to underlying factors (Le et al., 2020). The KMO index ranges from 0 to 1 where more than 0.5 indicates suitability of factor analysis (Renzhi & Baek, 2020). The results of these tests are presented in **Table III** where both the test suggest the use of PCA procedure for index construction in each case. Afterward, we used PCA to construct each index. The process of PCA is executed in two steps. First, we estimate different components to identify those components that account for the variations in the original variable and having the lowest pairwise correlation. In the second step, following Gujarati and Porter (2009), we estimated the index based on the components which account for a portion of variance with Eigenvalue greater > 1. The cumulative variations of each component are presented in **Table IV.**

[3] Shaheen, Ali, Kauser, & Ahmed, 2013), (Kaminsky & Schmukler, 2003; Demirgüç-Kunt & Detragiache, 1998; Neumann, Penl, & Tanku, 2009) and Raza and Mohsin (2011).

[4] (Chaudhry et al., 2018; Seabra et al., 2020;Seabra et al., 2020; Gok et al., 2020; Narayan, Le, & Srianantha kumar, 2018).

Table II The Description of Corporate governance, Investor Sentiment, Financial liberalization, Socio-political turbulence and Control Variables

Sr. No	Variable	Variable Measurement
Corporate Governance		
1	Board Size	Total number of board members
2	Board Independence	Proportionate of independent director to total board members
3	Board Meeting	Total number of board meeting annually
4	CEO Duality	1 if the CEO holds two designations, otherwise 0
5	Institutional Ownership	Percentage proportion of institutional investors
6	Concentrated Ownership	Log(total no of shareholders)
7	Managerial Ownership	Percentage proportion of shares held with directors
8	Big 5 Ownership	Percentage ownership of top five shareholders
9	Audit Quality	1 if audited by big4, otherwise 0
10	Audit Committee Composition	proportion of non-executive director to total No of director in audit committee
Investor Sentiment		
1	No of IPOs	Total No of IPOs annually
2	First day return on IPO	Average First day return on IPO
3	Share turnover	Total no of share turnover in PSX annually
4	Equity Share	Percentage of total equity to long term debt issuance
5	Close end mutual funds dis	Net asset value (NAV)- market value of funds
6	Dividend Premium	Log(dividend payers' Average M/B ratio - Non-dividend payers' Average M/B ratio)
Financial Liberalization		
1	Trade Openness	Percentage of sum of Import and Export to GDP
2	Deposit Rate	Deposit Rate
3	Lending Rate	Lending Rates
4	Private Sector Borrowing	Percentage of private sector credit to GDP
5	Foreign Portfolio Investment	Log(FDI)
6	Broad Money	Log(M2)
Socio-political Turbulence		
1	Assassination	Number of people killed in Assassination
2	Terrorism	Number of people killed in Terrorist Attacks
Control Variables		
1	Return on equity	Net Income/Equity
2	Size of firm	Log(total Assets)
3	Debt to asset ratio	Percentage of debt to total assets

Table III Results of Bartlett test of sphericity and Kaiser-Meyer-Olkin Measure of Sampling Adequacy

	Bartlett test of sphericity			Kaiser-Meyer-Olkin Measure of Sampling Adeq
	Chi-square	DF	p-value	
Corporate Governance	886.783***	45	0.000	0.671
Investor Sentiment	11177.2***	15	0.000	0.840
Financial liberalization	16868.205 ***	15	0.000	0.679
Sociopolitical Turbulence	4503.625***	01	0.000	0.710

Table IV Total Explained variance

Component	Eigenvalues	% of Variance	Cumulative Variance %
Corporate Governance index			
1	2.1422	.0.2142	0.2142
2	1.18188	0.1182	0.3324
3	1.10299	0.1103	0.4427
4	1.02114	0.1021	0.5448
5	.919097	0.0919	0.6367
6	.85019	0.0850	0.7217
7	.793079	0.0793	0.8011
8	.766344	0.0766	0.8777
9	.712334	0.0712	0.9489
10	.510748	0.0511	1.0000
Investor Sentiment index			
1	2.76694	0.4612	0.4612
2	1.64281	0.2738	0.7350
3	.789741	0.1316	0.8666
4	.484512	0.0808	0.9473
5	.261847	0.0436	0.9910
6	.0541515	0.0090	1.0000
Financial Liberalization index			
1	3.27656	0.5461	0.5461
2	1.64307	0.2738	0.8199
3	.696618	0.1161	0.9360
4	.278352	0.0464	0.9824
5	.086481	0.0144	0.9968
6	.0189242	0.0032	1.0000
Sociopolitical Turbulence index			
1	1.9041	0.9521	0.9521
2	.0958996	0.0479	1.0000

3.3 Baseline Estimation

We examined the determinants of downside risk using panel data framework. Hsiao (2005) argue that panel regression estimation has several benefits; accounts for unobserved heterogeneity, allows higher degree of freedom and addresses the issue of collinearity among explanatory variables up to a large extent. Hence, we estimated equations (i) and (ii) through static panel models. We also estimated the base line equations (i) and (ii) using BB dynamic panel framework of Blundell and Bond (1998) for the robustness of our empirical results. Dynamic panel models are also considered superior when the nature of relationship between two variables is endogenous (Akbar et al., 2016). Moreover, dynamic panel models are considered more effective in handling the problems of unobserved heterogeneity, simultaneous and dynamic endogeneities in the panel to provide consistent and unbiased coefficients especially when the selected panel is unbalanced (Bhagat & Bolton, 2008; Nguyen, Locke, & Reddy, 2015; Gul et al., 2020)

Detthamrong et al. (2017) state that behavior of corporate governance varies across firm's characteristics. Ullah and Kamal (2017) suggest that policy makers consider the size of the firm during the formulation of corporate governance framework. Furthermore, Hussain and Shah (2017) reported that adverse effects of investor sentiment were more pronounced in small size firms than large size firms. Mian and Sankaraguruswamy (2012) also argued that investor sentiment varies across firm size. Therefore, we estimated the following model using full sample as well as sub-samples (Big Firms and Small Firms):

$$DSSR_{it}^{E} = \beta_{0+}\, DSSR_{it-1}^{E} + \beta_1 CGINDEX_{it} + \beta_2 INVESENT_t + \beta_3 FINANLIB_t + \beta_4 SOCIOPOL_t + \sum_{i=1}^{n} \gamma_{it} ControlVar + \mu_i + \eta_t + \varepsilon_{it} \qquad (i)$$

whereas, $DSSR_{it}^{E}$ represents the downside systematic risk[5] i.e. β_i^E and $DSSR_{it-1}^{E}$ is its first lag. Nguyen et al. (2014) justified the AR(1) to curtail the potential autoregressive effect on stochastic term. Hence, we also consider AR(1) in our estimation. Moreover in dynamic panel setting of Blundell and Bond (1998) each variable is instrumented by its lag. Further, in equation (i) *βo* is the intercept term, *CGINDEXit* is corporate governance index for firm *i* at time *t*, *INVESENTt* is investor sentiment index for time *t*, *FINANLIBt* denotes financial liberalization index for time *t* and *SOCIOPOLt* is socio-political index for time *t*. The control variables are represented by *ControlVar* and include firm size, debt to asset ratio, return on equity, year wise dummy variables and industry dummies while ε_{it} is the error term.

To assess the moderating effect of socio-political turbulence on the relationship of corporate governance, investor sentiment and financial liberalization, we augment equation (i) by including the interactive terms of socio-political turbulence index to obtain the model in equation (ii) as:

[5] We estimated the β_i^E for each firm annually using daily data on its stock returns and the market returns using Estrada (2002) estimator i.e. $\beta_i^E = \frac{Cov[min(\mathrm{R_{it}}-\mu_i,0).\min(\mathrm{R_{Mt}}-\mu_M,0)]}{Var[\min(\mathrm{R_{Mt}}-\mu_M,0)]}$.

$$DSSR_{it}^{E} = \beta_{0+}\, DSSR_{it-1}^{E} + \beta_1 CGINDEX_{it} + \beta_2 INVESENT_t + \beta_3 FINANLIB_t + \beta_4 SOCIOPOL_t + \beta_5 CGINDEX_{it} * SOCIOPOL_t + \beta_6 INVESENT_t * SOCIOPOL_t + \beta_5 FINANLIB_t * SOCIOPOL_t + \sum_{i=1}^{n} \gamma_{it} ControlVar + \mu_i + \eta_t + \varepsilon_{it} \quad (ii)$$

where *CGINDEX$_{it}$* SOCIO-POLt*, *INVESENTt * SOCIOPOLt* and *FINANLIBt * SOCIOPOLt* are the interactive terms of socio-political index with corporate governance, investor sentiment and financial liberalization respectively.

4. Data Analysis

4.1 Descriptive Statistics and Correlation Matrix

The descriptive statistics of the variables are presented in **Table V**. DSSR has mean value of 5.415 with standard deviation of 7.843 that is higher than Estrada (2002). The difference in descriptive statistics on DSSR may be explained by dissimilar sample (index vs individual stocks), time horizon (monthly vs daily) and sample period (1993-2001 vs 2008-2018). CGINDEX has a mean value of 0.033 and standard deviation of 1.454 which is in line with Hussain and Shah (2017). Further, INVESENT has a mean value of 0.232 and standard deviation of 0.868 that is in line with what Hussain and Shah (2017) observed following Baker and Wurgler (2006; 2007) methodology of index construction. FINANLIB has a negative mean value of -0.085 and standard deviation of 1.786 and SOCIOPOL has a mean of 0.034 and a standard deviation of 1.319. INVESENT, FINANLIB and SOCIOPOL exhibit negative skewness (mean < median).

The correlation analysis is presented in **Table VI**. Consistent with the notion of agency theory, results show negative correlation coefficient of CGINDEX with DSSR which is statistically significant at 1 percent. However, INVESENT has a positive correlation coefficient with DSSR which suggests that investor sentiment and downside risk move in same direction. Consistent with notion that the presence of weak financial institutions liberalization spurs volatility, FINANLIB has weak positive correlation with DSSR. SOCIOPOL also has positive correlation with DSSR which is statistically significant at 1 percent. However, we observe that FINANLIB and INVESENT as well as SOCIOPOL and INVESENT have statistically significant and higher correlation coefficients (i.e. 0.59 and 0.62) suggesting possible multicollinearity. Therefore, we

estimated equation (i) and (ii) using CGINDEX, FINANLIB and INVESENT as independent variables separately to overcome possible multicollinearity as suggested by correlation analysis[6].

[6] We also estimated equations (i) and (ii) including all the independent variables simultaneously and the empirical results are qualitatively identical from both static and dynamic estimations.

Table V Descriptive Statistics

	Mean	Std. Dev.	Min	Max	Median
DSSR	5.415	7.843	0.128	31.418	2.261
CGINDEX	0.033	1.454	-3.995	5.314	0.030
INVSENT	0.232	0.868	-1.084	1.085	0.811
FINANLIB	-0.085	1.786	-3.30	2.301	0.158
SOCIOPOL	0.034	1.319	-1.607	2.526	0.284
ROE	0.204	0.2462	-0.33	0.7	0.150
SIZE	15.109	2.5	8.786	20.02	15.024
DTA	0.6494	0.5464	0.104	0.8639	0.604

The table reports descriptive statistics. DSSR stands for downside systematic risk, .CGINDEX is corporate governance index which is constructed through PCA. INVESENT is investor sentiment index which constructed through PCA. FINANLIB stands for financial liberalization index which is constructed through PCA using six proxies i.e. credit to private sector, trade openness, deposit rate, lending rate, money supply and foreign portfolio investment. The SOCIOPOL is constructed using two proxies i.e. number of people killed in political assassination and number of people killed in terrorist attacks. ROE is return on equity, SIZE is log of total assets and DTA is debt to asset ratio.

Table VI Correlation Matrix

	DSSR	CGINDEX	INVSENT	FINANLIB	SOCIOPOL	ROE	SIZE	DTA
DSSR	1							
CGINDEX	-0.38***	1						
INVSENT	0.05**	-0.09**	1					
FINANLIB	0.07*	-0.08**	0.59***	1				
SOCIOPOL	0.02**	-0.09**	0.62***	0.32***	1			
ROE	-0.06*	0.06*	-0.03	0.01	0.01	1		
SIZE	-0.33***	0.48***	0.0008	0.05	0.04	0.03	1	
DTA	0.26***	-0.13***	0.05	0.02	0.02	-0.06*	-0.24***	1

Statistical significance is denoted by ***, **, and * at 1, 5, and 10 percent, respectively

The table reports descriptive statistics. DSSR stands for downside systematic risk, .CGINDEX is corporate governance index which is constructed through PCA. INVESENT is investor sentiment index which is constructed through PCA. FINANLIB stands for financial liberalization index which is constructed through PCA using six proxies i.e. credit to private sector, trade openness, deposit rate, lending rate, money supply and foreign portfolio investment. The SOCIOPOL is constructed using two proxies i.e. number of people killed in political assassination and number of people killed in terrorist attacks. ROE is return on equity, SIZE is log of total assets and DTA is debt to asset ratio.

Table VII Results of Static and Dynamic Panel Estimation Models (Full Sample)

	Static Models			Dynamic Panel Models		
Variable	Model 01	Model 2	Model 03	Model 01	Model 2	Model 03
L.DSSR				0.294***	0.274***	0.111**
				(0.0732)	(0.054)	(0.055)
CGINDEX	-1.046***			-2.182***		
	(0.332)			(0.360)		
INVSENT		1.443***			1.163***	
		(0.212)			-(0.135)	
FINANLIB			1.960***			1.806***
			(0.298)			(0.203)
CG* SOCIOPOL	0.203*			1.071***		
	(0.107)			(0.215)		
INVSENT* SOCIOPOL		0.526***			0.475***	
		-(0.073)			(0.062)	
FINANLIB* SOCIOPOL			1.833***			1.806***
			(0.304)			(0.203)
SOCIOPOL	0.704***	1.088***	0.516***	0.730***	0.710***	0.208*
	(0.191)	(0.27)	(0.162)	(0.217)	(0.183)	(0.112)
ROE	-0.136	-0.0264	-0.0675	-0.142	-0.0281	-0.0287
	(0.144)	(0.054)	(0.055)	(0.104)	(0.035)	(0.037)
DTA	0.358	-0.252	0.0683	3.159**	1.460*	2.936***
	(0.742)	(0.546)	(0.551)	(1.234)	(0.858)	(0.971)
SIZE	2.087***	0.654	1.489***	-0.478**	-0.845***	-0.976***
	(0.663)	(0.476)	(0.467)	(0.242)	(0.130)	(0.133)
CONSTANT	-26.63***	-3.346	-15.02**	10.79***	16.05***	18.60***
	(10.22)	(7.29)	(7.143)	(3.907)	(2.198)	(2.278)
R-squared	0.03	0.054	0.032			
F-Statistics (P Value)	0.000	0.000	0.000			
Wald Test (*p*-value)				0.000	0.000	0.000
Sargan Test (*p*-value)				0.332	0.156	0.494
AR2 Test (*p*-value)				0.624	0.447	0.508
Number of id	230	230	230	230	230	230

Table VIII Results of Static and Dynamic Panel Estimation Models (Textile Sector Excluded)

	Static Models			Dynamic Panel Models		
Variable	Model 01	Model 2	Model 03	Model 01	Model 2	Model 03
L.DSSR				0.0249	0.253***	0.0932
				(0.0675)	(0.0586)	(0.059)
CGINDEX	-0.733**			-2.212***		
	(0.371)			(0.416)		
INVSENT		1.441***			1.147***	
		(0.223)			(0.139)	
FINANLIB			1.909***			1.845***
			(0.314)			(0.217)
CG* SOCIOPOL	0.218*			1.159***		
	(0.113)			(0.220)		
INVSENT* SOCIOPOL		0.495***			0.468***	
		(0.0768)			(0.0645)	
FINANLIB* SOCIOPOL			1.645***			1.845***
			(0.319)			(0.217)
SOCIOPOL	0.687***	1.102***	0.505***	0.874***	0.660***	0.199*
	(0.204)	(0.285)	(0.171)	(0.242)	(0.191)	(0.115)
ROE	-0.0134	-0.00723	-0.0473	-0.109	-0.0168	-0.0221
	(0.153)	(0.055)	(0.0559)	(0.0833)	(0.0317)	(0.0312)
DTA	0.213	-0.279	-0.00604	2.665**	1.555*	2.879***
	(0.746)	(0.553)	(0.558)	(1.152)	(0.870)	(0.972)
SIZE	1.732**	0.775	1.544***	-0.445	-0.868***	-0.982***
	(0.699)	(0.497)	(0.488)	(0.276)	(0.1380)	(0.1390)
CONSTANT	-20.89*	-5.176	-15.83**	10.59**	16.37***	18.73***
	(10.73)	(7.589)	(7.442)	(4.332)	(2.330)	(2.382)
R-squared	0.021	0.052	0.031			
F-Statistics (P Value)	0.000	0.000	0.000			
Wald Test (p-value)				0.000	0.000	0.000
Sargan Test (p-value)				0.354	0.658	0.189
AR2 Test (p-value)				0.725	0.527	0.396
Number of id	209	209	209	209	209	209

4.2 Empirical Results (Full Sample)

The results reported from our empirical estimations of equation (i) and (ii) in **Table VII** depict that CGINDEX has a significantly negatively relationship with DSSR ($\beta_{CGINDEX}$ = -1.046 and -2.182, p <.01, respectively) from both static and BB dynamic panel estimations. These findings are consistent with the notion of *management disciplining hypothesis* under the agency theory that existence of strong corporate governance mechanism reduces information asymmetry and enhances quality of managerial decisions. Effective managerial decisions ensure efficient allocation of available resources that reduces stock returns volatility and minimizes cost of capital for bearing lower systematic risk (Ali et al., 2018; Wang et al., 2015). Mathew et al. (2018) also provided empirical support suggesting that corporate governance reduces firm risk in line with the implications of agency theory.

The estimated coefficients of INVESENT are positive and statistically significant in both static and BB dynamic panel estimations i.e. $\beta_{INVESENT}$ = 1.443 and 1.163, p <.01, respectively (**Table VII**). It is consistent with *noise trader theory* that explains that the presence of noise traders spurs investors' exposure toward market risk. Previous studies by Audrino et al. (2020), Fang et al. (2020), Kumari (2019) and Maitra and Dash (2017) reported similarly findings. Hussain and Shah (2017) also reported that investor sentiment increased overall market volatility in the Pakistani equity market. Similarly, the results in **Table VII** reveal that the FINANLIB has positive and statistically significant estimated coefficients of 1.960 and 1.806 from static and BB dynamic panel estimations respectively that are significant at 1 percent. Thus, the econometric results of both models confirm positive association of financial liberalization with downside risk consistent with Keynesian hypothesis and the recent empirical findings of Roy and Shijin (2020).

Table IX Results of Static and Dynamic Panel Estimation Models (Big Firms)

	Static Models			Dynamic Panel Models		
Variable	Model 01	Model 2	Model 03	Model 01	Model 2	Model 03
L.DSSR				0.211***	0.109**	0.21***
				(0.032)	(0.0476)	(0.0387)
CGINDEX	-0.820**			-0.821**		
	(0.326)			(0.324)		
INVSENT		0.971***			0.839***	
		(0.249)			(0.0738)	
FINANLIB			1.918***			1.983***
			(0.342)			(0.163)
CG* SOCIOPOL	0.0627			0.743***		
	(0.108)			(0.142)		
INVSENT* SOCIOPOL		0.224**			0.360***	
		(0.0886)			(0.057)	
FINANLIB* SOCIOPOL			1.918***			0.725***
			(0.342)			(0.152)
SOCIOPOL	0.407**	0.786**	0.727***	1.027***	0.282*	0.610***
	(0.194)	(0.326)	(0.190)	(0.234)	(0.155)	(0.099)
ROE	-0.136	-0.155	-0.161	-0.152**	-0.0945	-0.0357
	(0.122)	(0.109)	(0.107)	(0.068)	(0.082)	(0.098)
DTA	4.669***	3.522***	4.623***	3.649***	2.454***	3.467***
	(1.645)	(1.321)	(1.293)	(0.791)	(0.641)	(0.558)
SIZE	1.756**	0.683	1.277**	-0.561**	-0.619***	-0.573***
	(0.709)	(0.615)	(0.569)	(0.249)	(0.134)	(0.129)
CONSTANT	-27.75**	-9.264	-18.56**	11.47***	11.79***	11.92***
	(11.61)	(10.11)	(9.328)	(3.900)	(2.246)	(2.134)
R-squared	0.043	0.041	0.079			
F-Statistics (P Value)	0.000	0.000	0.000			
Wald Test (p-value)				0.000	0.000	0.000
Sargan Test (p-value)				0.650	0.252	0.411
AR2 Test (p-value)				0.113	0.408	0.339
Number of id	148.0	148.0	148.0	148.0	148.0	148.0

Table X Results of Static and Dynamic Panel Estimation Models (Small Firms)

	Static Models			Dynamic Panel Models		
Variable	Model 01	Model 2	Model 03	Model 01	Model 2	Model 03
L.DSSR				0.224***	0.431***	0.277***
				(0.074)	(0.030)	(0.059)
CGINDEX	-1.485**			-3.842***		
	(0.692)			(0.673)		
INVSENT		1.832***			1.954***	
		(0.337)			(0.363)	
FINANLIB			2.147***			2.794***
			(0.483)			(0.524)
CG* SOCIOPOL	0.611**			2.509***		
	(0.302)			(0.457)		
INVSENT* SOCIOPOL		0.849***			1.248***	
		(0.122)			(0.174)	
FINANLIB* SOCIOPOL			2.147***			2.794***
			(0.483)			(0.524)
SOCIOPOL	0.755*	1.449***	0.544**	0.347	0.989**	1.155***
	(0.409)	(0.428)	(0.263)	(0.403)	-0.419	-0.279
ROE	-0.0397	0.00954	-0.0521	-0.214	0.159	-0.0677
	(0.403)	(0.0694)	(0.0701)	(0.553)	(0.338)	(0.343)
DTA	0.0701	-0.567	-0.0854	1.577*	0.653	1.142
	(1.057)	(0.698)	(0.706)	(0.89)	(0.603)	(0.787)
SIZE	2.519*	0.491	1.799**	-0.714	-1.095***	-1.283***
	(1.482)	(0.8980	(0.891)	(0.573)	-(0.340)	(0.394)
CONSTANT	-27.69	2.500	-14.49	13.56	20.18***	25.24***
	(20.9)	(12.66)	(12.51)	(8.499)	(5.005)	(6.122)
R-squared	0.037	0.077	0.057			
F-Statistics (P Value)	0.000	0.000	0.000			
Wald Test (p-value)				0.000	0.000	0.000
Sargan Test (p-value)				0.498	0.380	0.904
AR2 Test (p-value)				0.435	0.170	0.463
Number of id	82.00	82.00	82.00	82.00	82.00	82.00

Furthermore, the estimated coefficients of SOCIOPOL are consistently positive and statistically significant (at 1 percent in all cases except for model 3 in dynamic panel estimation i.e. significant at 10 percent only) in all the static and BB dynamic panel estimations indicating a positive relationship with DSSR (**Table VII**). It is consistent with the notion that socio-political turbulence adversely affect economic development. Rational market participants are reluctant to trade in order to avoid future losses in fragile financial markets and move their investment to safe havens which in turn induce market volatility (Gregory, 2020). Moreover, the interactive term CGINDEX*SOCIOPOL is also positively related to DSSR in both static and dynamic panel estimations ($\beta_{CGINDEX*SOCIOPOL}$ = 0.203, p <0.1 and 1.071, p<.01 respectively). It suggests that the constructive impact of corporate governance is reduced due to the presence of socio-political turmoil. It implies that incumbent governments in socially and politically unstable economies are more likely to adopt inefficient governance policies and find it difficult to undertake necessary reforms related to governance structure and implement that in turn creates market volatility and thus adversely affect long-run economic growth (Alesina & Drazen, 1991; Dollar & Svensson, 2000).

The interactive terms of INVESENT*SOCIOPOL and FINANLIB*SOCIOPOL have positive estimated coefficients i.e. $\beta_{INVESENT*SOCIOPOL}$ = 0.526 and 0.475, p <0.01 and $\beta_{FINANLIB*SOCIOPOL}$ = 1.833 and1.806, p <0.01 for the full sample in static and dynamic panel estimations respectively (**Table VII**). These results indicate that socio-political turbulence strengthens the association of investor sentiment and financial liberalization with downside systematic risk. The results also suggest that socio-political turbulence make capital markets more fragile i.e. equity prices in the market are more sensitive to arrival of new information regarding devastating events of social unrest. Hence, this chaotic environment provides favorable circumstances for investor sentiment to further exacerbate the fragile financial system thereby increasing the investors' exposure to systematic risk (Yu & Jong, 2020). The positive coefficient of the interaction of socio-political turbulence and financial liberalization is consistent with claim that sociopolitical turbulence is likely to shorten the horizon of policymakers leading to suboptimal short-term monetary and fiscal policies that induce volatility (Aisen & Veiga, 2006).

Our findings confirm the negative influence of corporate governance and positive impact of investor sentiment and financial liberalization on downside risk and the moderating role of socio-political turbulence. In addition, we also observe that both leverage and size are consistently significant across the three models in the dynamic panel estimations. Consistent with extant literature, the findings suggest that firms with higher financial risk have higher volatility and large firms have lower volatility. However, given that textile sector is the biggest in terms of number of firms listed on PSX and hence have higher representation in our sample, we excluded the 21 firms of textile sector from full sample in order to avoid sample bias and verify the reliability of the aforementioned empirical results. The results are presented in **Table VIII** that validate our findings from **Table VII** to be reliable.

4.3 Empirical Results of Sub-sample (Big Firms and Small Firms)

To disentangle the observed size effect in extant literature and in our empirical results in **Table VII** and **Table VIII**, the estimated outputs of equation (i) and equation (ii) for our size based sub-samples (Big and Small) are presented in **Table IX** and **Table X**. It can be observed that negative impact of corporate governance, in full sample, is robust across Big firms ($\beta_{CGINDEX}$ = -0.820 and -0.821, p <.01, **Table IX**) and Small firms ($\beta_{CGINDEX}$ = -1.485 and -3.842, p <.05, **Table X**) in static and BB dynamic panel estimations. The magnitude of coefficient is greater in small firm vis-à-vis big firm, which is consistent with Ullah and Kamal (2017) who also observed that corporate governance varies across firm size as well as Hussain and Shah (2017). In line with the findings of the full sample, the estimated coefficients of investor sentiment index are positive and statistically significant at 1 percent across sub-samples of big firms ($\beta_{INVESENT}$ = 0.971 and 0.839, **Table IX**) and small firms ($\beta_{INVESENT}$ = 1.832 and 1.954, **Table X**). These results imply that investor sentiment positively influences Big and Small firms' volatility measured as downside risk (DSSR). These findings may suggest that investors switch from stocks in smaller firms to bigger firms due to noise trading hence inducing higher volatility for smaller stocks. The magnitude of investor sentiment coefficients across different sub-samples are also consistent with notion that investor sentiment has greater impact over small firms than big size firms (Mian & Sankaraguruswamy, 2012).

Further, in the case of financial liberalization, FINANLIB has positive estimated coefficients in Big and Small firms sub-samples reported in **Table IX** and **Table X** from both static and BB dynamic panel estimations i.e. $\beta_{FINANLIB}$ = 1.918 and 1.983, p <.01 and $\beta_{FINANLIB}$ = 2.147 and 2.794, p <.01 respectively for big and small sub-samples . Our results suggest that financial liberalization leads to increase in downside risk for big and small firms. It may be explained that in such a scenario small firms will exhibit higher (downside) risk as these stocks will fluctuate more on the downside given the higher risk of default induced by greater access to credit vis-à-vis big firms.

Furthermore, the results reported in **Table IX** and **Table X** validated the moderating role of socio-political turbulence; socio-political turbulence weakens the impact of governance with downside risk in both small and big firms. It also strengthens the association of investor sentiment and financial liberalization with downside systematic risk in sub-samples (Big &Small). Overall, our empirical findings suggest that the observed magnitude of relationships of corporate governance,

investor sentiment and financial liberalization with downside risk as well as the moderating role of socio-political turbulence vary across small and big firms.

5. Conclusion and Implications

Markets have witnessed several financial scandals such as Enron and WorldCom. Particularly, in emerging markets, risk is attributed to several factors such as weak corporate governance mechanism, irrational behavior of investors, liberation of financial policies, low liquidity, asymmetric information, unstable macroeconomic conditions and socio political turbulence[7].

The results from our static and dynamic panel regressions for our sample of non-financial firms listed on PSX suggested a negative relationship between corporate governance and downside risk and implies that strong corporate mechanism deflates firm's downside systematic risk. We also observed that the relationship between corporate governance and downside systematic risk is robust across the full sample as well as the two sub-samples based on firm size consistent with the agency theory. We found a positive relationship between investor sentiment and downside systematic risk that supports the argument that investors' sentiment trigger overall market volatility in line with the *noise trader theory* (De Long et al., 1990). Further our findings suggest that financial liberalization is positively related to downside systematic risk consistent with Bekaert et al. (2006) and Thomas (2010) who argued that financial liberalization increases overall market risk in the presence of weak financial institutions. In all cases, we found that the results showed variations in terms of magnitude of the coefficients across sub-samples based on size of the firms i.e. Big and Small firms.

Our study has multifaceted and far reaching implications for developing countries particularly in Asia that share similar characteristics as Pakistan. The findings from our study provide useful insights to individual investors, corporate managers, and regulatory authorities for the deeper understanding of factors that contribute to downside risk in equity market. Our findings suggest that policymakers may focus on structural changes in the existing code of corporate governance in order to reduce investors' exposure to downside risk and strive for minimizing noise trading. Our study also suggest that policymakers may focus on structural reforms of the financial system to

[7]See Wang et al. (2015), and Dash (2017) and Ur Rehman (2013), Bekaert, Harvey, and Lundblad (2006), Claessens, Djankov, and Lang (2000), Broner and Rigobon (2004), Lim and Brooks (2011), Hussain and Shah (2017), Hussain and Shah (2017).

make the financial markets more resilient in order to absorb extreme socio-political shocks and protect investors from turmoil in financial markets and achieve sustainable economic growth.

Apart from the reliability and relevance of our study, we acknowledge some limitations. First, our study take into account limited governance features (board Structure, ownership structure and audit quality); future studies may also consider external features of governance to examine the impact of governance on downside risk. Moreover, we have considered only one measure of systematic risk based on semi-variance hypothesis; future studies may consider different proxies for risk measurement including higher-moments (e.g. co-skewness and co-kurtosis) in order to provide more rigorous insights. The generalization of our findings is limited to the Pakistani equity market only; future research may consider sample of countries across developed, emerging and developing markets in order to provide better insights to the policy makers, investors, fund managers and other stakeholders.

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