Investor Sentiment and Firm Downside Systematic Risk

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Abstract

The study examines the effect of investor sentiment on downside systematic risk .The investor sentiment is measured through six proxies of Baker & Wurgler (2006; 2007). The downside systematic risk is measured through the DCAPM of Estrada (2002). The research considered a sample size of 230 non-financial firms for the period of 2003-14. The study result reveals that investor sentiment increases the firm's systematic risk. Further, individual proxy analysis indicates that number of IPOs, average first day returns on IPO, average daily turnover, equity share, close end funds discount and dividend premium have persistent effect over systematic risk.

Keywords: Risk, DCAPM, Investor Sentiments, Downside systematic risk, CAPM

Introduction

The market volatility is not only caused by certain events but also due to the investor's response to such incidents. The scenario has raised conflict between the financial analysts and the speculators regarding the predictive ability of future stock prices (Bahloul & Bouri, 2016). The answer is still awaited. The two school of thoughts i.e., chartist theorists versus Random walk hypothesis followers has different view point. The chartists' theorists presume that the variation in future stock returns is largely influenced by the past performance. Thus the corporations which have performed better in the past would be profitable in future and vice versa. Moreover, the investors can use technical analysis to predict the stock returns and avoid undue risk. Conversely, the random walk believers suggest that the stock prices move in an arbitrary manner. Fama (1965) argued that the stock returns are not dependent on the historical information.

In the same vein, Black (1986) proposed that "noise" which acts as a catalyst to deviate the stock prices from their fundamental characteristics. The results suggest that the investors are better off in making investment decisions based on the factual information (Labidi & Yaakoubi, 2016). However, if such decisions are undertaken as a result of market speculations the expected return would be sacrificed (Maitra & Dash, 2017). Consequently, the stock prices may diverge from their fair value resulting in the instigation of downside risk. Under such circumstances, the rational investor would not actively participate in the stock trading activities (Frugier, 2016). Moreover, the speculators being the risk seekers outperform the rational investors. Nevertheless, the information asymmetry is also necessary for the liquidity of stock market. In the absence of 'noise', most of the investors would prefer the buy and hold strategy (De Long,

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Shleifer, Summers, & Waldmann, 1990). Hence, the sentiments increase the risk exposure of the investor to a great extent.

The popularity of noise trader theories have raised another important concern that "Why noise trader risk is priced? De Long *et al*. (1990) conducted a research to answer the query. They observed that the noise trader risk results in deviation of market price from its fair value. The rational investors suffer loss because the market takes time to regain the fair value. Similarly, the research revealed a positive association between noise trading risk and the volatility of stock market. Empirical studies such as Solt and Statman (1988), Brown and Cliff (2004), Wang, Keswani, and Taylor (2006) have supported the belief of noise trader that the stock market volatility is caused by investor sentiment. Likewise, Ahmed, Shah, and Mahmood (2012) and Ur Rehman (2013) suggested that investor sentiment affect the firm risk.Similarly, Wu, Hao, and Lu (2017) suggested local sentiment leads to mispricing of the securities.However, the other school of thought suggests that the investor sentiment are driven by the stock market volatility (Lee, Jiang, and Indro 2002).

The current research contributes to the existing literature in three ways. Firstly, the current research used DCAPM to measure downside sytematic risk instead of CAPM and value at risk(VAR).Since, Artzner, Delbaen, Eber, and Heath (1997) highly criticized the value at risk as it measures the percentile profit-loss distribution. Similarly, Hogan and Warren (1974), Bawa and Lindenberg (1977), Harlow and Rao (1989) and Estrada (2002) and Rashid and Hamid (2015) disparage the traditional CAPM. These empirical studies claimed that investors are more concerned about the downside systematic risk and have least concern regarding the upward fluctuations. Therefore, DCAPM is more suitable to capture investor's exposure toward downside risk.

Secondly, previous studies such as Ur Rehman (2013) and Ahmed *et al*. (2012), Solt & Statman (1988), Brown and Cliff (2004), Wang, Keswani, and Taylor (2006), Wu, Hao, and Lu (2017) argued that investor sentiment effect market volatility. However, Lee, Jiang, and Indro (2002) argued that extreeme volatatlity casused investor sentiments. This two way causilty creates the problem of endogneouity. Thus, the study used Arellano-Bond Dynamic Data-Estimation regression (System GMM) to uncover relationship investor sentiment and downside risk.

Thirdly, emerging markets have long standing history of extreme volatility as compare to developed capital markets (Bekaert & Harvey, 2003). The investors behviour are noticebaly irrantional as compare to market participants' bevhaior in developed markets(Lesmond, 2005). The emerging markets have key characteristics of abnormal stock returns volatility, weak market efficiency, low liquidity and unstable macro-economic situation. Lim and Brooks (2011) and Edwards, Biscarri, & De Gracia (2003) argued that understanding volatality in emerging economic is critical for the asset

allocation.Therefore the study unearth the relationship of investor sentiment downside systematic risk.

Literature Review

The efficient market hypothesis and the Noise trader theory have laid down the foundation of the two different schools of thought about investor sentiment. The EMH suggest that securities are fairly priced when the markets are efficient. EMH received the analysts' attention during the early days of its inception. However, the practitioners claim that securities are not always fairly priced because of the information asymmetry. Black (1986) and De Long *et al*. (1990) carried out extensive research to explore the phenomenon. The results supported the noise trade theory by indicating the possibility of stock price deviation from intrinsic value. The theory suggested the investors' behaviour towards the noisy signals such as sentiment which are not related to the fundamental characteristics may cause the stock price to deviate from its intrinsic value. In short, the stock market volatility is driven by the investor sentiment.

Investor sentiment is defined in the literature as the feelings or emotions about the risk and return irrespective of the necessary information. The optimistic attitude gives rise to positive investor sentiments which thrust the market index upwards whereas the pessimistic approach generates negative sentiments which causes the stock index returns to decline. Therefore, the investor sentiment plays an important role in understanding the risk and return behaviour of capital markets (Baker & Wurgler, 2006, 2007). Maitra and Dash (2017) examined the effect of investor sentiments over stock returns volatility using the family of GARCH model. The study ascertained the relationship of investor sentiments with conditional volatility as well realized volatility. The study also argued small size firms are susceptible than large size firm to the investor sentiments. Recently, Chau, Deesomsak, and Koutmos (2016) argued that investor sentiments have greater effect in bearish market than in bull markets. In addition, Aydogan (2016)observed that investor sentiments varies across the economies. Similarly, Naik and Padhi (2016), Kumari and Mahakud (2015) and Suresh and George (2016) explored the relationship of investor sentiment and stock market volatility. These argued that investor sentiments contribute to market volatility up to a greater extent.

Considering the importance of investor sentiments, the previous research studies have investigated its behaviour across the various security markets. The results revealed the mispricing of financial assets in these markets. The previous research (see for instance) Daniel, Hirshleifer, and Subrahmanyam (1998) and De Long *et al*. (1990) while analyzing the behaviour of stock returns and investor sentiments observed the mispricing of securities. The over or under valuation of securities create opportunity for the investors to increase the return on investment. Conversely, these anomalies increase the risk exposure of investors. Daniel, Hirshleifer, and Subrahmanyam (1998) analyzed the biasness of noise traders using different proxies such as representativeness,

conservatism, self attribution and overconfidence of investors. The results revealed that the noise investors are usually short sighted and prefer the mispricing of securities for capital gains. The opportunity window does not last for too long and as per the phenomenon of law of normal returns the security prices moves to their fair value. De Long *et al*. (1990) argued the mispricing of securities is significantly associated with the investor sentiments. Due to the unfair perception of investors, the securities are undervalued and they ask for higher risk premium. The research also revealed the positive association between the higher stock return and optimistic behaviour of investor. Similarly, in case of pessimism the stock prices are adversely affected. Brown & Cliff (2004) and Baker & Wurgler (2007) showed the inverse relationship between the investor sentiment and stock return. Further, Baker and Wurgler (2006, 2007) analyzed a significant impact of investor sentiment on the stock prices of financial distressed firms. Lee, Shleifer, and Thaler (1991) suggested the change in net assets value (total assets minus total liabilities divided by number of outstanding shares) and market price of share is caused by the investor sentiment. Similarly, Baker and Wurgler (2006) explored the positive association between stock return and optimistic behaviour of investor. Hence, the literature suggests a significant role of investor sentiment in the valuation of financial securities.

Further, Lee *et al*., (1991) examined the role of investor sentiment on the stock return of small market capitalization using proxies like Closed End Mutual Funds Discount, Number of Initial Public Offerings (IPO's) and Stock Turnover Ratio. The results ascertained the significant relationship between investor sentiment and stock returns. Additionally, Neal and Wheatley (1998) examined the association between the investor sentiment and return of small capitalization market securities. The research used two different proxies of investor sentiment and revealed that the large closed end mutual funds discount is positively associated with the stock returns. Nonetheless, odd-lot sales to purchases have no significant influence on small market capitalization returns. Further, Bodurtha, Kim, and Lee (1995) recommended the use of country fund discount as a measure of investor sentiment. Similarly, Elton, Gruber, and Busse (1998) investigated the association of investor sentiment and portfolio return using the proxy of close end mutual fund discount. The research showed the influence of investor sentiment is greater on the stock returns of small firms as compared to their large counterparts using only a single exogenous variable. Moreover, many researchers have claimed the close end mutual fund discount as a popular measure of investor sentiment. The argument is further strengthened by Neal and Wheatley (1998), Swaminathan (1996) and Lee *et al*. (1991) who also considered close mutual fund as one of the most appropriate measure of investor sentiment. Despite of its common use in the research literature, the contradiction exists regarding its significance (Chen, Kan, and Miller 1993 and Elton *et al*. 1998).

Moreover, Neal and Wheatley (1998) argued that size premium can be predicted using net mutual funds redemptions. Baker and Wurgler (2006) also analyzed the association of dividend premium and volatility premium. The results suggested the negative relationship between the said variables i.e., when the dividend premium is increased by the firms, the volatility decreases. The dividend premium is the better measure for the stocks whose valuation and profit taking position is difficult to achieve. The asymmetric information creates an attractive opportunity for the noise trader to make profit. Hence the noise traders can use their optimistic or pessimistic behaviour to influence the stock returns. The previous research studies such as Pontiff (1996) and Wurgler and Zhuravskaya (2002) endorsed the volatility of stock return as a result of the fundamental characteristics and arbitrage risk.

Withal,Baker, Wurgler, and Yuan (2012) used the initial public offering (IPO), the next day return after IPO, the volatility premium and market turnover to construct the sentiment index of six capital markets. In addition to it, the research study decomposed the above mentioned proxies into country level and global sentiment index. The results indicated an insignificant influence of the global sentiment index on the disparity of country level returns. Further, the global and local sentiment indices have no significant association with the cross-sectional returns among the capital markets. Moreover, the capital flow is stimulated by the investor sentiments across various financial markets. Likewise,The total trading volume of stocks on IPOs and the first day returns are also used as measures of investor sentiment (Baker and Wurgler, 2006). The theoretical justification of these proxies is that the stockholders and brokers have greater influence on the capital markets when the sentiments are at peak.The empirical studies have suggested the returns would be high on the first day after IPO because of the optimistic behaviour of the traders. For example, the average first day return after IPO was found to be 70% in 477 IPOs' of United States during the dot com bubble of 1999 (Baker *et al*., 2012).

Another common proxy used for the investor sentiment is the trading volume or market turnover. The trading volume is used extensively as in technical analysis to complement the trading patterns like Doji, Pennant, Ascending triangle, and descending triangle and Bullish-bearish Flag which are largely used in technical analysis by the stock market investors. The buying and selling is usually done by the traders on the basis of these patterns. Scheinkman and Xiong (2003) analyzed the positive association between the trading volume and stock returns. The increase in buying and selling of securities generates the trading activities which lead to the increased profitability. The increased profitability encourages the investors to pour in more investment in the capital markets. As a result the demand for shares increases which paves the way for shareholders wealth maximization. Some analysts have shown a significant association between the trading volume and share prices. Similarly, the trading activity is an inherent reason for the good or bad performance of the stock market. The low trading volume

decreases the liquidity of capital markets. In case of extreme liquidity problems the stock market collapses. Therefore, the literature suggests a strong linkage between the trading volume and market price is one of the major reasons behind the financial turmoil of 1998-99 and 2007-08. Likewise, Kindleberger and Aliber (1978) explored that the artificial bubble is created due to huge trading of overvalued stocks. In the same vein, Cochrane (2002) showed the causal relationship between the stock prices and trading volume is considered as a generic reason of financial crisis in capital markets. Further, Lamont and Thaler (2003) selected a sample of technological stocks to observe the aforementioned relationship. The results indicated that the overpriced subsidiaries have approximately 38% return which is 5 times greater than the average return of subsidiary. Ofek and Richardson (2003) During the dot.com bubble, the trading activities in the internet based companies was found to be very high as compared to their counterpart non-internet based corporations (Ofek and Richardson, 2003). The theoretical support for the said phenomenon is presented by Harrison and Kreps (1978) who proposed five models of optimism based on the theory of rational bubble. De Long *et al*. (1990) suggested a strong theoretical association between the investor sentiment and trading volume. Further, Kelly (1997) conducted a study to analyze the impact of investor sentiments on returns. The results showed a negative association between the investor sentiment and stock returns. The noise traders' financial resources are dependent upon the household income and expected future returns. The results indicated that the rational investors restrict themselves from participating in stock trading in the presence of large noise traders with less income. The research highlighted that the noise traders reduces the likelihood of better stock returns.

In light of the above discussion, Brown (1999) analyzed whether stock returns in short run (1 Yr>Ri <2Yr) and long run (2 Yr>Ri <3Yr) are being affected by investor sentiments or not? The research study used the primary as well as secondary data to analyze the behaviour of individual and institutional investors. The results revealed that the individual as well as institutional investors drive the stock market. It is contradictory to the traditional point of view, which suggests the sentiment phenomenon is being influenced by noise traders. In another study, the association between investor sentiment and stock market volatility was analyzed by utilizing the data of individual investors obtained from the American association of individual investors. While analyzing the relationship, the study argued that noise trading acts as a driving force in affecting the stability and liquidity of stock market. Brauer (1993) incorporated the methodology of French and Roll (1986) to analyze the factors influencing the mutual fund premium. The outcome of the study suggested that seven percent variation in the mutual fund premium or discount is influenced by investor sentiment. Likewise, Graham and Harvey (1996) conducted a study to analyze the relationship between investment newsletters on the trading decisions of the investors. The research suggested an insignificant impact of the newsletter on the volatility of stock market.

Based on the empirical evidence, the research study has laid down a solid foundation to formulate the relationship between investor sentiment and volatility. The previous research studies have used proxies such as close end mutual funds discount, trading volume, the first day return after IPO, volatility premium and dividend premium. The current research analyzes the effect of investor sentiment on downside total risk, downside systematic risk and downside unsystematic risk using an index based on the above mentioned proxies.

Methodology

The study examined the casual relation of investor sentiment and downside systematic risk through dynamic penal estimation model (System GMM).The number of IPOs, average first day returns on IPO, average daily turnover, equity share, close end funds discount and dividend premium are used for the estimation of investor sentiment index using principle component analysis (PCA). Three components with eigen value greater than one are considered for investor sentiment index. The research used 230 cross-sections for the period of 2003-14. In addition, the study also examined the individual proxy effect on downside systematic risk.

Downside Systematic risk

The study used Estrada (2002) method for the calculation of Downside systematic risk.

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

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 $y_t = Min[(\mathrm{R}_{it}-\mu_i,0)]$ and $X_t = Min[(\mathrm{R}_{Mt}-\mu_M,0)]$ and let μ_y and μ_x be the mean of y_t and x_t, respectively (Estrada, 2002)

Investor Sentiment Measurement

Investor's sentiment is considered a major stake holder in mispricing of the securities (Brown & Cliff, 2005).Various studies like Daniel *et al*. (1998) and De Long *et al*. (1990) empirically tested the relationship of the investors' sentiments and suggested strong effect of sentiments in mispricing of the securities in capital market. These proxies were previously used by various studies like Baker & Wurgler (2006, 2007), Ur Rehman (2013) and Ahmed *et al*. (2012).

Table 1: *Investor Sentiment & Control Variables*

S.No	Variable	Symbol	Variable Measurement
1	No of IPOs	NOIP	Number of initial public issues in a single year
2	First day return on IPO	FDRIPO	Avg First day return on initial public offering
3	Share turnover	PSXTURN	Share turnover in Million (Pakistan stock exchange)
4	Equity Share	EQSHARE	Equity share in total equity and long term debt issuance

5	Close end mutual funds discount	CEMFD	The difference between Net Asset Value (NAV) and market value of funds
6	Dividend Premium	DP	The log difference of the average M/B ratio of dividend payers and non payers firms
7	Firm Size	SIZE	log(Total Assets)
8	Debt to Asset ratio	DTA	Total debt to total asset ratio
9	Return on equity	ROE	Net income divided by Total equity

Sample Size Detail

The research considered 230 non-financial firms of Pakistan Stock Exchange. The study considered major thirteen provided in table 2. However, financial firms were excluded due to different regulatory frame work.

Table 2: *Sample Size (Industry Wise Firm Distribution)*

S. No	Industry Name	Firms
1	Textile industry	67
2	Oil and Gas	20
3	Transport, Technology and Communication	8
4	Engineering and Allied industries	12
5	Fertilizer	6
6	Glass & Ceramics	6
7	Paper & Board	6
8	Automobile Parts & Accessories	16
9	Pharmaceuticals	7
10	Food & Personal Care Products	29
11	Cement	18
12	Chemical	20
13	Miscellaneous	14
	Total	230

Econometric Models

Empirically studies such as Ur Rehman (2013) and Ahmed *et al*. (2012), Solt and Statman (1988), Brown and Cliff (2004), Wang, Keswani, and Taylor (2006) argued that investor sentiment act as driving force to trigger the volatility in stock market. While Lee, Jiang, and Indro (2002) suggested that stock market abnormal volatility triggers financial panic among investors. Therefore, the study used dynamic penal estimation model i.e. System GMM to cater the problem of endogeneity between investor sentiment and downside systematic risk. The study used Arellano-Bond Dynamic Data-Estimation regression (System GMM) for regression analysis using penal data.

$$\beta_{it}^{E} = \alpha_{o} + \sum_{i=1}^{n} \gamma_{it} ControlVariable + \beta_{it} Invstor\ Sentiment\ Index_{it} + \varepsilon_{it} \quad (1)$$

B_{it} is Downside Beta, $\sum\gamma$it ControlVariable included Debt to asset ratio, Size and ROE. While investorSentimentindex$_{it}$ is constructed using six proxies of Wulger & Baker (2007) such as Number of IPOs(NOIPO), Average first day returns on IPO(FDRIPO), Average daily turnover in millions(PSXTurn) , Equity share(EQShare), close end funds discount(CEMFD) and Dividend premium(DP). $\varepsilon it = \mu i + \upsilon it$ depicts

unobserved firm specific effect and ʋit denotes the random effort that varies across time. The subscript i and t are refer to firm and time respectively.

$$\beta_{it}^{E} = \alpha_{o} + \sum_{i=1}^{n} \gamma_{it} ControlVariable + NOIPO_{t} + FDRIPO_{it} + PSXTURN_{t} + EQSHARE_{it} + CEMFD_{it} + DP_{it} + \varepsilon_{it} \quad (2)$$

NO IPt is number of of IPO annually, FDRIPOit is first days return, PSXTURNt is average share turnover in PSX, EQSHAREit equals to equity share, CEMFDit denotes the closed end mutual funds discount and DPit is dividend premium, which calculated by the log difference average book of market ratio using firm offering dividend and firm offer no dividend.

Data Analysis

Descriptive Statistics and Correlation

The research used descriptive statistics to scrutinize the characteristics of endogenous and exogenous variables. The descriptive statistic depicts that downside systematic has mean value of 5.41 and standard deviation value of 7.842. This shows higher variation in the set of downside systematic risk as compare to other variable. Moreover downside risk has skewness and kurtosis value of 23.4 and 16.45 respectively. Further close end funds discount has higher Kurtosis value i.e. 5.28. Further Equity share has mean value of 308.76. Further, turnover ratio in Pakistan has higher mean value of 5385.19 as compare to other proxies. Likewise, turnover ratio in Pakistan has higher standard deviation value of 4209.41.

Table 3: *Descriptive Statistics*

S.No	Variable	Mean	Median	Max.	Min.	Std Dev.	Skew.	Kurt.
1	DS-SR	5.415	2.196	31.41	0.1284	7.842	23.4	16.45
2	INVSENT	0.532	0.81	1.084	-1.083	0.672	-1.753	4.347
3	NOIPO	49.25	36.78	116.4	18.39	29.66	0.95	2.75
4	FDRIPO	177.9	183.7	282.5	26.20	78.68	-0.84	2.88
5	PSXTURN	5385	6681	1440	16.77	4209	0.28	2.58
6	EQSHARE	308.8	300.1	375.6	223.1	56.35	-0.31	1.51
7	CEFD	37.09	25.52	123	10.79	30.13	1.75	5.28
8	DP	9.05	11.15	12.69	1.33	4.07	-0.92	2.12
9	ROE	0.204	0.15	110.1	-32.64	2.594	33.545	145.6
10	SIZE	0.649	0.604	12.16	0.009	0.546	9.275	145
11	DTA	15.1	15.02	20.02	8.786	1.6	0.084	3.24

DS-SR stands for downside systematic risk,INVSENT stands for investor sentiment index, , NOIPt is Number of of IPO annually, FDRIPOit is first days return, PSXTURNt is Pakistan stock exchange average turnover, EQSHAREit equals to Equity share, CEMFDit denotes the Closed end mutual funds discount and DPit is Dividend premium, which calculated by the log difference average book of market ratio using firm offering dividend and firm offer no dividend. DTA stands for debt to asset ratio, SIZE stands for firm size and ROE is return on equity.

The correlation coefficient between downside systematic and Investor sentiment index suggests a weak negative correlation. Moreover, equity share and first day average returns on IPO have weak positive correlation coefficient value of with downside

systematic risk respectively. However, the study observed a strong positive correlation between first day average returns on IPO and equity share. Further, no of IPOs has moderate association with equity share. Similarly, the study observed the strong association of equity share with dividend premium. However, first day return has weak association with downside systematic risk in comparison of other investor sentiment proxies. Gujarati (2009) suggested that if correlation coeffecient value exceed 0.80 then there may be problem of multicollinearity. However, variance inflationary factor(VIF) test reveals no problem of multicollinearity.

Table 4: *Correlation*

	DS-SR	INV.	NOIPO	FDRIPO	PSXTURN	EQSHARE	CEFD	DP	DTA	ROE	SIZE
DS-SR	1										
INV.	-0.08	1									
NOIPO	-0.01	-0.26	1								
FDRIPO	0.02	-0.21	0.17	1							
PSXTURN	-0.08	0.78	0.06	0.17	1						
EQSHARE	0.04	-0.49	0.44	0.76	-0.02	1					
CEFD	-0.02	-0.21	0.67	0.04	-0.11	0.33	1				
DP	0.04	-0.23	0.12	0.65	0.04	0.83	-0.01	1			
DTA	0.09	0.04	-0.03	0.01	0.04	-0.01	-0.02	0.01	1		
ROE	-0.01	-0.03	0.03	-0.01	-0.02	0.02	0.03	-0.02	-0.07	1	
SIZE	-0.15	0.01	-0.00	-0.04	-0.02	-0.03	0.02	-0.04	-0.22	0.04	1

DS-SR stands for downside systematic risk,INVSENT stands for investor sentiment index NOIPt is Number of of IPO annually, FDRIPOit is first days return, PSXTURNt is Pakistan stock exchange average turnover, EQSHAREit equals to Equity share, CEMFDit denotes the Closed end mutual funds discount and DPit is Dividend premium, which calculated by the log difference average book of market ratio using firm offering dividend and firm offer no dividend. DTA stands for debt to asset ratio, SIZE stands for firm size and ROE is return on equity.

Regression Results

The research used arellano-bond dynamic data-estimation to analyze the effect of investor sentiment index over the downside systematic risk. The research considered firm-level specific variables such as firm size, debt to asset ratio and return on equity as control variables. The p value of Sargan test suggested that the instruments are valid. The AR(2) test p values are insignificant. These values suggest that data has no issue of serial correlation. The investor sentiment has a statistically significant positive coefficient value. The dynamic penal estimation results depict that investor sentiment has a positive coefficient. The positive coefficient suggests that investor sentiment index increases the firm downside systematic risk. The results also complement the claim of Black (1986) that investor sentiment causes extreme fluctuation in stock prices as a result investor exposure toward market volatility increases. Similarly, the research provided empirically support to the noise trader theory (De Long, Shleifer, Summers, & Waldmann, 1990). The results are robust with Naik and Padhi (2016) and Suresh and George (2016).

Table 5: *Investor Sentiment and Downside Systematic risk(DS-SR)*

Var.	Model 01	Model 02	Model 03	Model 04	Model 05	Model 06	Model 07	Model 08
β(L1)	0.098***	0.095***	0.037***	0.0797***	0.0983***	0.0796***	0.128***	-0.0588***
	(0.01)	(0.01)	(-0.01)	(-0.009)	(-0.0097)	(0.009)	(0.009)	(0.0003)
SIZE	2.65***	1.78***	2.82***	1.502***	2.648***	1.335***	2.753***	-13.33***
	(0.28)	(0.24)	(0.25)	(0.191)	(0.279)	(0.240)	(0.224)	(0.337)
DTA	1.15***	0.99***	0.99***	0.754**	1.151***	0.799***	1.419***	7.263***
	(0.32)	(0.33)	(0.31)	(0.335)	(0.317)	(0.308)	(0.336)	(1.427)
ROE	0.05	0.009	0.04	0.0789*	0.0515	0.013	0.0864	-0.337***
	(0.04)	(0.045)	(0.04)	(0.041)	(0.043)	(0.043)	(0.055)	(0.1040)
INV. INDEX	0.78***							
	(0.08)							
NOIP		0.004**						0.0209***
		(0.001)						(0.0016)
FDRIPO			0.01***					0.0964***
			(0.001)					(0.0022)
PSXTURN				-0.0001***				-0.0007***
				(1.13E-05)				(2.35E-05)
EQSHARE					0.0145***			0.461***
					(0.0014)			(0.010)
CEMFD						-0.00392*		-0.494***
						(0.0031)		(0.009)
DP							0.255***	4.965***
							(0.0126)	(0.114)
CONS.	-37.41***	-24.34***	-42.10***	-18.93***	-42.01***	-17.20***	-41.58***	281.2***
	(4.25)	(3.72)	(3.84)	(2.921)	(4.612)	(3.812)	(3.492)	(5.818)
Sargan (P-Value)	0.23	0.29	0.162	0.121	0.3001	0.503	0.908	0.144
AR(2) (P Value)	0.45	0.25	0.430	0.657	0.223	0.4123	0.3171	0.3171
Obs.	795	795	795	795	795	795	795	1,071

Standard errors in parentheses**** p<0.01, ** p<0.05, * p<0.1, β(L1) stands for downside systematic risk, INVSENT stands for investor sentiment index NOIPt is Number of of IPO annually, FDRIPOit is first days return, PSXTURNt is Pakistan stock exchange average turnover, EQSHAREit equals to Equity share, CEMFDit denotes the Closed end mutual funds discount and DPit is Dividend premium,DTA stands for debt to asset ratio, SIZE stands for firm size and ROE is return on equity.

Further, The study examined the individual effect of investor sentiment's proxies that include number of IPOs, average first day returns on IPO, average daily turnover, equity share, close end funds discount and dividend premium. As per dynamic penal regression estimation, the number of IPOs has positive coefficient value. The results suggest a statistical significant positive influence of number of IPOs over downside systematic risk. Similarly, the first day return on IPO has coefficient value of 0.0124. The results suggest a statistical significant direct relationship. In similar way, equity share has coefficient value of 0.0145. The results suggest a statistical significant influence of equity share over downside volatility. Likewise, dividend premium also have statistically

significant coefficient value of 0.255. The aforementioned coefficient values indicate a positive change in number of IPOs, first day return on IPO, equity share and dividend premium would increase the firm downside systematic risk. Nevertheless, average share turnover has negative coefficient value. This suggests an inverse relationship of average share turnover with downside volatility. Further, close end mutual fund discount has negative coefficient. Hence, an increase in average daily share turnover and close end mutual fund discount would reduce the firm downside volatility.

Moreover, the last dynamic estimations tested the persistent behavior of the number of IPOs, average first day returns on IPO, average daily turnover , equity share, close end funds discount and dividend premium. The dynamic regression estimation shows that number of IPOs, average first day returns, equity share and dividend premium increase the firm downside risk. However and average share turnover and close end mutual funds reduced the firm exposure toward left tail moments. The results are also in line with Ahmed, Shah, and Mahmood (2012) and Ur Rehman (2013).

Conclusion

The research securitized the casual relationship between the investor sentiment and downside systematic risk. The research considered the number of IPOs, average first day returns on IPO, average daily share turnover in millions, equity share, close end funds discount and dividend premium for the measurement of investor sentiment. Further, DCAPM of Estrada (2002) is used for the estimation of downside systematic risk. In addition, the individual effect of each proxy is also examined for in-depth analysis. The study results reveal that investor sentiment index significantly affect the firm's systematic risk. The results also reveal that the presence of investor sentiments increases the firm systematic risk. Further, the research ascertained positive effect of number of IPOs, first day return on IPO, equity share and dividend over the downside systematic risk. While average daily share turnover in millions and close end mutual fund discount negatively affect the firm downside volatility.

Generally, the research has greater implication for emerging markets with similar characteristics. Particularly, in case of Pakistan, the SECP required necessary changes in rules and regulations to curtail the irrational behaviour of investors, which would minimize the left tail moments of stock market. For future research, the cross country comparison would an interesting avenue. Further, the future studies may incorporate primary data for the measurement of investor sentiments.

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