University of Wah Journal of Management Sciences
Volume 7 (Issue 2), December 2023, pp. 18-37

The Impact of Investor Sentiment on Equity Returns: Comparison between Financial and Non-Financial Sectors of Pakistan Stock Exchange

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Article History:

Received:

20 Sep, 2023

Revised:

01 Dec, 2023

Accepted:

11 Dec, 2023

ABSTRACT

Purpose: This study intends to examine and compare the impact of Investor Sentiments (IS) on Equity Returns (ER) in the financial and non-financial sectors of Pakistan.

Design and Methodology: This study uses quantitative secondary data spanning from 2008 to 2019, collected from the official website of Pakistan Stock Exchange (PSX) and publication of State Bank of Pakistan (SBP). The quantitative data analysis has been done by using Vector Auto Regression (VAR) model.

Findings: This study demonstrates a positive relationship between IS and ER in the financial and non-financial sectors companies listed in PSX.

Implications: As a result of these findings, the investors have a better understanding and knowledge about diverse aspects of IS. This study also facilitates the process of price forecasting performed by fund and financial advisors. Last not the least, this study bears important implications for policymakers by enabling them to reduce variations in ER and to hedge risk through stabilizing IS.

Keywords: Investor Sentiment, Price Earnings Ratio, Share Turnover, Money Flow Index, Vector Auto Regression Model.

1. Introduction

Behavioral finance which is a new paradigm in finance continuously expands by attracting more and more researchers to identify the behavioral aspects of investors in their investment decisions. Behavioral finance introduces the modern finance theory by contradicting the traditional belief of investors' complete rationality by providing the idea that the investment decisions of investors are

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sometimes influenced by their behavioral biases, it is impossible for them to always think and act logically. This replacement implies that behavioral portfolio theory replaced the mean-variance portfolio theory proposed by Markowitz (1952). Additionally, it means that established asset pricing models, like the capital asset pricing model (Sharpe, 1964) are replaced by behavioral asset pricing models (Statman, 2014). This is so because conventional financial theories and asset pricing models are predicated on the idea that expected returns are computed through risk, and that risk is solely determined by changes in fundamental elements.Therefore, in addition to basic risk, behavioral portfolio theory and behavioral asset pricing models acknowledged the significance and influence of investors' emotional and behavioral biases on their decision-making (Kapoor & Prosad, 2017).

In behavioral finance, irrational traders are termed as noise traders (Hervé, Zouaoui, & Belvaux, 2019). Noise traders are considered as the investors who irrationally act on noise for investment decision making rather than considering primitive information to earn abnormal returns markets (Peress & Schmidt, 2017). Therefore, their cognitive errors and emotions impact their preferences in selecting certain stocks for investment. Therefore, it is revealed by Barrot et al. (2016) that “noise traders” are the reason behind increased liquidity and this increased liquidity serves as a factor which incorporates in the fluctuation of returns. Additionally, Brown (1999) stated that trading patterns hold by noise traders are linked with the prevailing market-wide sentiment. Antoniou et al. (2015) defined investor sentiment (IS) as an investor’s overall attitude towards a specific financial asset or financial market that is independent of the flow of primary information. Shleifer and Summers (1990) were the first to develop the concepts of limits to arbitrage and psychology, which together make up the new field of financial research known as behavioral finance where psychology emphasizes the existence of cognitive biases like IS and investor irrationality. According to De Bondt et al. (2008), various market crashes such as “the stock market crash of 1997”, “the Asian crisis of 1997” and “the global financial crisis of 2008” provided this area with significant importance and attraction because it was believed that investors’ psychology was one of the crucial factors that impacted financial markets. On the same topic, Loewenstein et al. (2001) exhibit a direct relationship between IS and their decision-making process.

The existing literature on the sentiment-stock market behavior relationship exhibits mixed outcomes as some studies prove that there exists a positive association between IS and ER (Baker & Wurgler, 2006; Corredor et al., 2015; Schmeling, 2009) while some other studies prove said relationship is negative (Brown & Cliff, 2005; Ryu et al., 2017). Numerous studies were conducted on the said relationship in the context of developed markets as developed markets acknowledged the significance of IS which plays an important role in investors' decision-making process hence ultimately impacts the stock market performance (Baker & Wurgler, 2006; Concetto & Ravazzolo, 2019; Finter et al., 2012; Kim & Park, 2015; Sinha, 2016). Kim and Nofsinger (2008) stated that literature related to the sentiments of investors is not extensively revised in developing markets although developing markets particularly Asians are more prone to sentimental biases as compared to Western cultures.

Pakistan Stock Exchange (PSX) is also a developing market and is considered one of the leading exchanges in the world yet one of the best-performing stock exchange in Asia having an objective to provide investors with a safe, efficient, and permanent marketplace where investors can trade in the common stock of listed companies and other securities. PSX mainly consists of financial and non-financial sectors which are then subdivided into 36 sectors. The difference between financial and non-financial sectors is the difference in their asset structure and revenue-generating pattern (Ukaegbu & Oino, 2014).

In PSX, the market capitalization of financial firms and non-financial firms are 31% and 69% respectively. The financial sector includes investment and commercial banks, leasing companies, open and closed-end mutual funds, modaraba companies, and insurance companies while the non-financial sector majorly comprises textile, woolen, jute, sugar, cement, tobacco, oil and gas, automobiles, and pharmaceutical firms (State Bank of Pakistan, 2019). Therefore, based on mixed results of previous studies and lack of research in emerging markets, this study focuses on scrutinizing the comparison of the impact of IS on ER in the financial and non-financial sectors of Pakistan. Financial and non-financial sector firms of the KSE-100 index are selected for the current study because it is considered as most acknowledged index of PSX which consists of the largest companies representing all market sectors based on market capitalization. The KSE-100 index represents 85% of the market capitalization of PSX. To the best knowledge of the researcher, this is the first study that intends to investigate the comparison of the relationship between IS and ER of financial and non-financial sectors in Pakistan. The major focus of the study is to examine whether there is any difference in ER of financial and non-financial sectors in the KSE-100 index due to the sentiments of investors.

The previous studies identified proxies that include direct and indirect measures. Baker and Wurgler (2006) stated that direct measures of IS may exhibit biases, as sometimes investors are not consistent with their answers in surveys and their actions in a market. Therefore, the current study will use some indirect proxies to measure sentiments of the investor such as Price Earnings Ratio (PER), Share Turnover (SHT), and Money Flow Index (MFI). These indirect measures are used in some famous previous studies (Baker & Stein, 2004; Baker & Wurgler, 2006, 2007; Chen et al., 2010; Chong etl al., 2017; Statman et al., 2006). The major objective of the study is to examine whether there is any relationship between IS and ER in financial and non-financial sector firms of the KSE-100 index.

2. Literature Review

The section describes the theoretical background which defines how traditional finance is challenged by behavioral finance. Subsequently, the literature about the connection between IS and stock market returns both for developed and developing equity markets has also been examined and reviewed.

2.1 Theoretical background

Traditional finance theories claim that market efficiency and investors' rationality plays a vital role in investors' investment decision to maximize their wealth (Fama, 1965). Fama (1965) was the first who introduce the concept of efficient markets and he defined efficient markets as *"a market where there are a large number of rational, profit maximizers investors who are actively competing with each other, trying to predict future market values of individual securities, and where important current information is almost freely available to all participant"* (De Bondt & Thaler, 1985).

Roberts (1967) continues Fama's work on efficient markets and defines today's well-known concept of the Efficient Market Hypothesis (EMH). Investor's complete rationality, no impact of irrational investors on stock prices, and limit to arbitrage are basic assumptions of EMH which were criticized on both theoretical and empirical grounds. The main questionable area is investors' rationality, which shows that sometimes investors exhibit biases in their investment decisions which in turn results in adverse outcomes.

Various researchers including Kahneman and Tversky criticized traditional finance theories which resulted in the emergence of behavioral finance.

Behavioral finance is defined as *"finance from a broader social science perspective including psychology and sociology"* (Shiller, 2003). Behavioral finance helps to look at and understand finance with a much broader perspective and directly challenges the EMH hence, it can be considered as one of the major research topics (Shiller, 2003). The investors' complete rationality assumption is also contradicted by behavioral finance by defining that the sentiment of investors has a high influence on their decisions related to investment. This is the foundation of research carried out by Huang et al. (2015); and Shleifer et al. (1990), which proved that the sentiment of investors is a systematic risk element having an impact on the stock market. Various theories explain the investor's cognitive biased decision such as the animal spirits hypothesis (Keynes, 1937), bounded rational theory (Simon, 1955), prospect theory (Tversky & Kahneman, 1979), the noise trader theory (Shleifer & Summers, 1990), over/under-reacting theory (Hirshleifer & Teoh, 2003) and theory of mental accounting (Thaler, 2005) but there is no single theory which comprehensively explains all aspects and market anomalies that are observed by behavioral finance advocates (Ton, 2019).

According to behavioral finance, investors occasionally make biased investing decisions that are influenced by their emotions, which runs counter to the idea that they are fully rational. The idea of IS was first introduced by Shleifer et al. (1990). Although various renowned papers 4 use the concept of "investor sentiment" including (Baker & Wurgler, 2006, 2007; Barberis et al., 1998; Daniel et al., 1998; Qiu & Welch, 2006) but still no general definition of IS still exists, that is used as a universal definition. Therefore, finding a clear definition remains a challenge. Baker and Wurgler (2006) defined IS as "the propensity to speculate." According to Antoniou et al. (2015), sentiment is an investor's general propensity or attitude toward financial markets or assets that is independent of basic knowledge. In simple words, IS can be defined as the expectations and feelings of investors about market conditions.

2.2 Review of Related Studies

This section of the literature review concentrates on some previous studies that were carried in different countries and explored the connection between IS and returns of the stock market. Baker and Wurgler (2006) conducted the most famous and primary research related to IS. They utilized SHT, number of IPOs, IPO first-day return, dividend premium, closed-end fund discount, and the equity share in new issues to construct the sentiment index and used this index to examine the impact of IS on US stock market return and volatility. Their result challenged traditional finance by proving the significant impact of IS on the US stock market. Kim and Park (2015) analyzed the impact of IS on ER of the Korean stock market and by using buy-sell imbalance as a measure of sentiment they found sentiment does not affect stock returns. Corredor et al. (2015) examined the link between the sentiment of investors and three Central European markets: The Czech Republic, Hungary, and Poland. Results of the study show a strong influence of IS on taken markets and the impact of investor-related sentiment is far stronger than more developed European markets.

Sinha (2016) investigated the association between news articles, sentiment, and US stock returns and revealed that around a quarter (13 weeks) are required by the market to integrate the information from news articles. Findings indicate that stock prices are not influenced by sentiment. Tuyon et al. (2016) used survey-based and market-based IS proxies (the consumer sentiment index, the business condition index) and the stock futures index to investigate the impact of IS on Malaysian stock market returns. Findings explored a significantly positive linkage between proposed proxies and stock returns. Zia Ur Rehman et al. (2017) investigated the effect of IS on stock returns in Japan and Germany from 2004 to 2014. SHT, MFI, RSI, interbank offer rates, change in the regional market stock index, and performance of the foreign markets are used to build an index for sentiments. They evidenced that a strong positive association exists between IS and returns. Dai and Yang (2018) investigated the association between IS and feedback trading which is defined as a trading strategy that involves buying when the price rises and vice versa.

The findings of the study concluded that when sentiment is relatively high, positive feedback traders have more intention to trade. Aggarwal and Mohanty (2018) examined the effect of IS on the ER of the Bombay Stock Exchange and the National Stock Exchange of India by using the time from 1996 to 2017. To measure IS, they utilized principal component analysis by including various proxies. They proposed a significantly positive relationship between IS and stock returns in the context of both markets. Kim and Lee (2022) investigated the relationship between investor emotion and stock performance in two active but distinct Korean stock markets. They create a relative strength index, buy-sell imbalance, and adjusted turnover rate as part of an investor sentiment index using daily KOSPI and KOSDAQ data. They discovered that sentiment among investors has a major impact on stock performance, especially in the KOSDAQ with substantial individual involvement. The relationship between stock returns and investor sentiment is influenced by company variables such as size and pricing.

The conditional impact of investor sentiment on stock returns was determined by Wang and Duxbury (2022), which used turnover ratio as a proxy for sentiment and applied GARCH-type models. The researchers found that optimistic (pessimistic) shifts in investor sentiment would increase (decrease) stock returns in bull regimes and decrease (increase) stock returns in bear regimes.

They undertake a worldwide study of investor mood on 40 different international stock markets to investigate how investor sentiment affects stock returns through direct and indirect pathways, as well as how this impact changes in bull and bear market regimes. These researchers also conducted a study to determine how investor sentiment might affect stock returns in the future across 50 international stock markets (Wang et al., 2021). At the worldwide level, they found a negative correlation between investor sentiment and future stock returns using the consumer confidence index (CCI) as a sentiment proxy. Investor sentiment has a more immediate effect in emerging markets but a more lasting effect in developed markets, even though the division between developed and emerging markets does not break the negative trend. This heterogeneity is explained to varied degrees by the degree of individual investor market engagement, cross-market variances in culture and institutions, as well as intellect and education. Liu et al. (2023) utilized social media posts from stock market participants as well as natural language processing tools to explore the synergistic relationship between stock prices and investor sentiment. Findings revealed highly significant positive synergy between investor mood and stock prices at the macro level. That is, price of a stock is directly linked with investor sentiment.

Previous literature on IS and stock market returns exhibit mixed outcomes. However, the Pakistan stock market is mainly composed of retail investors who are active on a daily basis. Therefore, a significant relationship between IS and ER in the KSE-100 index of PSX can be hypothesized.

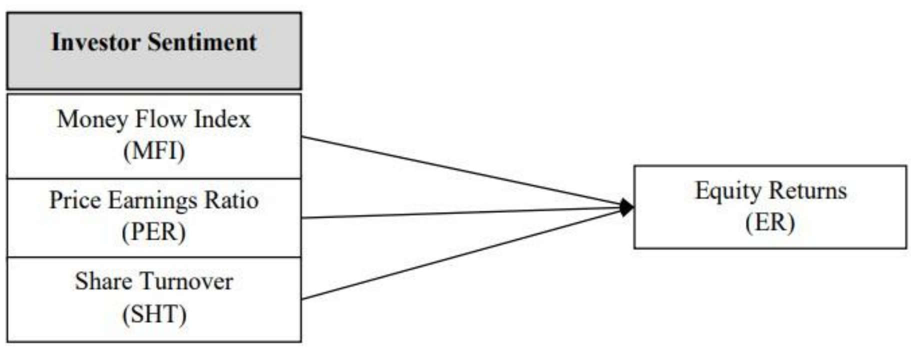


Figure 1. Research Model

3. Data and Methodology

3.1 Measurement of Sentiment

Earlier studies show that many researchers around the globe used different proxies to measure IS. Finter et al. (2012) claimed that proxies if used isolated cannot portray a whole picture as different stocks exhibit different sensitivity levels towards IS. The previous studies identified proxies that include direct and indirect measures such as investor surveys (Brown & Cliff, 2005; Qiu & Welch, 2006), retail investors trades (Baker & Wurgler, 2000; Greenwood & Nagel, 2009), trading volume (Baker & Stein, 2004; Scheinkman & Xiong, 2003), mutual fund flows (Brown & Cliff, 2005; Lamont & Frazzini, 2005), dividend premium (Baker & Wurgler, 2006; Fama & French, 2001), closed-end fund discount (Neal & Wheatley, 1998; Zweig, 1973), option implied volatility (Whaley, 2000), put-call ratio (Brown & Cliff, 2005; Dennis & Mayhew, 2002), risk-appetite index (Kumar & Persaud, 2002), IPO first-day returns (Baker & Wurgler, 2006, 2007; Rehman, 2013), IPO volume (Baker & Wurgler, 2006, 2007; Cornelli, Goldreich, & Ljungqvist, 2006; Lee, Shleifer, & Thaler, 1991), equity issues over total new issues (Baker & Wurgler, 2000), insider trading (Seyhun, 1998), Money Flow Index (MFI) (Chen et al., 2010; Chong et al., 2017; Khan & Ahmad, 2019), Price Earnings Ratio (PER) (Fisher & Statman, 2006; Khan & Ahmad, 2019) and Share Turnover (SHT) (Baker & Wurgler, 2006, 2007; Rehman, 2013).

Baker and Wurgler (2006) stated that direct measures of IS may exhibit biases, as sometimes investors are not consistent with their answers in surveys and their actions in the market. Therefore, the current study will use some indirect proxies to measure sentiments of the investor such as Price Earnings Ratio (PER), Share Turnover (SHT), and Money Flow Index (MFI) in the Pakistan stock market for the period of 2008 to 2019. The justification of using these indirect measures is supported by previous studies (Baker & Stein, 2004; Baker & Wurgler, 2006, 2007; Chen et al., 2010; Chong et al., 2017; Statman et al., 2006). Secondly, the availability of data for calculating these proxies is also the reason for selecting these indirect measures. The details and calculations of indirect proxies used in this study are as follows:

Price Earnings Ratio: This is a valuation ratio that measures "*how much investors are willing to pay per unit of current earnings and reveals expectation of the market about a company's growth*". Anderson and Brooks (2006) define PER as market price per share divided by annual earnings per share. The current study used Anderson and Brooks (2006) method to calculate PER.

PER= Market Price per Share/ Earnings per Share

Share Turnover: SHT measures the trading activity of the stock market and is considered an important indicator of IS. SHT is defined as the "liquidity ratio of the volume of transactions on the number of shares outstanding" (Baker & Stein, 2004). SHT of an individual stock is computed by dividing stock's trading volume into outstanding shares, mathematically;
SHT = Volume/Outstanding Shares
Where, Earnings per share is used to find outstanding shares by the formula used by Statman et al. (2006).
Outstanding Shares = Net Income/Earnings per Share

Money Flow Index: MFI is an important indicator of IS and defined as a "momentum indicator used to measure inflow and outflow of money in a stock, at a specific period, indicating that whether a security is oversold or overbought"
(Bernard & Thomas, 1990; Chen et al., 2010; Hudson & Green, 2015; Khan & Ahmad, 2019; Kim & Ha, 2010). It reflects the liquidity of the stock market by determining the short-term price movements caused by investors (Bernard & Thomas, 1990). To construct the MFI, we first define

Typical Price=high + low + close/3
The daily typical price is the simple average of daily high, low, and close prices. The money flow is defined as:
Money Flow= Typical Price * Turnover:
Money flow is considered as positive if the current typical price is greater than the previous typical price and vice versa.
Money Ratio = Positive Money Flow/Negative Money Flow
The MFI is calculated as follows:
MFI = 100 – 100/1 + Money Ratio
It can also be expressed as
MFI=100*Positive Money Flow/Positive Money Flow+ Negative Money Flow
The reference equation that shows the association between IS and ER is written as follows:

$$ER_{i,t} = \beta_0 + \beta_1 PER_{i,t} + \beta_2 SHT_{i,t} + \beta_3 MFI_{i,t} + \mathcal{E}_t$$

where Ɛ, t and i represent error term, time (years), and number of firms respectively.

4. Data Analysis

The section describes the results of some standard diagnostic tests like descriptive statistics, unit root test, lag length selection, and the Hausman test. Subsequently, some econometric models such as the Fixed effects regression model, Granger causality, and Vector Auto Regression Model (VAR) model are described.

4.1. Descriptive Statistics

Descriptive statistics are used to exhibit quantitative descriptions in a manageable form. In simple words, descriptive statistics presents basic features of the data by reducing larger data into simple summaries (Fisher & Marshall, 2009). Descriptive statistics of variables under study for financial and non-financial sectors of the KSE-100 index are presented below to better understand the behavior of variables.

Table 1. Descriptive Statistics of Variables for the Financial and Non-financial Sectors.

	Financial Sector				Non-Financial Sector			
	ER	PER	SHT	MFI	ER	PER	SHT	MFI
Mean	-0.841	-0.136	-3.523	0.901	-0.689	-0.151	-3.180	0.978
Median	-0.736	-0.115	-3.383	0.877	-0.622	-0.083	-3.093	0.947
Maximum	0.169	-9.77E-10	-1.249	2.561	0.751	0.235	0.826	3.381
Minimum	-3.518	-1.259	-5.971	-0.382	-2.587	-1.564	-5.785	-2.274
Std. Dev.	0.582	0.168	0.888	0.310	0.514	0.223	0.886	0.460
Skewness	-0.108	-0.149	-0.402	0.608	-0.435	-0.138	-0.074	-0.390
Kurtosis	1.014	0.907	0.515	1.118	1.016	0.593	0.556	0.807
Observations	240	240	240	240	732	732	732	732

Table 1 displays the results of the descriptive statistics of financial and non-financial sectors of the KSE-100 index for ER, PER, SHT, and MFI. All these variables show annual observations over a sample period of 12 years spanning from 2008 to 2019. The mean value represents the average annual value where the median exhibits the central value of the series. The minimum and maximum values represent the two extreme values of the series. Standard deviation exhibits deviation from the sample mean. Normality of data is measured by skewness and kurtosis, where skewness measures the degree of asymmetry of the series while kurtosis is a measure of flatness or peak-ness of distribution of series. The value of skewness and kurtosis between +1 and -1 indicates that data is normally distributed around its mean (Hair et al., 2016).

4.2. Fixed Effects Model

The standard test to select the suitable model between the fixed effects model and random-effects model is the specification test developed by Hausman. (1978). The null hypothesis of the Hausman test is that the random-effects model is suitable while the alternate hypothesis is the appropriate model is a fixed effect. The observed p-value of the Hausman test is 0.006 for the financial sector and 0.031 for the non-financial sector. both these p-values are less than the 5% threshold value representing that the fixed effects model is preferred for regression analysis for both financial and non-financial sectors of the KSE-100 index of PSX.

The fixed-effects model is a regression analysis model that considers the connection between independent and dependent variables of various entities (countries, firms, persons, etc.) over time. Therefore, the fixed effects model is used whenever it is of interest to analyze the impact of variables over time within an entity as each entity has its characteristics that may or may not impact the dependent variable. The current study used a fixed-effects model for regression analysis and the results are reported below.

Table 2. *Regression results for equity returns using financial and non-financial sectors.*

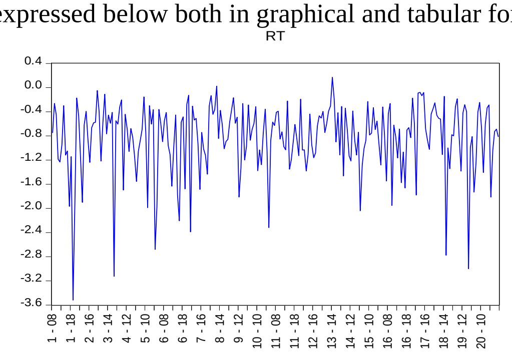
	Financial Sector			*Non-Financial Sector*		
Variable	*Coefficient*	*t-Statistic*	*Prob.*	*Coefficient*	*t-Statistic*	*Prob.*
Constant	-0.050	-0.135	0.048	-0.235	-1.878	0.041
PER	-0.224	-0.882	-0.260	-0.186	-2.299	0.033**
SHT	0.273	2.829	0.005*	0.183	4.465	0.001*
MFI	0.137	2.129	0.036**	0.103	2.133	0.024**
R-squared	0.127			0.160		
No. observations	240			732		

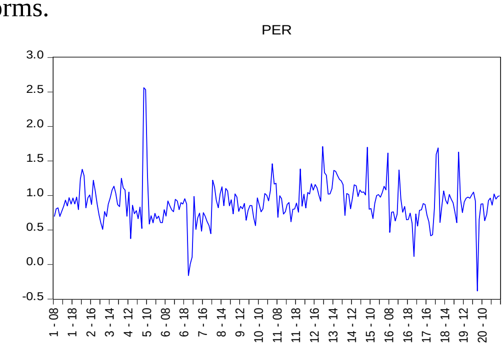
* and** indicates significance at 1% and 5% level, respectively

Table 2 report the regression results for financial and non-financial sectors of the KSE-100 index of PSX by using annual observations for the period of 12 years spanning from 2008-2019. As shown in the table, there is a negative but insignificant relationship between PER and ER while this relationship is statistically significant at a threshold of 5% level in the non-financial sector. SHT and MFI exhibit a significant positive association with ER at 1% and 5%level of significance respectively for both financial and non-financial sectors. The value of R-squared is 12.7 percent and 16.0 percent for financial and non-financial sectors respectively, which is not much high but considered good enough in studies focusing on human behavior (Frost, 2014; 2019).

Unit Root Test

The augmented Dicky-Fuller test (Dickey & Fuller, 1979) is used to test the stationarity of data. This step is essential before performing a later analysis. A unit root test with a null hypothesis representing the presence of unit root has been applied to the variables under study and results are expressed below both in graphical and tabular forms.





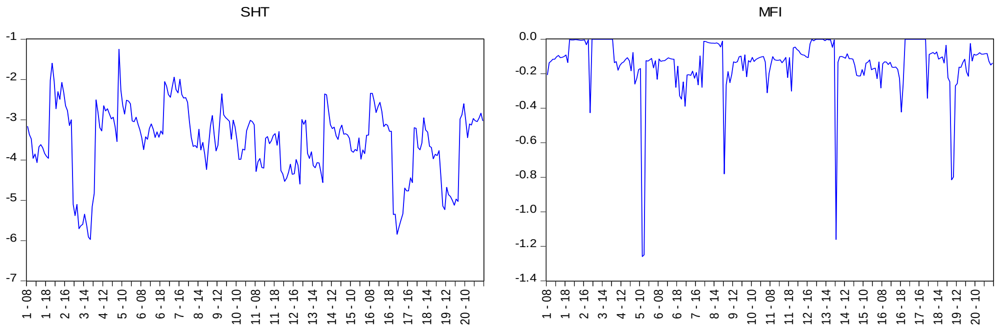


Figure 1 Raw sentiment measures for financial sector.

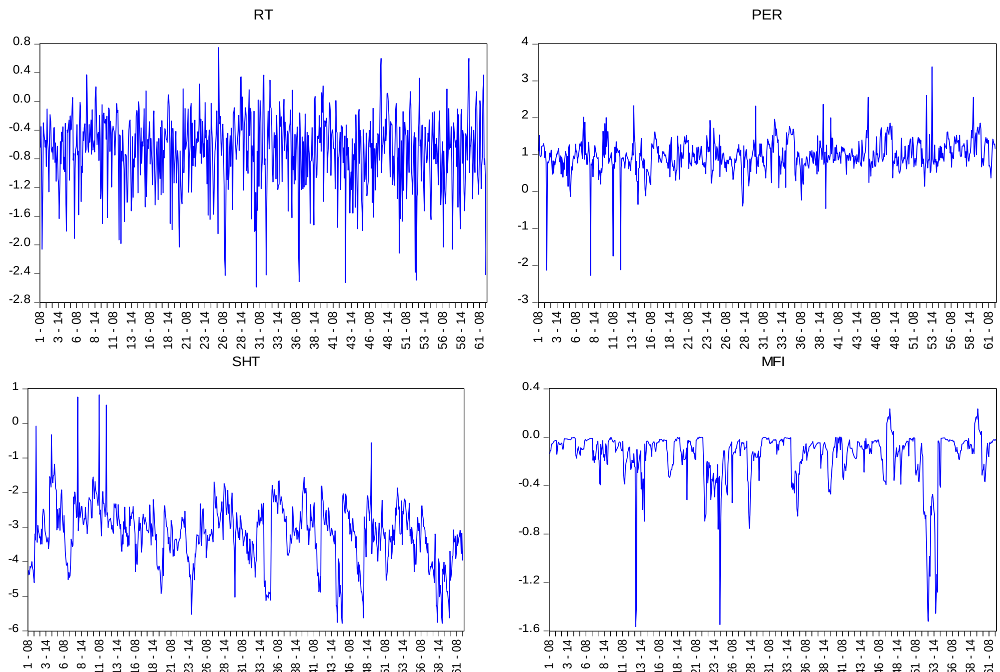


Table 3. ***Unit root analysis of variables for financial and non-financial sectors.***

	Financial Sector		Non-Financial Sector	
Variables	Statistic Values	Probability	Statistic Values	Probability
ER	-7.227	0.0000	-11.583	0.0000
PER	-7.051	0.0000	-8.143	0.0000
SHT	-3.102	0.0000	-4.034	0.0000
MFI	-6.944	0.0000	-3.046	0.0000

Figures 1 and 2 have plotted the values of ER, PER, SHT, and MFI for financial and non-financial sectors of the KSE-100 index by solid fluctuating lines. Graphical representation and table 4.3 shows that the null hypothesis of unit root stands rejected for ER, PER, SHT, and MFI for both financial and non-financial sectors. Hence, all variables are stationary at a level and ready for further analysis.

Lag Length Selection

Determining the appropriate lag structure in the system is an important requirement of the VAR model. The reason behind lag length estimation is to check whether past values are still influencing today's values of the underline variable (Braun & Mittnik, 1993). To determine an optimal number of lags, the VAR lag order selection method available in Eviews 10 package is used. Among all provided criteria, the current study used AIC to determine an appropriate number of lags in the model. The reason behind selecting AIC is its widespread acceptance and because of its high chances to demonstrate true lag length with minimum chances of underestimation of a model (Cavanaugh & Neath, 2019; Liew, 2004). The result of optimal lag selection for the financial and non-financial sectors is presented below.

Table 4 Optimal Lag Order Selection for Financial and Non-financial Sectors

	Financial Sector					Non-Financial Sector				
Lag	LR	FPE	AIC	SC	HQ	LR	FPE	AIC	SC	HQ
0	NA	0.00035	3.40778	3.52688	3.45553	NA	0.00212	5.19781	5.25514	5.22090
1	187.294	4.36e-05	1.31052	1.90603*	1.54928*	686.394	0.00013	2.45702	2.74367*	2.57246*
2	29.3511*	4.32e-05*	1.29712*	2.36904	1.72688	24.7531	0.00014	2.48283	2.99881	2.69064
3	15.8218	5.12e-05	1.46098	3.00929	2.08174	63.5438*	0.00012*	2.33890*	3.08419	2.63906
4	23.0902	5.38e-05	1.49446	3.51919	2.30623	17.7989	0.00012	2.39163	3.36626	2.78416
5	13.8509	6.50e-05	1.65970	4.16083	2.66248	19.0785	0.00013	2.43723	3.64117	2.92211
6	6.58677	8.92e-05	1.93994	4.91748	3.13372	18.8319	0.00014	2.48239	3.91565	3.05963
7	19.1982	9.61e-05	1.96351	5.41745	3.34829	22.8647	0.00014	2.50718	4.16977	3.17678
8	4.96619	0.00013	2.25784	6.18819	3.83363	14.5222	0.00015	2.56951	4.46142	3.33146

*indicates lag order selected by the criterion

Table 4 expresses four different lag length selection criteria for financial and non-financial sectors of the KSE-100 index. For the financial sector, three of them, LR, AIC, and FPE suggest the use of p=2 lags while the remaining two HQ and SC suggest p=1 lag. While in the case of the non-financial sector, three of them, LR, AIC, and FPE suggest the use of p=3 lags while the remaining two HQ and SC suggest p=1 lag. The current study selects lag length 2 for the financial sector and lags 3 for the non-financial sector for VAR estimation as most of the criteria and the selection criteria AIC recommend a lag length of two for the financial sector and lag length of three for the non-financial sector for estimation of VAR model.

Vector Auto Regression (VAR) Model

To explain the linear interdependencies of multiple series, the VAR model proposed by Sims (1980), has been considered as the most flexible successful, and easy to use model. VAR estimates help to get a better understanding of relationships between variables. General VAR for financial and non-financial sectors of the KSE-100 index is performed and table 5 presented the related VAR estimates.

Table 5. Vector Auto Regression Estimates for financial and non-financial sectors

	Financial Sector		Non-financial Sector	
	Coefficient	t-value	Coefficient	t-value
Constant	-1.265	-4.641*	-0.495	-4.460*
ER(-1)	0.495	6.279*	0.228	5.316*
ER(-2)	-0.173	-2.994**	0.006	0.142**
ER(-3)	-	-	-0.012	-0.290
PER(-1)	-0.020	-2.458**	-0.093	-0.487**
PER(-2)	0.047	0.135	0.101	0.403
PER(-3)	-	-	-0.081	-0.396
SHT(-1)	0.162	3.160**	0.224	3.672*
SHT(-2)	-0.222	-1.505***	-0.275	-4.115*
SHT(-3)	-	-	0.062	1.199
MFI(-1)	0.120	1.605***	0.209	3.154*
MFI(-2)	-0.022	-0.135	-0.276	-4.201*
MFI(-3)	-	-	0.060	0.993

*, ** and*** indicates significance at 1%, 5% and 10% level, respectively

Table 5 exhibits the general VAR estimates for financial and non-financial sectors of the KSE-100 index using 2 and 3 lags respectively. Results in the financial sector of the KSE-100 index exhibit that current ER has a significant positive relationship with its first lag at a 1% level of significance but ER and ER (-2) exhibit a negative association that is statistically significant at a 5% significance level. The first lag of PER exhibits a positive and statistically significant association with ER while no relationship is found between ER and PER (-2). The VAR estimates show that there exists a statistically significant relationship between ER and SHT (-1) and SHT (-2) but this relationship is positive for the first lag and negative for the second lag. The first lag of MFI and ER exhibit a significant positive relationship at a 10% level of significance that is barely accepted however, there is no significant relationship found between ER and the second lag of MFI.

Results in the non-financial sector of the KSE-100 index exhibit that the current ER has a significant positive relationship with its first two lags at a 1% level of significance. However, no relationship has been observed between ER and ER (-3). PER (-1) and ER have a significant negative relationship at a 5% level of significance. However, there is no significant relationship found at PER (-2) and PER (-3). The output of VAR estimates shows that there exists a statistically significant relationship between ER and SHT (-1) and SHT (-2) but an insignificant relationship has been observed between ER and SHT (-3). The first two lags of MFI and ER exhibit a significant relationship at a 1% level of significance that is quite high however, there is no significant relationship found between ER and third lag of MFI.

Granger Causality Test

Individual parameter estimates of the VAR model are considered not much reliable to check the direction of the association between variables. Granger causality tests are employed to ascertain the presence of a causal relationship between two variables (Granger, 1969). The ability of one variable to predict the values of other variables, the variable is considered to be a granger cause of other variables. The results of the Granger causality test between variables for financial and non-financial sectors are reported below.

Table 6. Granger causality test for financial and non-financial sectors.

	Financial Sector			Non-Financial Sector		
Null Hypothesis:	Obs	F-Statistic	Prob.	Obs	F-Statistic	Prob.
PER does not Granger Cause ER	200	4.022	0.046**	549	6.754	0.000*
ER does not Granger Cause PER		0.024	0.975		0.171	0.915
SHT does not Granger Cause ER	200	8.239	0.000*	549	5.906	0.000*
ER does not Granger Cause SHT		1.900	0.152		3.834	0.009*
MFI does not Granger Cause ER	200	0.143	0.866	549	2.517	0.050**
ER does not Granger Cause MFI		0.817	0.442		0.259	0.854

*significant at 1% level of significance, **significant at 5% level of significance

Table 6 shows the result of a causal relationship of dependent and independent variables concerning financial and non-financial sectors of the KSE-100 index by using a lag length of 2 and 3 respectively. In the financial sector, the results exhibit that PER granger causes ER expressing a unidirectional relationship which is from former to latter. Whereas, the causal relationship between SHT and ER is bidirectional as both SHT and ER Granger cause each other at a 1% significance level. MFI and ER do not Granger cause each other in financial sector firms. In the non-financial sector, the results exhibit that PER and MFI granger cause ER having significance level of 1% and 5% respectively but both PER and MFI expressed a unidirectional relationship which is from former to latter. Whereas, the causal relationship between SHT and ER is bidirectional as both SHT and ER Granger cause each other at a 1% significance level.

5. Discussion

The current study extends the literature on IS in the context of emerging stock markets such as Pakistan as literature related to the sentiment of investors is less focused in emerging markets as compared to developed markets. This study exhibits the impact of such behavioral biases on ER and shows the role of those biases on investor's investment decisions as Wan, Cheng, and Yang (2014) also revealed that investors decision in stock markets put a great influence on shaping market trend, which will thus impact the economy. Additionally, policymakers and portfolio managers who take IS into account to decrease variation in ER and to hedge risk respectively will also be benefited from this study. Capital markets authorities will be guided through this study regarding the impact of investor behavior on the stock market and ensuring listed companies provide sufficient information for investors to control and minimize investors' irrational behaviors. This study will be equally important to policymakers and investors in the stock markets to consider the role of behavioral factors on the investment decisions of investors.

Despite extensive literature revised, there are few limitations associated with this study which are discussed in this section. The present study focused on annual data for twelve years. A large period may be considered to get more generalized results. Moreover, all listed firms of PSX could be used despite only the KSE-100 index. Another challenge of this study is the unavailability of direct measures for IS as this study used indirect proxies to measure IS as numerous previous studies used some indirect measures of IS such as consumer confidence index. Finally, this study is conducted in the context of PSX, so the findings of this study are regionally restricted and the results of the study may differ from other countries. Hence, it can be proposed that similar emerging stock markets may have the same findings, but results may not be generalized to other stock markets in the world. However, future research can be carried by taking other indexes of PSX. Moreover, all listed firms of PSX could be used despite only the KSE-100 index to get more generalized results. Further research could be conducted to compare the role of IS while studying the pre and post-effects of major economic events, for instance, the major Asian financial crisis of 1997, the Global financial crisis of 2008, and the COVID-19 pandemic.

5.1 Implications of the Study

Literature on IS in emerging markets is less extensive as compared to developed markets therefore, this study will try to extend the literature on IS and ER in emerging stock markets such as Pakistan. According to Bekaert and Harvey (2003); De Santis (1997) emerging markets exhibit larger price fluctuations as compared to mature markets. This study investigates behavioural biases of investors in stock market and how investment decisions are influenced by those biases. As Wan, Cheng, and Yang (2014) revealed that investors decision in stock markets put great influence in shaping market trend, which will thus impact the economy A comprehensive understanding of investors' reactions to stock market fluctuation may help the financial advisors, fund managers and planners to select suitable investment strategies for their clients and predict security returns. Additionally, policy makers and portfolio managers who take investor' sentiment into account to decrease variation in ER and to hedge risk respectively will also be benefited from this study. Capital markets authorities will be guided through this study regarding impact of investor behaviour on stock market and ensuring listed companies to provide sufficient information for investors to control and minimize investors irrational behaviours. This study will be equally important to policy makers and investors in the stock markets to consider the role of behavioural factors on investment decisions of investors. This study will help firms going public to comprehend the role of investor behaviour on prices of securities therefore they can set realistic prices to attract investors.

5.2 Limitations and Recommendations

Despite of extensive literature revised, there are few limitations associated with this study which are discussed in this section. The present study focused on annual data for the time of twelve years. Large time may be considered to get more generalized results. Moreover, all listed firms of PSX could be used despite of only KSE-100 index. Another challenge of this study is unavailability of direct measure for IS as this study used indirect proxies to measure IS as numerous previous studies used some indirect measures of IS such consumer confidence index. Finally, this study is conducted in context of PSX, so findings of this study are regionally restricted, and the results of the study may differ from other countries. Hence, it can be proposed that similar emerging stock markets may have same findings, but results may not be generalized to other stock markets in the world. This study focused to investigate the impact of IS on ER of PSX. Therefore, some suggestions for future research are as under: The study focused on financial and non-financial firms that are listed in KSE-100 of PSX. However, future research can be carried by taking other indexes of PSX. Moreover, all listed firms of PSX could be used despite of only KSE-100 index to get more generalized results. The current study utilized secondary data to create certain proxies served as measure of IS. Therefore, usage of primary data that is collected directly from investors is an improvement in research as this will improve reliability of statistical tests and gives better comprehension of IS. The current study is carried in context of PSX. Therefore, findings of this study may be applicable to similar emerging markets but not generalized for other stock markets of the world. Hence, an extension would be carried by exploring differences and similarities with other emerging stock markets. The further research could be conducted to compare role of IS while studying the pre and post effects of major economic events for instance, major Asian financial crisis of 1997, Global financial crisis of 2008, and COVID-19 pandemic.

6. Conclusion

Investor Sentiment (IS) has become one of the major focuses in the field of finance and considered as an essential factor in the investment decision making. Many research findings argued that fluctuation in IS reflects the variation in stock prices as well as returns which ultimately shows stock market behaviour. This study intends to examine and compare the impact of IS on Equity Returns (ER) in financial sector and non-financial sectors in Pakistan. To best knowledge of the researcher this is first study which concentrated to examine whether there is any difference in ER of financial and non-financial sectors in KSE-100 index due to IS. This study uses quantitative secondary data spanning from 2008 to 2019, collected from official website of Pakistan Stock Exchange (PSX) and publication of State Bank of Pakistan, “Financial Statement Analysis of Financial and Non-Financial Companies listed at PSX”. The quantitative data analysis has been done by using Vector Auto Regression (VAR) model. This study demonstrates that the relationship between IS and ER in context of PSX is significantly positive. The findings of this study have important implications especially for investors, fund managers, financial advisors and policy makers. As a result of these findings, the investors have better understanding and knowledge about diverse aspects of IS. This study also facilitate the process of price forecasting performed by fund and financial advisors. Last not the least, this study bears important implications for policymakers by enabling them to reduce variations in ER and to hedge risk through stabilizing IS.

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