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Article

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ECONOMETRICS | RESEARCH ARTICLE

Testing overconfidence bias in Pakistani stock market

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Abstract: Excessive trading phenomenon is contrary to the concept of traditional finance that is based on the rational expectation theorem and efficient market hypothesis. Therefore, this study is aimed at exploring the existence of overconfidence behavior in the stock market. The market-wide panel VAR model is used to investigate the lead–lag relationship between stock returns and turnover. Our results suggest that investors are overconfident in Pakistani stock market because turnover depends directly upon stock returns. The findings have important implications for investors and brokers for developing appropriate trading strategy.

Subjects: Statistics; Economics, Finance, Business & Industry; Finance

Keywords: overconfidence; turnover; volatility; panel VAR

1. Introduction

Standard economic theory does not provide certain financial solutions of puzzles arising in the financial market. Overconfidence bias is one of such puzzles which have caught attention of behavioral scientists and psychologists over the last few decades because it involves excessive trading resulting in recent financial crises. Information availability and asymmetric flow may be due to various fluctuations in the stock markets. That reflects the dynamic interplay between informed and uninformed traders because the traders should look at trading volume. These traders interact with each other in the marketplace in light of their own trading strategies. This price adjustment alters the volume and

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PUBLIC INTEREST STATEMENT

This study reveals presence of overconfidence in investors while designing investment decisions. Several studies postulate that the historical performance of stocks is related with overconfidence and success, especially privacy. In such a situation, investor becomes overconfident and shows risk-taking behavior which leads toward more trading. This study reveals the importance of global and local information available to investors. In particular, it shows how to respond to the movements in returns as well as changes in the availability of investor information transmitted in stock market. The results have implications for market participants in terms of decision-making, policy-makers, and regulators in understanding how overconfident investors react and leave impact on modeling appropriate market behavior.

this fact is considered as an important source of information in the stock market. High trading volume is a common phenomenon in global financial markets. As one of the most influential in the world financial markets, the New York Stock Exchange, the average monthly turnover in 2010 was approximately 100%. It is quite challenging for contemporary models of standard finance (De Bondt & Thaler, 1985). Since classic models cannot explain excessive trading, we rely on behavioral finance theory, which deviates from the assumption of rational agents.

Overconfidence implies excessive trading leading to poor performance. In classical model, trading activity cannot be explained; it does not indicate the rationality phenomenon. According to Baltussen (2009), rationality indicates that investors are able to create only those feasible situations which provide benefits to themselves. On the other hand, Shiller, Fischer, and Friedman (1984) and De Bondt and Thaler (1985) did not support efficient market hypothesis to discuss the rationality phenomenon. Similarly, Black (1986) recommended that individual investors trade on noise rather than information. Thus, behavioral finance models criticize traditional finance model due to irrational traders in the market. For instance, Tversky and Kahneman (1973) proposed prospect theory which indicates that investors hold loser stocks longer than winner stocks because they tend to be risk averse. On the other hand, they argued that investors prefer to hold undervalued stocks because they are ready to tolerate more risk. High trading volume was observed in global financial markets due to presence of overconfidence in investors. One Chinese research found that Chinese investor trading rate is four times superior to that of USA. So investor overconfidence is one factor which leads to excessive trading. For example, Statman, Thorley, and Vorkink (2006) concluded that turnovers and lag returns predict future returns and this was found in trading levels. Overconfident investors often experience significant losses and expenses (Odean, 1998).

This research focuses on the interaction between turnover and overconfidence (Statman et al., 2006). Overconfidence bias is considered as an important factor which affects trading puzzles in the financial market. Therefore, if the current trade volume is explained by the historical market return, it can be considered as a proof of overconfidence. Based on this lead–lag relationship, we will apply a market-wide panel VAR model to examine the existence of overconfidence. The study is significant in context that least work is done in Pakistani financial market and this will fill that gap. It also provides an approach about rationality of Pakistani investor and according to our knowledge. This research will contribute in management knowledge because it also considers the irrational investor behavior. The motivation of this study is to explore fluctuating behavior of investors and to overcome this gap in financial market researches.

2. Literature review

Historically it is noticed that psychologist focus on overconfidence bias and they examined that overconfident investors overestimate their prediction ability and face losses. In case of overconfidence, investors tend to overreact in negotiation and dealing with others while they are showing poor performance with frequent trading. So it is concluded that people tend to think that they are better than what they are in actual (Trivers, 1991). Several psychologists and research scholars illustrated that people are normally overconfident about their abilities because they tend to overestimate their accuracy about information (Fischhoff, Slovic, & Lichtenstein, 1977; Frank, 1935). Taylor and Brown (1988) argued that people see themselves as better than average and most individuals judge themselves better than other people see them. Goodie (2005) examined the overconfidence bias in two different studies by checking perceived power on confidence and lying bet opinions with gamblers problem and non-gamblers problems. In first study, regular gamblers of 200 college students consisting of 80 females and 120 males were selected to answer some questions and found that problems gamblers achieved least problematic points than non-problem gamblers showing less positive bets. In second study, bets were produced to make position of value which is independent of overconfidence by taking 384 participants consisting of 105 females and 279 males and they concluded that problem gamblers showed greater overconfidence and bet taking.

Glaser and Weber (2007) revealed that more than half of investors believe that their abilities are above average which convinced them to go for excessive trading. Odean (1998) concluded that overconfidence is quality of people, not of markets and studied that how different characteristics of people affect the market. The relationship between market return and overconfidence has been under observation for many years. Daniel, Hirshleifer, and Subrahmanyam (2004) examined that overconfidence is a result of overreaction to private information and underreaction to publically available information leads to mispricing. So there could be presence of such relation and a hypothesis could be constructed on this basis:

H1: Does Investors are overconfident, that current trading activity is significantly related to past market returns?

Behavioral finance theory is one of the important techniques to understand fundamental basis affecting different stocks fluctuations especially during global financial crisis. Abbes (2013) analyzed this asymmetric effect of volatility and concluded that outcome of bad news is stronger than good news which indicates that volatility is positively related to trading volume and it results only due to overconfidence. However, overconfidence cannot explain volatility during financial crisis due to losing investor's confidence in financial market. On basis of this hypothesis could be constructed;

H2: Does excessive trading of overconfident traders in stocks significantly contribute to the observed returns volatility?

3. Methodology

This paper examines the overconfidence and turnover in Karachi stock exchange. Simple random sampling technique is used for stocks selection and data are collected from 2005 to 2013. Descriptive statistics, correlation matrix, unit root test, granger causality, and impulse response are used here as major econometric techniques. This paper has applied the methodology of which has been earlier used by Visaltanachoti, Lu, and Luo (2007).

3.1. Variable description

In case of overconfidence, the study focused on VAR model and impulse response (Chuang & Susmel, 2011; Griffin, Nardari, & Stulz, 2007; Metwally & Darwish, 2015; Statman et al., 2006) where relation between markets return and turnover is under consideration. Several studies argue that historical success stimulates the overconfidence and when a success is relating with private information especially. In such situation, overconfident investor shows risk-loving behavior and tends to excessive trading. Since we have firm-level data across time and lead–lag relationship between turnover and stock returns need to be explored, therefore panel VAR is an important econometric technique which divides the trading volume into components out of which one is relevant to investors overconfidence.

$$y_t = a + \sum_{k=1}^{k} A_k Y_{t-k} + \sum_{l=1}^{L} B_L X_{t-1} + e_t$$

where Y_t = turnover; X_t = Volatility; e_t = Residual term; A_k = matrix that measures how trading proxy and returns react to their lags; B_L = matrix that measure how trading proxy and returns react to month; K et L: numbers of endogenous and exogenous observations.

4. Result and discussion

Descriptive statistics indicates the normality of data. The mean value of returns is 0.008 with minimum containing of −0.64 and maximum of 0.083. However, total observation of cross-sectional weighted returns, volatility and turnover is 3,240 each. The turnover has a mean of 10.67 commonly represent the fact that turnover of larger companies is large. Higher turnover mean and lower mean of returns indicate that even in lower returns, the investors are investing and hence security turnover is increasing. The values of skewness and kurtosis are almost in between the upper and lower

Table 1. Descriptive statistics

	Return	Turnover	Volt
Mean	0.009	10.669	0.009
Median	0.007	11.167	0.007
Maximum	0.083	17.671	0.100
Minimum	−0.006	−0.379	0.000
Std. Dev.	0.007	3.877	0.008
Skewness	2.655	−0.488	3.953
Kurtosis	15.87	2.538	29.01

Table 2. Unit root analysis

Variables	ADF Prob. test	P.P	Status
		Prob. test	
Return	0.0000	0.0000	Stationary
Turnover	0.0000	0.0000	Stationary
Volatility	0.0001	0.0001	Stationary

extremes which indicate that normality of data in return and turnover is not a major issue but values of these two indicators are exceeding in volatility. For making normalization of this variable also, we have to adopt technique of percentile, logarithm, change, or natural logarithm (Table 1).

4.1. Unit root test

Phillip Pearson and Augmented Ducky Filler tests are used to analyze the stationarity of different variables. Here there are total three variables including returns, turnover, and volatility. Both the tests are supporting that all three variables are showing stationarity at level and one thing which is noticed that there is no trend in these variables. Results of unit root test have been shown in Table 2. Although, unit root test clearly indicates that turnover, return, and volatility are stationary at level which shows that there is no co-integration in these variables. Thus, here we use panel VAR in unrestricted form instead of Vector error correction.

4.2. Lag order selection criteria

Panel VAR required a proper lag upon basis of which further processing is continued. Here, one thing which is very important that different researchers focused on several techniques of lag orders but our study is aimed at Akaike information criteria which depend upon data category. Akaike information criteria are most popular in identifying of lag of endogenous variables and this will be continued by conducting panel VAR at different levels of lags. The results of panel VAR are repeated at 4 lags and it is found that lag 4 is the lowest value of Akaike information criteria (Tables 3–5).

Thus yesterday turnover gives impact on today's turnover, which designates that investor overconfidence keeps turnover at higher level. The results show that returns of preceding days offer significant negative impact on current day's turnover which is indication of the presence of overconfidence under bearish market.

Furthermore, presence of relationship between returns and turnover is not found in later periods. The results of panel VAR imply that turnover has high relationship with previous value. Significance of returns on turnover indicates that historical profits authenticate the market turnover. This investigation supports that preceding return days decide current turnover.

Table 3. Lag order selection criteria

Lag	log L	AIC	SC
0	4712.3	−2.909952	−2.9024
1	8124.7	−5.016519	−5.0014
2	8194.9	−5.057417	−5.0348
3	8232	−5.077865	−5.047[a]
4	8244.1	−5.08288[a]	−5.0452

Notes: AIC: Akaike info criterion; Endogenous variables: TURN RETURN. Exogenous variables: C VOLT

[a]Lag order selected by the criterion.

Table 4. Panel VAR

	Turn	Return
Panel A		
TURN(−1)	0.81101	0.000307
	−0.01884	−4.10E-05
	[43.0504]	[7.46257]
TURN(−2)	0.047706	−0.000169
	−0.02382	−5.20E-05
	[2.00274]	[−3.24981]
TURN(−3)	0.038814	5.93E-06
	−0.02385	−5.20E-05
	[1.62743]	[0.11368]
TURN(−4)	0.077385	8.90E-05
	−0.01857	−4.10E-05
	[4.16797]	[2.19300]
Panel B		
RETURN(−1)	−16.15209	0.218891
	−6.00161	−0.01312
	[−2.69129]	[16.6808]
RETURN(−2)	−25.9807	0.031208
	−6.35228	−0.01389
	[−4.08998]	[2.24695]
RETURN(−3)	−21.51968	0.032683
	−6.29456	−0.01376
	[−3.41877]	[2.37471]
RETURN(−4)	−13.10279	0.011667
	−5.6578	−0.01237
	[−2.31588]	[0.94309]
C	0.206567	−0.002192
	−0.08996	−0.0002
	[2.29613]	[−11.1445]
VOLT	83.81182	0.669416
	−4.43764	−0.0097
	[18.8866]	[68.9925]

Note: Standard errors in () and *t*-statistics in [].

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Table 5. Granger causality test

Null hypothesis	*F*-Statistic	Prob.
RETURN does not Granger cause TURN	5.299	0.0003
TURN does not Granger cause RETURN	11.425	0.000

Note: Sample: 1,3240. Lags: 4.

4.3. Granger causality tests

Granger causality test is applied besides panel VAR. This test approximately authenticates the results of panel VAR. However, this test is not conducted for such purpose. Its main purpose is to detect causality. The results are displayed as follows:

The first hypothesis is accepted as its probability value significant and Granger test shows that return has impact on turnover. The second null hypothesis is accepted having probability value significant and hence Granger implies that turnover has an impact on return. So we reject the hypothesis that turnover does not affect the return. Hence granger test shows that both variables affect each other with lead lag and bidirectional way. This finding indicates that historical trading volume (turnover) improves some predictive power for future returns in KSE.

4.4. Impulse response

Impulse response function is a graphical analysis and it represents the behavior of endogenous variable regarding a shock from other endogenous variable. It is only possible in panel VAR. Following IRF graphs have been taken to predict future behavior of turnover and return. Figure 1 shows the impact of 1 standard deviation (upward) movement of return on return. This graph indicates that returns are positive in beginning but then start declining which tends to zero finally.

Figure 2 indicates the shock of returns on turnover. This graph indicates that returns are leaving impact on turnovers but they are showing positive relation. This indicates that investors will react to fluctuations in returns but their overconfidence will keep volumes in upward mode. Figure 3 indicates that there is no change in future returns due to turnover in Pakistan. This line initiates from zero showing a little response and then it becomes flat presenting no response in movement. So this

Figure 1. Response of RETURN to RETURN.

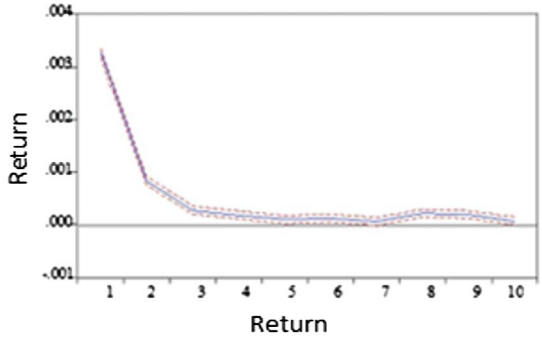


Figure 2. Response of RETURN to TURN.

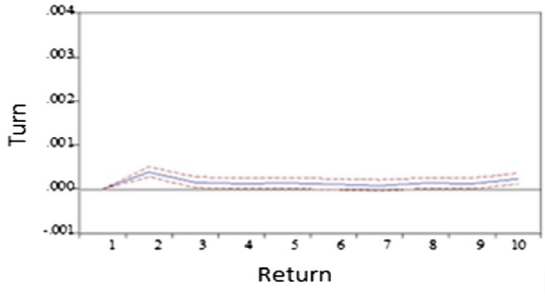


Figure 3. Response of TURN to RETURN.

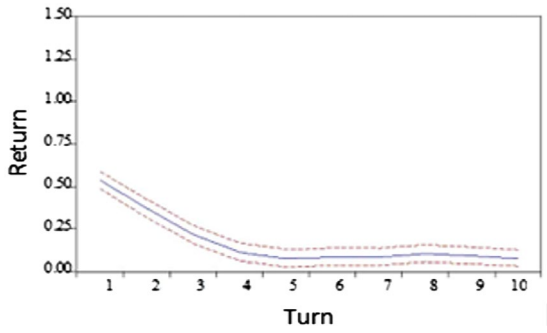
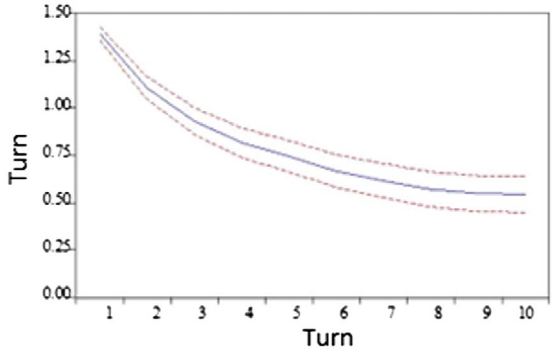


Figure 4. Response of TURN to TURN.



line is flatter and indicates that returns do not make changes in it due to change in turnover. Figure 4 indicates a large and persistent response in turn to turn shock. Each point represents a large change due to response of shocks.

5. Conclusion

The fundamental purpose of this study is to examine the loss realization and high trading volume by overconfidence. This study established that individual mature investors (a) use graphical information in making their financial investment decisions; (b) focus on line graphs which shows historical performance (c) indication of major biases. Financiers in Pakistani market are suffering from different cognitive and emotional biases but our concern is to illustrate overconfidence biases. These biases lead to reduction in their final wealth. Investors can avoid losses by holding wining; sell losing stocks too early and avoiding from highly trading stocks. This paper focuses on overconfidence bias which tends to restrict diversification of portfolio and leads to excessive trading in Pakistani financial market.

Market-wide panel VAR model is used as econometric technique to check the relationship between return and turnover (Statman et al., 2006). VAR results indicated that historical market return is negatively related with turnover which is strong indication of overconfidence. Furthermore, impulse response confirmed its presence by indicating that the response of market turnover to return is stronger than the response in the opposite direction. However, US investors are much more overconfident as compared to Pakistani investors.

This research has few implications for investors and policy-makers. This research will be beneficial for both investors as well as managers but if we say that all investors made their investments in any firm without any hope of short-term or long-term reward, this will be fully wrong. However, those investors who are striving under overconfidence should deliberate with professional and well-trained advisors before investing even limited investment. Future study must be carried out to explore more forthcoming factors of disposition effect and overconfidence. Researchers are suggested to practice international available data for example developed, emerging and Asia pacific economies, so that this research will be validate at global level.

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