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Overconfidence and turnover: Evidence from the Karachi Stock Exchange

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Abstract
High trading volume is a common phenomenon in global financial markets. The most prominent explanation of excess trading volume is overconfidence. High market returns make investors overconfident and as a consequence, these investors trade more subsequently. The aim of this paper is to check if investors in Karachi stock exchange suffer from the overconfidence bias. We construct VAR model and impulse response function to investigate the relationship between return and turnover, the presence of which can be considered as evidence of overconfidence. Our results suggest that investors are indeed overconfident in the Karachi stock exchange.
Keyword: Overconfidence, Turnover, Volatility, VAR

Introduction:
There are some puzzles found on the financial markets, which previously could not be solved using the standard economic theory, we accounted for once overconfidence of investors was assumed. These issues include excessive trading volume. The fluctuations in stock market and trading volume are influenced by the flow of information. Traders keep a close eye on trading volume because it reflects the dynamic interplay between informed traders and uninformed traders who interact with each other in the marketplace in light of their own trading strategies and, ultimately, set market clearing prices. Trading volume is termed as the critical piece of information in the stock market because it either activates or deactivates the price movements. High trading volume is a common phenomenon in global financial markets. As one of the most influential financial markets in the world, the New York Stock Exchange (NYSE)'s average monthly turnover in 2010 was approximately 100%. Excessive trading has been considered "the single most embarrassing fact to the standard finance paradigm" (DeBondt and Thaler, 1994). Since classic models cannot explain excessive trading, we resort to behavioral finance theory, which deviates from the assumption of rational agents.
Many psychological and empirical studies in Finance have found that people are not always rational, and systematic cognitive biases will lead to deviations from inferences drawn by classic theory. In this paper our main emphasis is on overconfidence bias, which is considered as key success factor in trading puzzle in financial markets. The overconfidence effect is a well-established bias in which someone's subjective confidence in their judgments is reliably greater than their objective accuracy, especially when confidence is relatively high. Investor's overconfidence has been discussed for many years by a lot of researchers in their security valuation and trading skills.
This paper focuses on the close connection between trading volume and overconfidence. Considering data availability, we follow the paper of Statman et al. (2006), which takes turnover as a proxy for the level of overconfidence. Gervias and Odean's (2001) paper provides the basic framework for Statman's model: due to the self-attribution bias, high returns in a bull market will increase investors' overconfidence. On the other hand, the close relation between overconfidence and trading volume has been verified by several studies. Since overconfident investors believe in their abilities and will act based on the information they obtain, trading volume is affected. Hence, if the current trading volume can be explained by the past market return, it can be considered as an evidence of overconfidence. Based on this lead-lag relationship, we will apply a market-wide VAR model to examine the existence of overconfidence.Previous empirical studies have shown the presence of investors' overconfidence in many countries. In this paper, our objective is:

1. To investigate whether the overconfidence effect exists in the Karachi Stock Exchange by testing the interaction between trading volume and market returns.
2. To explore how strong the impact of overconfidence is on market returns.

This study will take investor overconfidence to see whether Pakistani stock market's returns are dependent on overconfidence of investors or whether returns themselves determine the trading volumes. This study will provide an insight into rationality of Pakistani investor. The findings can be used by investors to make trade

decisions at right. Moreover it is useful in understanding market behavior. This can provide valuable information for financial advisers educating clients and for asset managers developing trading strategies.

In a fully rational market, stock prices would be determined according to valuation theory. Share price would reflect investor estimates of company fundamentals, as measured by the discounted value of expected future cash flows.

We assume that stock markets for the most part are efficient in this fundamental sense. We also assume there are enough overconfident investors to systematically, but temporarily, bias the prices of individual stocks away from fundamental value. We define an overconfident investor as one who believes too strongly in his or her own assessments of a stock's fundamentals. If there are enough overconfident investors to affect the market, stock prices will partially ignore objective information or react too slowly to new information.

But eventually prices do react. The disparity between reality and the beliefs of the overconfident investors will be too great, or go on too long. At that point, fundamentals reassert themselves, as expectations realign with reality. This realignment moves prices closer to fundamental values. We test the hypothesis that overconfidence is a pervasive trait of investors and see whether the bias found in Pakistani stock prices.

Literature review:

Overconfidence is one of the psychological factors known to affect our everyday life and also well documented. When people tend to think that they are better than they really are (Trivers, 1991). The psychology and behavioral science literature characterize people that behave as if they have more ability than they actually possess as being overconfident (e.g.,Campbell, Goodie, & Foster, 2004; Lichtenstein et al., 1982; Yates, 1990).

Investors who attribute past success to their skill and past failure to bad luck are likely to be overconfident. An investor who is overconfident will want to utilize his perceived superior ability to obtain large returns. Overconfidence causes investors to be too certain about their own abilities and not to weight the opinion of others sufficiently. Overconfident investors apparently believe that they have superior information, even when this is not actually the case. Thus, the overconfidence hypothesis predicts that such investors will trade more, resulting in reduced returns. Several studies consider the proposition that investor overconfidence generates the high trading volume observed in financial markets .Odean (1998) argues that the high level of trading volume is the most important effect of overconfidence. Statman, Thorley, and Vorkink (2006) present empirical evidence for the US market and argue that trading volume is higher after high returns, as investment success increases the degree of overconfidence. Furthermore, (Barber and Odean, 2000) who claims that overconfident investors underreact to new information, or overweight the value of information, but they also hold unrealistic beliefs about how high their returns will be . These theoretical models predict that overconfident investors, because either they overestimate the precision of the information they have, or because they think they have above average investment skills, trade more than rational investors. Zeyuan and Shuman (2011) in their study concluded that both market turnover and market return are found to be autocorrelated. The response of market turnover to shocks in market return is stronger than the response in the opposite direction, which is consistent with overconfidence. Margarida and Victor (2012) examined that there is a strong and positive relationship between investment in information and intensity of trading in financial assets is sensitive to the sources of information used by investors. Moreover overconfident and non-overconfident investors do not rely on the same sources of information. According to Boussaidi.R (2013) investors who exhibit overconfidence overestimate the precision of their private signals and therefore trade excessively on the basis of these signals causing a return volatility. Salma and Ezzeddine (2009) in their study analyzed overconfidence hypothesis in the Tunisian market and found that past market returns affect trading activity and there is the contemporaneous significant positive relation between volume and volatility.

Fayyaz and Khalid (2012) found significant positive response of turnover to market return shock. This response was persistent for quite a long time which confirms the presence of investor overconfidence. Salma and Ezzeddine (2007) examined the Tunisian market and found that investors tend to be overconfident in general cases. In terms of investment, it is difficult for overconfident investors to beat their peers than to beat the market as a whole. Furthermore, age and income are not significantly related to self-confidence. Finally they concluded that men are more confident than women in general cases and in beating the market.

Beenish and Naeem (2013) in their study indicated that over confidence of the investors do not account for the risk associated with the return of the security and volumes are not impacted by return's volatility. Markus and Martin (2007) have concluded in their study that those people having more skills of investment trade more but this thing does not matter either they have better past performance or not. It is indicated in the results of Dennis et al. (2005) that the less accurate their investment decisions are the more horizontal are participants to exhibit overconfidence. It is also observed that during one of two experiments (i) those participants who believe that their life is largely controlled by external factors are less often classified as overconfident, whereas (ii) males are less flat to overconfidence than females. At the end it is also noted that age is positively correlated with overconfidence. Gina and Liangpeng (2009) analyze that future trade performance of investors is positively affected by their previously-demonstrated trading ability which substitutes for private signal precision and is inferred from their prior purchases' subsequent performance. Joshua and Jack (1999) test that systematic difference between confidence and accuracy, including an overall bias toward overconfidence. They also analysed stable individual differences determining why some people, domains and types of judgments are more flat to overconfidence will be important to understand the ways of making confidence judgments. Zhou.D (2011) in his study concluded that overconfidence of the market maker intensifies the

aggressiveness of informed trading on the private and public information, leading to an increased insider profit, and a more efficient and more stable market.

Markus and Martin (2009) exhibit in their study that trading volume of an investor is affected by past market return and past portfolio returns. Investor follows the theory of more risk, more return in which he want to attain high risk stocks and reduce the stocks in its portfolio. It is also found that high past market returns do not lead to higher risk taking or reducing diversification. Yenshan and Cheng (2010) have analysed that there exists a significant positive relationship between investor behaviour and investment performance in its first few auctions but there comes a gradual decline in their returns from subsequent auctions. Such type pattern is also displayed in the dollar returns of these frequent bidders. It is also concluded that the results are consistent with the theory on the prediction of overconfidence that frequent bidders will under-perform infrequent bidders. There is a significant negative relationship between overconfidence and trading performance and result indicates that trader in an interactive environment is more overconfident and their performance is approximately poorer than traders in an isolated environment Phillip (2007). Gongmeng et al. (2007) concluded in their study that Chinese investors are suffering following three types of biases (i) they predisposed to sell stocks that have appreciated in their prices while not those that have depreciated in their prices (disposition effect) acknowledging gains not losses; (ii) they are being overconfident; and (iii) they consider that the past returns are signals of future returns (a representative bias).

Hypothesis 1: Investors are overconfident, so current trading activity is positively related to past market returns.
Hypothesis 2: Excessive trading of overconfident traders in stocks positively contributes to the observed returns volatility

Data and methodology:

Our database consists of monthly observations of Karachi stock exchange from January 2002 to December 2012. We use monthly observations for trading volume and returns, but our estimate of volatility is constrained by the availability of daily returns. We focus on monthly observations under the perspective that changes ininvestor overconfidence occur over monthly or annual horizons:

Definition of Variables

- mret : the monthly stock market return
- mturn : the monthly volume (shares traded).
- vol : the monthly temporal volatility of market return based on daily market returns within the month

Empirical Methodology

Following Statman and al. (2006), we use a vector autoregressive (VAR) and impulse response functions in order to study the interaction between market returns and trading proxies
(Volume).We uses the following form of the VAR model:

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

- Yt : a (nx1) vector of endogenous variables (return and trading proxy : turnover and volume).
- Xt : a (nx1) vector of exogenous variable :volatility.
- e_t: a (nx1) residual vector. It captures the contemporaneous correlation between endogenous variables.
- Ak : the matrix that measures how trading proxy and returns react to their lags.
- BL : the matrix that measure how trading proxy and returns react to month (t-1) realizations of exogenous variables.
- K et L: numbers of endogenous and exogenous observations. K and L are chosen based on the Akaike (1974) (AIC) and Schwartz (SIC) information criteria.

Results and discussion:

Descriptive analysis:

Table 1

	M RETURN	MTURN	VOL
Mean	0.019592	7.835276	0.012426
Median	0.021201	8.223179	0.011038
Maximum	0.241106	9.644660	0.034285
Minimum	-0.448796	0.989541	7.55E-05
Std. Dev.	0.082542	1.397346	0.006736
Skewness	-1.518837	-2.163459	1.063875
Kurtosis	10.27793	8.516456	4.020211
Jarque-Bera	342.0768	270.3443	30.62485
Probability	0.000000	0.000000	0.000000
Sum	2.586198	1034.256	1.640193
Sum Sq. Dev.	0.892532	255.7876	0.005943
Observations	132	132	132

The table 1 provides descriptive statistics statistics on monthly market return and market trading as well as market-wide based control variable: volatility , during the period 2002-2012

Unit Root Test:

Before analysis and applying model to the data, this paper adopts Augmented Dickey Fuller (1979) test and Phillips-Perron test (1988) to ensure that every variable is under stationary. In these tests, the null hypothesis is that a series is nonstationary Table 2 shows that the null hypothesis that the stock return series trading volume series and volatility series are nonstationary (i.e., have a unit root) is rejected for stock returns ,trading volume and volatility series. This confirms that both trading volume stock returns and volatility series are stationary and are, therefore, useful for further statistical analysis.

Table 2

Variables	ADF Test prob.*	P.P Test prob.*	H_0 :Nonstationarity
M TURN	0.0138	0.0109	Rejected
MRETURN	0.0000	0.0000	Rejected
VOL	0.0000	0.0000	Rejected

VAR Lag Order Selection Criteria:

Optimal lag of exogenous variable is very important in VAR analysis. We will us Akike information criteria to find optimal lag of exogenous variables. This will be done by conducting VA R at different level of lags and the level which provides lowest score for above criterion will be used as lag value for endogenous variables

Table 3

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-60.08319	NA	0.009637	1.033600	1.124577	1.070557
1	15.72968	146.7346	0.003026	-0.124672	0.057281*	-0.050758*
2	18.28506	4.863460	0.003098	-0.101372	0.171559	0.009499
3	24.81949	12.22571	0.002975	-0.142250	0.221658	0.005578
4	32.62590	14.35373*	0.002798*	-0.203644*	0.251241	-0.018859
5	34.63481	3.628990	0.002891	-0.171529	0.374332	0.050212
6	37.68404	5.409928	0.002938	-0.156194	0.480644	0.102504
7	42.22525	7.910505	0.002915	-0.164923	0.562891	0.130732
8	42.85247	1.072339	0.003082	-0.110524	0.708268	0.222089

*** indicates lag order selected by the criterion**
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Endogenous variables: MTURN MRETURN , Exogenous variables: C VOL

Vector Autoregression Estimates
Table 4

	MTURN	MRETURN
MTURN(-1)	0.930834	0.023114
	(0.09228)	(0.00837)
	[10.0868]	[2.76196]
MTURN(-2)	-0.272620	0.011745
	(0.12689)	(0.01151)
	[-2.14855]	[1.02068]
MTURN(-3)	0.115859	0.007095
	(0.12917)	(0.01171)
	[0.89698]	[0.60573]
MTURN(-4)	0.042805	-0.030771
	(0.09565)	(0.00867)
	[0.44751]	[-3.54737]
MRETURN(-1)	1.732692	-0.029804
	(0.87920)	(0.07973)
	[1.97076]	[-0.37381]
MRETURN(-2)	-0.341871	-0.058846
	(0.85095)	(0.07717)
	[-0.40175]	[-0.76256]
MRETURN(-3)	1.109384	-0.064013
	(0.84824)	(0.07692)
	[1.30787]	[-0.83216]
MRETURN(-4)	-0.479139	0.100311
	(0.81521)	(0.07393)
	[-0.58775]	[1.35687]
C	0.985427	0.008014
	(0.45942)	(0.04166)
	[2.14492]	[0.19236]
VOL	31.54807	-6.180575
	(10.6109)	(0.96227)
	[2.97316]	[-6.42294]

The results of the VAR conclude that turnover is in high correlation with its previous value. Thus yesterdays turnover has impact on today's turnover. This indicates that investor overconfidence keeps the turnover at higher level .Further it is observed that return volatility has significant impact on returns and turnover. This may indicate that over confidence of the investors donot account for the risk associated with the return of the security. The second parts of these results indicate that previous days returns have significant positive impact on today's turnover. However no evidence is found of the correlation between returns and turnover in later period. The significance of returns on turnover indicates that lag of returns determine the turnover in market. This indicates that previous day's return determines to today turnover. This result is consistent with overconfidence hypothesis as high market returns make

the investors overconfident in the sense that they underestimate the variance of stock returns. The results also confirm that Pakistani stock market investors have imperfect knowledge of the market and perfect market hypothesis does not hold.

Granger Causality Tests:

Table 6

Lags: 4

Null Hypothesis:	Obs	F-Statistic	Prob.
MTURN does not Granger Cause MRETURN	128	4.26343	0.0029
MRETURN does not Granger Cause MTURN		0.67413	0.6112

The first null hypothesis is rejected as it p values less than .05 and F-stat is 4.26.Thus granger test reveal that turnover has impact on return. These finding implies that in the presence of current and past return trading volume add some predictive power for future return in Karachi stock exchange. These results agree with some theoretical model that implies information content of volume for future return and on the basis of such asymmetric information overconfidence investor trade more. However, this relationship doesn't hold in the opposite way because the second null hypothesis is accepted because it has p values more than .05 and F-stat 0.67.Thus we could not see the influence of past market return on the trading volume in the Granger causality test.

Impulse response analysis:

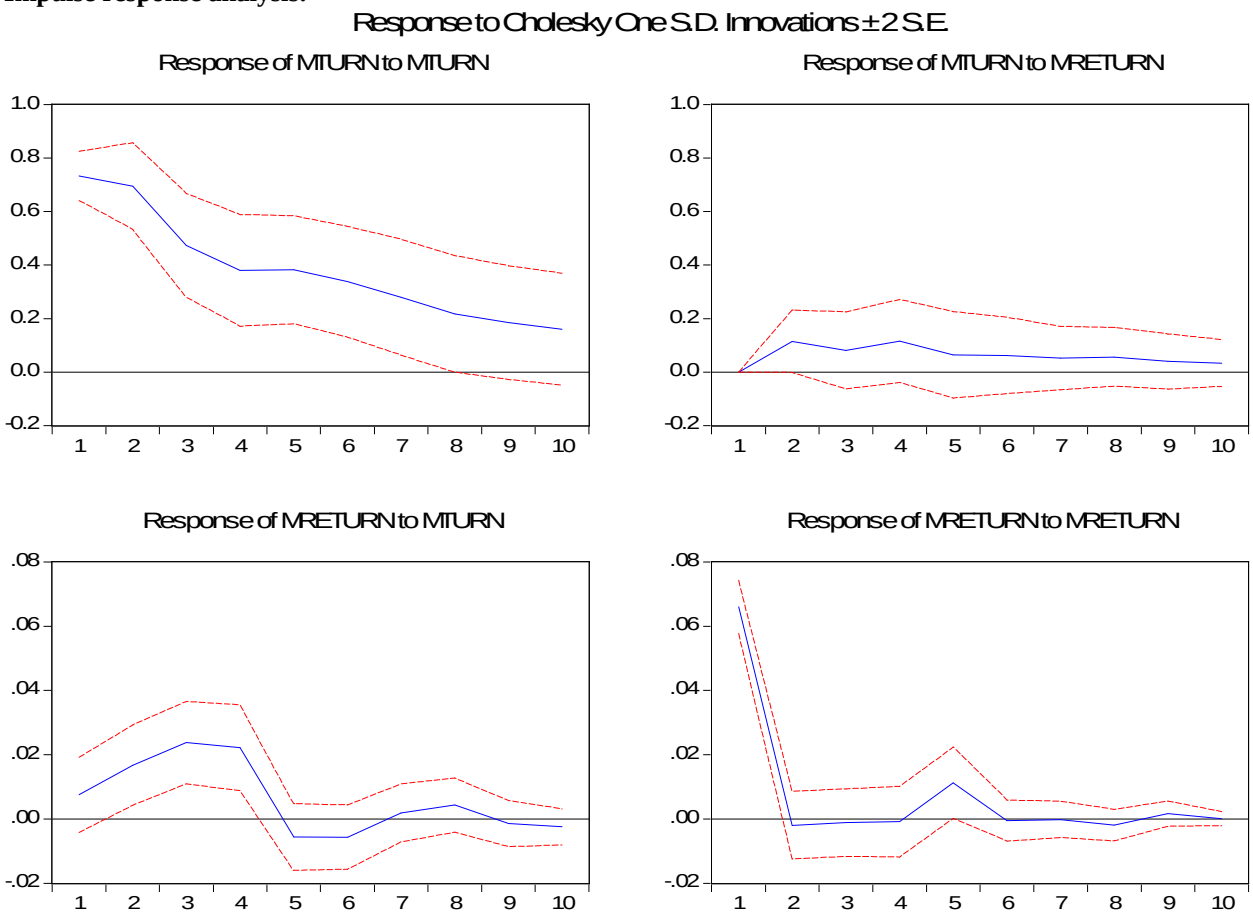

Figure 1 indicates a large and persistent response in mturn to mturn shock. Figure 2 indicates the shock of mreturn (impulse) on mturn (Response). The graph indicates that mturn are impacted by returns and the shock of mreturn impacts them but they stay in positive territory. This indicates that investors do react to shocks in returns but their overconfidence, translated in terms of turnover, will keep volumes in positive territory. Figure 3 indicates that future returns are affected by change in turnover in Pakistan. The line is in the positive territory

with upward trend up to four months and then on the negative side. Figure 4 indicates the impact of 1 SD deviation movement (upward) of mreturn on mreturn. The graph indicates that return are positive in the beginning but then start landing in negative territory by eventually getting equal to zero.

Conclusion:

In this study, we analyze the overconfidence hypothesis in the Karachi stock exchange using vector autoregressive (VAR) and associated impulse response functions (IRF). One implication of overconfidence theory says that overconfident investors trade more aggressively. Assuming that past returns lead investors to become overconfident, we tested the hypothesis that turnover was positively related to past returns. Another implication of theory is that trading by overconfident investors contributes to the returns volatility. Accordingly, we tested the hypothesis that returns volatility is positively associated with overconfidence related turnover.

Here we find past market returns affect turnover in VAR and significant positive response of turnover to market return shock in IRF. This response was persistent for quite a long time for monthly IRF. Thus, results confirm the presence of investor overconfidence at KSE. This is the key finding of this study.

For the second hypothesis consistent with previous studies, we also found significant contemporaneous positive relationship between turnover and returns volatility in our VAR analysis. The predictability of security returns based on lagged volume has been documented by many financial economists as a possible violation of strict market efficiency.

Due to time, data constraints we took monthly data for our analysis. However future study may be conducted by taking daily data of market and conducting VAR analysis. We have taken only volatility as control variable; other variable like dispersion can be taken for analysis.

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"Knowledge is power. Information is power. The secreting or holding of knowledge or information may be an act of tyranny camouflaged as humility."

BEST OF LUCK