

Said, Bahrawar; Shafiq ur Rehman; Ullah, Rizwan; Khan, Javed

## Article

# Investor overreaction and global financial crisis: A case of Pakistan stock exchange

Cogent Economics & Finance

## Provided in Cooperation with:

Taylor & Francis Group

*Suggested Citation:* Said, Bahrawar; Shafiq ur Rehman; Ullah, Rizwan; Khan, Javed (2021) : Investor overreaction and global financial crisis: A case of Pakistan stock exchange, Cogent Economics & Finance, ISSN 2332-2039, Taylor & Francis, Abingdon, Vol. 9, Iss. 1, pp. 1-18, <https://doi.org/10.1080/23322039.2021.1966195>

This Version is available at:

<https://hdl.handle.net/10419/270140>

### Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

### Terms of use:

*Documents in EconStor may be saved and copied for your personal and scholarly purposes.*

*You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.*

*If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.*



<https://creativecommons.org/licenses/by/4.0/>

# Investor overreaction and global financial crisis: A case of Pakistan stock exchange

Bahrawar Said, Shafiq Ur Rehman, Rizwan Ullah & Javed Khan |

To cite this article: Bahrawar Said, Shafiq Ur Rehman, Rizwan Ullah & Javed Khan | (2021) Investor overreaction and global financial crisis: A case of Pakistan stock exchange, Cogent Economics & Finance, 9:1, 1966195, DOI: [10.1080/23322039.2021.1966195](https://doi.org/10.1080/23322039.2021.1966195)

To link to this article: <https://doi.org/10.1080/23322039.2021.1966195>



© 2021 The Author(s). This open access article is distributed under a Creative Commons Attribution (CC-BY) 4.0 license.



Published online: 03 Sep 2021.



Submit your article to this journal [↗](#)



Article views: 2129



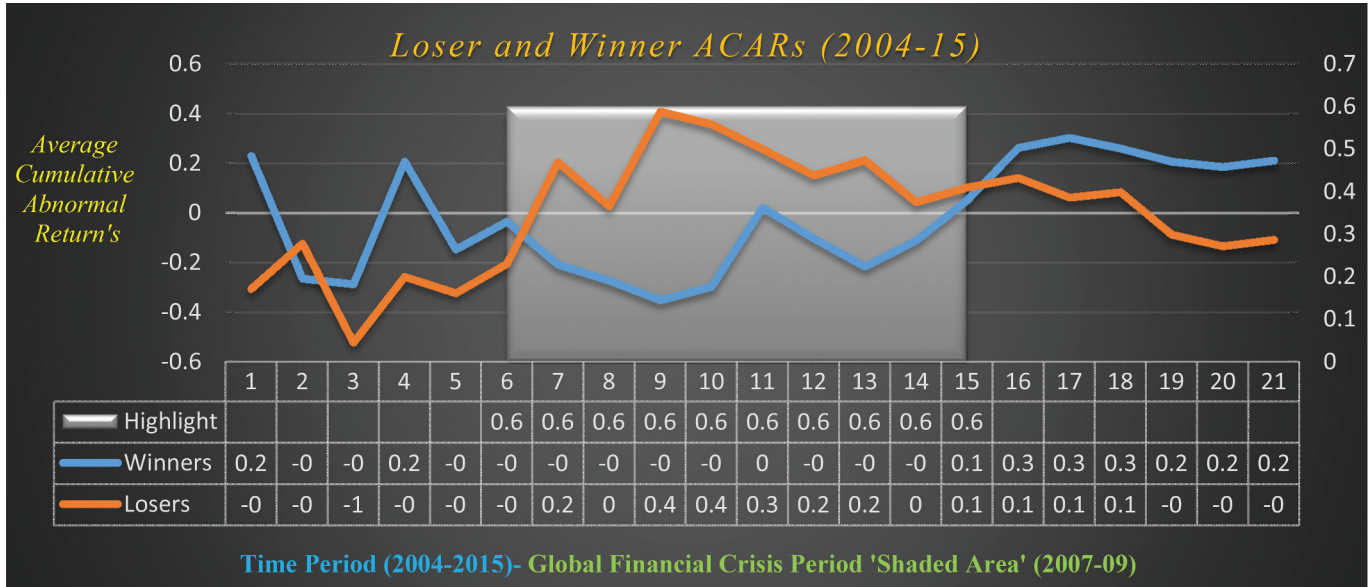
View related articles [↗](#)



View Crossmark data [↗](#)



Citing articles: 2 View citing articles [↗](#)



# Investor overreaction and global financial crisis: A case of Pakistan stock exchange

Bahrawar Said, Shafiq Ur Rehman, Rizwan Ullah and Javed Khan

*Cogent Economics & Finance* (2021), 9: 1966195

## FINANCIAL ECONOMICS | RESEARCH ARTICLE

# Investor overreaction and global financial crisis: A case of Pakistan stock exchange

Bahrawar Said<sup>1</sup>, Shafiq Ur Rehman<sup>1</sup>, Rizwan Ullah<sup>1\*</sup> and Javed Khan<sup>1</sup>

Received: 19 August 2020

Accepted: 28 July 2021

\*Corresponding author: Rizwan Ullah, Commerce and Management Sciences, University of Malakand, PAKISTAN  
Email: [rizwanullah33@yahoo.com](mailto:rizwanullah33@yahoo.com)

Reviewing editor: David McMillan, University of Stirling, Stirling, United Kingdom

Additional information is available at the end of the article

**Abstract:** Recently, the investor overreaction catches the attention of the academicians and practitioners. The topic comes under the limelight of academicians and policymakers. This study, therefore, addresses investor overreaction and its relationship with the global financial crisis for the period of 2004–15. The study used stratified random sampling technique; equal allocation method of Krejcie and Morgan. By adopting the methodology of Debondt and Thaler, the study finds that there is highly significant overreaction (distinct reversal) in the stock market in the global-financial crisis period, which may attribute to the aggressive behavior of individual investors in the market. Overreaction has also been shown in the line graph shaded area which opposes the efficient market hypothesis and verifies the presence of a weak form of efficiency. Econometric tests are applied for robustness check that confirms weak form of efficiency in the PSX. The study has implications for both the investors and policymakers. This study is quintessential for those investors who have the aptitude to look introspectively and to evaluate their behavioral biases. Further, investors would learn to transmute behaviors and to build portfolios which will help them to stick to their long-term investment strategies and hence achieve their investment goals.

**Subjects:** Quantitative Finance; Accounting and Finance for Events; Finance

**Keywords:** Overreaction; underreaction; portfolios; Pakistan stock exchange



Bahrawar Said

### ABOUT THE AUTHOR

Bahrawar Said is currently working as a Lecturer at Department of Commerce and Management Sciences at University of Malakand. Previously, he had been a visiting Lecturer at Grafton University College Islamabad (2016–17) and then joined Civil Secretariat Planning and Development Department as a Development Officer (2017–18). Additionally, in his MS degree, he worked on “behavioural finance and stock market efficiency”. Now, he is a PhD scholar. His PhD research is mainly focused on market micro-structure, financial reforms and market efficiency.

### PUBLIC INTEREST STATEMENT

This research is an application of behavioral finance on the real-world problems. It explains that stock markets are exposed to investors’ biases that subject to the spill-over effect of other stock markets. The scholars interested in the realm of behavioral finance can use our findings in their research for in-depth insights. Every investor trading in the stock market suffers biases in short-run, while return to normal position later on shows overreaction, that is, showing more aggressive behavior in the market. If investors face bad news that directly affect the investors’ behavior in negative way, it results in irrational decisions. More specifically this paper investigated the impact of global financial crisis on the investors’ decisions in the stock market of Pakistan. The study highlighted the issue that investors in the stock market possess less information. Further, they do not make rational decisions in short-run in the market, which consequently leads to investor overreaction.

## 1. Introduction

Stock market prediction has always been a matter of debate for market analysts. One of the general questions is that why do securities prices change? No one came with real and precise answer. One aspect is that stock-price predictions and understanding stock market's whereabouts is not possible. In another view, it could be predicted with the help of historical market data and its trend (Bachelier, 1900; Malkiel, 2003). It is common that the fluctuation in the trading of stocks in the market is linked with many other factors; like any natural disasters, political uncertainties, recession across the world, wars, oil prices, economic conditions, globalization, and bad news about the stock market, and so on. The above news has direct and indirect impacts on the market (Otchere & Chan, 2010).

Market analyst studies stock market inefficiencies in which securities mispriced from their fundamental values and those securities become overvalued or undervalued in the stock market. Further, it either causes investor underreaction or overreaction in financial terminologies in the stock market that oppose efficient market hypothesis (hereafter; EMH) and verify the presence of weak form of efficiency. The literature of behavioral finance is categorized in two main areas; the overreaction identification in the EMH that explains by behavioral models like DeBontd and Thaler (1985) and the identification of the investor biases inconsistent with classical economic theories of rational behaviors like that discussed by Barber & Odean (1999); Pompian (2011). The market efficiency is essential in a country because when the market is inefficient in adjustment to the news. Then, the less informed investors tend to overreact and the analysts as well as the savvy investors leave behind the market by receiving overvalued and undervalued securities information. Consequently, they earn abnormal returns in that period (Mehmood et al., 2012). Research in experimental psychology asserts that when an investor violates Bayes' rule that would subsequently tend to overreact to unanticipated news. So, it is essential to know whether this behavior matter at the market level or not. In investor overreaction, stock price tends to depart from their fundamental values; with good news it goes up, while declines with bad news. However, over a period of time prices come back to their old position by exhibiting that prices have overreacted and then corrects itself.

The study of overreaction is well-understood phenomena and explained meticulously (DeBontd & Thaler, 1985; Poterba & Summers, 1988; Howe, 1986; Brown & Harlow, 1988; Fama, 1970; Smith, 2016; Ball, Kothari & Shankeen, 1995). Jegadeesh and Titman (1993) had come with more detailed evidences in favor of momentum effect in short run and contrarian effect in long run. Besides, some other studies investigated investor overreaction in developing markets. For instance, Sohail and Javid (), Bhutta and Shah (2014), and Soomro et al. (2016) conducted study in Karachi Stock Exchange, and Vardar and Okan (2008) investigated in Istanbul Stock Exchange. The results of the above studies were mixed and inconclusive. These studies targeted top 30 and 100 index based on market capitalization, which lacked generalizability. Different methodologies were used that lacked cohesiveness. Similarly, this is the first study of investor overreaction according to the best knowledge of author that aims to cover all sectors till date that addresses this gap in the present literature. The study contributed through constructing portfolios on the basis of weekly ACARs<sup>1</sup> in the long-run. So, it provides better understanding and concrete results of investor overreaction till date in Pakistan Stock Exchange (hereinafter; PSX). The main objective of the study is to check the investor overreaction in the pre-financial, amid and post-financial crisis' period. Along with it, random walk test is applied as a robustness-check in favor of weak form of efficiency. Overreaction (Crime of small numbers) of the investors is considered inconsistent with EMH. The methodology of DeBontd and Thaler (1985) based on portfolios of ACARs is mostly exploited and considered the most appropriate method of detecting the impact of news on stock prices.

The main findings of the study indicate that there exists highly significant overreaction in the stock market employed t-test: T-SAEV Two-Sample Assuming Equal Variances. The study divulges that there is distinct reversal for the global financial crisis, which exposes a high degree of

overreaction in these different periods that may be attributable to the aggressive behavior of individual investor in the market. It could be inferred from the findings that Pakistan is an emerging economy that has partial linkages to the worldwide financial markets. Econometric tests are used as a robustness-check and it confirmed weak form of efficiency in the PSX.

This study is quintessential implications for those investors who have the aptitude to observe introspectively and evaluate their behavioral biases. Several individual investors who elect either to do it themselves or to rely on financial advisor merely for incidental advice. They often find themselves incapable to separate their emotions at the time of investment decisions. This overreaction does not have to be an enduring happening. After studying this research and investigating profoundly into their behaviors, investors can definitely learn to transmute behaviors and to build portfolios that help them stick to their long-term investment strategies. Hence, they achieve their investment goals.

Section one provides background and gap of the study. Section two includes history, basic theme, literature, and hypotheses. Section three has the methodology and statistical techniques. Section four encompasses descriptive statistics, investor overreaction, and random walk tests for robustness check. Conclusion, findings, recommendations and implications, future research and limitations are abridged in section five.

## 2. Literature review

Efficient Market Hypothesis suggests that investors irrationally respond to good and bad news causing stock prices to depart from their intrinsic value. Although over some period of time, stock prices slowly revert to their intrinsic value and it suggests that prices overreact in the early period. As investors ascertain their mistakes, then prices return to their intrinsic value. Particularly, stocks with previously low returns will afterward experience relatively high returns, while stocks that had previously performed better would show weak performance in the future. Interestingly, the application linked with overreactions is the capability to earn abnormal profits via implementing a contrarian strategy. This possibility acts as a serious blow to EMH (Fama, 1970). Likewise, a substantial body of pragmatic literature has provided manifestation for overreaction in the stock markets. The pioneer school of thoughts of DeBondt and Thaler (1985) is consistent with the overreaction hypothesis, in which the authors find that the loser-portfolio outperforms the winner one. It was the first attempt at the behavioral principle of investors in the stock market which is also called the winner-loser effect. Moreover, they affirmed that security prices could be predicted on the basis of historical prices that contradict the weak form of EMH.

Studies revealed that stock returns are positively correlated in the short-run, while negatively correlated in long-run (Jegadeesh & Titman, 1993). This suggests that investors act excessively optimistically (Overreact) for prior winners in the short-run. Poterba and Summers (1988) and Fama (1970) also affirmed the results of the study of DeBondt and Thaler (1985).

The overreaction hypothesis has become central in behavioral finance in current years. Brown and Harlow (1988) came with improvement on studying the magnitude, directional effect, and intensity of the investor overreaction in NYSE in the simplest way, which supports the study of DeBondt and Thaler (1985). Moreover, investors overweight short news and attract more than a proportional share of investors' attention in the market. Jegadeesh and Titman (1993) found evidence in favor of short-term momentum effect as well as long-term contrarian effect. Howe's report (1986) based on the one-week large depreciation in stock price, that explained the winner exhibits negative abnormal returns after the post-period portfolio formation. Bowman and Irvesan (1998) presented evidence in favor of overreaction as short-term reversals, while found contradictory long-term overreaction. Ball et al. (1995) conducted a study in NYSE-AMEX and argued that the DeBondt and Thaler (1985) loser stocks were found having low prices. Their study is further criticized on formation period (December),



while the results of the study were found inconsistent with the overreaction of June and July. Ali et al. (2011) investigated overreaction in Bursa Malaysia and found that there was a lower level of overreactions for winner stocks. Ali et al. (2011) investigated the stock overreaction on the shariah-compliant stock in Bursa Malaysia for the period 1988–2009 and argued that there was stronger overreaction before financial crisis in Asia in 1997 and in 2008, which decreased later on. Alrabadi (2012) examined the short-term reaction of shocks on the Amman Stock Exchange and found that there is an under reaction for both positive and negative shocks.

The investor excessive overconfidence and increased optimism in the bullish market “NASDAQ” caused investor overreaction in the Taiwanese stock market, while no effect was found on U.S side (Chang et al., 2011). Yang and Luo (2014) analyzed during rumors clarification, ACAR’s were positively significant in the Bull market, while ACAR’s were significantly negative in Bear market conditions. In both conditions, investors could not differentiate between true and false rumors. Bhutta and Shah (2014) found that corporate governance had no impact on investor reaction. Additionally, Sohail and Javid () examined investor underreaction and overreaction in financial crisis, targeting KSE. The study showed the winners portfolio exhibited a huge increase in price in the initial four weeks and that shows insignificant overreaction. On the other hand, the losers portfolio having enormous price drops and does not show any significant reaction in the global financial crisis in Pakistan. Irshad and Sarwar (2013) investigated the weak form efficiency of KSE in which fundamental analysis can easily earn abnormal return utilizing different stock valuation techniques. Soomro et al. (2016) conducted a study on five cement firms of PSX, which was based on average abnormal returns and found that all investor overreactions are insignificant, except the eleventh and twelfth months.

### 3. Hypotheses

H1: There is an overreaction in the global financial crisis period.

H2: There is no overreaction in the pre and post-global financial crisis period.

H3: Portfolio of loser ACARs does perform better than that of the winners in crisis period.

### 4. Research approach of Portfolios and data description

According to paradigm diversity, the positivist paradigm is used to test the overreaction hypothesis. Through this quantitative approach, daily closing stock prices (2500 observations/closing prices for each firm) of 70 firms were collected and then converted into 500 weekly returns. Data were collected from 70 firms through equal allocation method of stratified random sampling technique (Krejcie & Morgan, 1970), which includes two firms from each sector (total of 35 sectors) of PSX. The study was conducted for the period of 2004–2015. The core concern of the study is to investigate investor’s overreaction using the methodology of DeBondt and Thaler (1985). Consequently, three econometric unit root tests were used for the robustness check of the study.

### 5. Methodology of the study

The ACARs winner and loser portfolios are constructed in descending order, where winner ACARs are first 25 (out of 70 firms) outperformed stocks and the loser ACARs are the last 25 stocks that showed worst performance. The results of ACAR portfolios that comprises 21 weeks which were checked with a gap of 22 weeks from 500 entire sample. Portfolios are constructed which include formation period (1st week), then next t-24, t-48, t-72, t-96, t-120, t-144, ... t-480, tracked from 2004 till 2015. At last, three econometric unit root tests (ADF, PP, and KPPS) are applied on 2500 stock prices for robustness check of the study. The portfolios of the study are based on ACARs which is the methodology of DeBondt and Thaler (1985). In the first step, historical returns are calculated for the selected stocks.

$$R_{i,t} = (P_1 - P_0) / P_0 \quad (1)$$

$R_t$  is the Actual returns,  $P_1$  is today's price and  $P_0$  is the beginning price. In the second phase, the Expected Returns are calculated where

$$ER_{i,t} = R_{m,t} \quad (2)$$

$ER_i$  is the Expected Returns which is considered equal to the market index (PSX) return.

$$R_{m,t}$$

$R_{m,t}$  is the market returns in which Pakistan Stock Exchange 100 index is taken. Then, abnormal returns are calculated by way of.

$$AR_{i,t} = R_{i,t} - E(R_{i,t}) \quad (3)$$

$AR_{i,t}$  is the abnormal returns of security "i" over the period "t".  $R_{i,t}$  is the actual/historical returns, and  $ER_{i,t}$  is equal to market return (PSX). Furthermore, the Cumulative Abnormal Returns are calculated as.

$$CAR_{i,t} = 1/25 \sum_{i=1}^n AR_{i,t} \quad (4)$$

$CAR_{i,t}$  is the Cumulative Abnormal Returns of stock "i" over the period 't'.

$$ACAR_{i,t} = \sum_{i=1}^n CAR(i,t) \quad (5)$$

Hence, Average Cumulative Abnormal Returns (ACARs) are constructed by applying t-Test: Two-Sample Assuming Equal Variances, the first 25 best stocks that became "Winners" and the last 25 stocks that performed worst are said to be "losers". Then, the 25 shares that performed best are combined to form a winner portfolio.

$$ACAR_{i,t} = 1/25 \sum_{i=1}^{25} AR_{i,t} \quad (6)$$

The same portfolio combination is done for making a portfolio of loser stocks.

Then, the overreaction and under-reaction can be calculated as follows:

$$ACAR_{s_{loser}} - ACAR_{s_{winner}} > 0 (\text{overreaction}) \quad (7)$$

$$ACAR_{s_{loser}} - ACAR_{s_{winner}} < 0 (\text{underreaction}) \quad (8)$$

If the results of these portfolios are greater than zero, then it will be an overreaction in the market and vice versa.



## 6. Data empirical analysis and discussions

The above [table 1](#) shows the result of descriptive statistics of the portfolios of ACARs for the whole sample and separately for the loser and winner portfolios. The mean returns, maximum (minimum) returns, the standard deviation (0.4321) is high for the loser ACARs than the standard deviation (0.3116) of the winner ACARs that revealed high risk in loser ACARs. The winner ACARs are positively skewed, while the loser ACARs is negatively skewed. Both winner and loser ACARs kurtosis show more flatness in the distribution and is platykurtic. The observations in the last row show 21 weeks out of 500 with a gap of 22 in each.

H2: There is no overreaction in the pre-crisis period in the stock market.

The investor reaction results based on ACARs on weekly basis are given in the [Table 2](#) which is picked from the whole sample. In the pre-financial crisis period (2004–06), 120 weeks were selected to check the results of the said hypothesis. The results exhibited highly significant overreaction in the week 20 (0.221), week 90 (0.276), and week 100 (0.374). Conclusively, in the normal periods, that is, when there is no good or bad news, then investors don't exhibit overreaction and the winners stay winners and the loser stay losers.

H1: There is an overreaction in the global financial crisis period in the stock market.

The overreaction hypothesis is checked during the global financial crisis period (2007–09) in [table 3](#). The results disclosed that the investors seemed to follow the phenomena of overreaction. The EMH asserts that financial markets are efficient, which do not hold in the case of Pakistan, as it is an emerging economy. This hypothesis is valid in the period of financial crisis, as the investors show excessive optimism to risk-taking in the form of overreaction. The difference in the ACARs of winner and loser portfolios is positive (showed overreaction) in almost all the periods which show that the investors in a developing country such as Pakistan exhibits overreaction to the global financial crisis.

**Table 1. Descriptive statistics for the whole sample and separate for loser and winner portfolios**

	Whole Sample	Winner Portfolios	Loser Portfolios
Mean	0.0241	0.0709	-0.2493
Median	0.0283	0.1427	-0.1434
Maximum	0.148	0.7782	0.4836
Minimum	-0.0230	-0.5699	-1.2586
Standard Deviation	0.098	0.3116	0.4321
Skewness	-0.5073	0.2323	-0.5404
Kurtosis	-0.3861	0.4548	-0.0869
Probability	0.000	0.000	0.000
Sum	1.463	1.490	-5.235
Observations	21	21	21

**Table 2. Investor overreaction's results on weekly basis for the pre-crisis period (2004–06)**

Week	ACAR (W)	ACAR (L)	Losers–Winners	p-Value
10	0.5866	0.2083	-0.3781***	0.000
20	-0.1213	0.1005	0.2219***	0.000
30	0.0960	-0.2865	-0.3825	0.230
40	0.2960	0.0187	-0.2772**	0.002
50	0.2669	-0.0875	-0.3545***	0.000
60	0.1318	0.1051	-0.0267***	0.000
70	0.4598	0.0755	-0.3843	0.110
80	0.0450	-0.0480	-0.0930***	0.000
90	-0.4638	-0.1873	0.2765***	0.013
100	0.1503	-0.1079	0.3744**	0.005
110	0.0042	-0.0639	-0.0677***	0.000
120	0.3144	0.2025	-0.1118*	0.012

Note. \*\*\*, \*\* and \* indicates 1%, 5% and 10% significance level.

**Table 3. Investor overreaction on weekly basis in the global financial crisis period (2007–09)**

Week	ACAR (W)	ACAR (L)	Losers–Winners	p-Value
150	0.4351	0.1604	-0.2746***	0.000
160	-0.213	-0.0285	-0.0241*	0.060
170	0.1330	-0.1083	-0.2413***	0.000
180	0.0513	0.2971	0.2460***	0.000
190	-0.2034	0.1022	0.3057***	0.000
200	-0.0937	0.3259	0.4197**	0.003
210	-0.0485	0.4328	0.4813**	0.004
220	-0.3605	0.0775	0.4379***	0.000
230	0.5072	0.2086	0.7159***	0.000
240	-0.8956	0.2324	1.1280**	0.028
250	-0.0334	0.5643	0.5976***	0.000
260	0.0428	0.2426	0.1997	0.340

Note. \*\*\*, \*\* and \* indicates 1%, 5% and 10% significance level.

H2: There is no overreaction in the post-global financial crisis period in the stock market.

The above hypothesis is also checked in the post-financial crisis period (2010–12) in [table 4](#), the results showed that the investors did not show any significant overreaction except in few periods. Conclusively, the investors' overreaction was only limited to almost two years, since the start of the financial crisis period. Later on, the impact of the bad news diminished in the stock market.

H1: There is an overreaction in the global financial crisis period in the stock market.  $ACAR_{loser} > ACAR_{winner} > 0$

**Table 4. Investor overreaction results on weekly basis for the post-crisis period (2010–12)**

Week	ACAR (W)	ACAR (L)	Losers—Winners	p-Value
290	0.0179	0.1218	0.1039***	0.000
300	-0.2295	-0.0513	-0.0513***	0.004
310	-0.3075	-0.24475	0.0628***	0.004
320	0.0088	-0.2048	-0.2137***	0.000
330	-0.1229	-0.1502	-0.027	0.471
340	-0.2296	-0.1502	0.0794***	0.000
350	-0.0519	-0.1501	-0.0982	0.221
360	-0.0914	-0.0152	0.0761***	0.000
370	0.0540	-0.1405	-0.1945***	0.001
380	0.0632	0.0304	-0.0327***	0.000
390	0.0224	-0.0450	-0.0674***	0.009
400	0.0224	-0.0629	-0.0853***	0.000

Note. \*\*\*, \*\* and \* indicates 1%, 5% and 10% significance level.

The overreaction hypothesis is also checked for the whole period of the study (i.e. 2004–15) and the results are presented in Table 5. The results indicated that the investors appeared to follow the phenomena of overreaction in the crisis period (2007–09). The results of the study assert that the

**Table 5. Weekly loser and winner acars (overreaction) results over the entire period (2004–15) of 70 firms with p-value**

Week (Dates)	ACAR (W)	ACAR (L)	Losers—Winners	p-Value
01 (11-06-2004)	0.2300	-0.3054	-0.5355***	0.000
24 (19-11-2004)	-0.2644	-0.1233	0.1411***	0.000
48 (06-05-2005)	-0.2866	-0.5226	-0.2360***	0.000
72 (21-10-2005)	0.2080	-0.2570	-0.4650***	0.068
96 (24-03-2006)	-0.1466	-0.3228	-0.1762**	0.015
120 (22-09-2006)	-0.0341	-0.2046	-0.1705	0.461
144 (09-03-2007)	-0.2081	0.2045	0.4127**	0.014
168 (24-08-2007)	-0.2718	0.0273	0.2991	0.952
192 (08-02-2008)	-0.3512	0.4087	0.7599***	0.002
216 (25-07-2008)	-0.2968	0.3575	0.6544***	0.000
240 (09-01-2009)	0.0214	0.2573	0.2358*	0.098
264 (26-06-2009)	-0.1024	0.1514	0.2538***	0.000
288 (11-12-2009)	-0.2155	0.2127	0.4282	0.911
312 (28-05-2010)	-0.1107	0.0434	0.1541**	0.040
336 (12-11-2010)	0.0516	0.1031	0.0515**	0.013
360 (29-04-2011)	0.2629	0.1418	-0.1210**	0.017
384 (07-10-2011)	0.3034	0.0624	-0.2410***	0.000
408 (30-03-2012)	0.2602	0.0839	-0.1762***	0.000
432 (14-09-2012)	0.2074	-0.0871	-0.2945***	0.000
456 (01-03-2013)	0.1853	-0.1334	-0.3187**	0.029
480 (16-08-2013)	0.2116	-0.1081	-0.3198	0.402

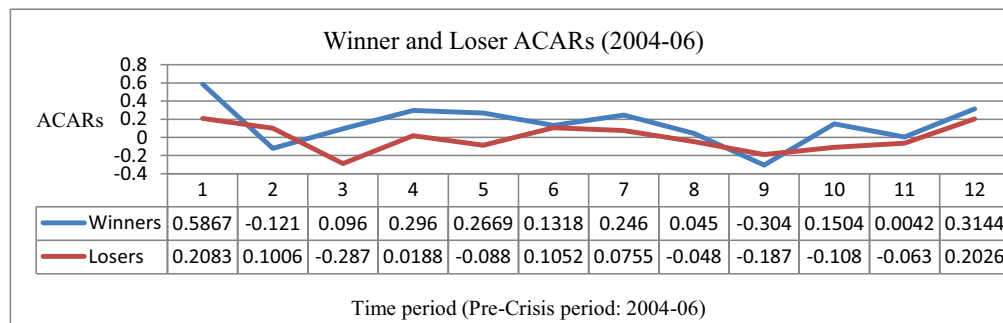
Note. \*\*\*, \*\* and \* indicates 1%, 5%, and 10% significance level.

Pakistani stock market is a weak-form efficient market in which investors get influenced by the outside news. This hypothesis is valid for the whole period of 10 years to confirm the overreaction effect except in the pre-crisis period in which the investors exhibit excessive aversion to risk-taking in the form of under-reaction in the foundation week 01 (-0.5355), 48 (-0.2360), 72 (-0.4650), and 96 (-0.1762) and the post-crisis period which is week 360 (-0.1210), 384 (-0.2410), 408 (-0.1762), 432 (-0.2945), and 456 (-0.3187), which is statistically significant; however, weeks 120, 168, 288, and 480 are found insignificant. On the other hand, the overreaction is found in weeks 24 (0.2411), 144 (0.4127), 192 (0.7599), 216 (0.6544), 264 (0.2538), 312 (0.1541), and 336 (0.515) which are highly significant. In Pakistan’s stock market, the investors suffer from both excessive optimism and representative bias (in which investor overemphasizes on the arrival of news and resulted in overreaction). The results are consistent with the existing literature (see, for instance, Wiggernhorn & Madura, 2005; Sohail & Javid, ; Zhang & Deng, 2010; Karan & Kapusuzoglu, 2010).

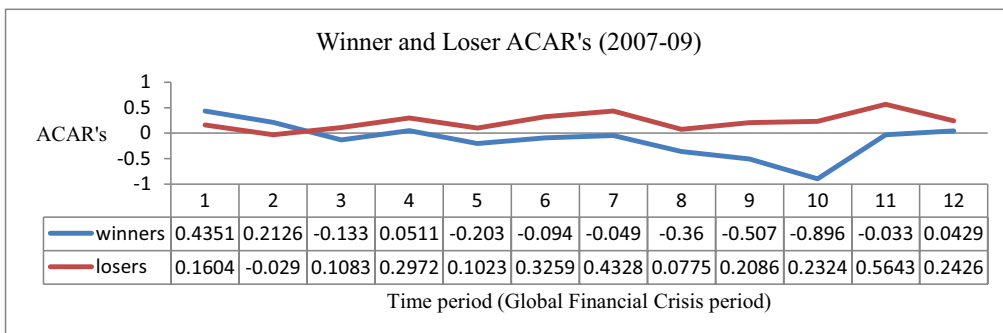
In the **Figure 1**, the Y-axis displays the ACARs, while the X-axis shows the time period (weeks) before the financial crisis period (2004–06). The blue line shows the movement of winner portfolios, while the red line shows the movement of loser portfolios of ACARs. In the pre-financial crisis period, the portfolio of losers ACARs does not perform better than that of the winner portfolios. The loser portfolios ACARs are lower in almost all of the weeks in pre-crisis period.

The **Figure 2** shows the winner and loser portfolios’ performance in the global financial crisis period (2007–09). It is shown that the losers’ portfolio performed better in the whole period than the winner portfolio in the crisis period, which shows overreaction in the global financial crisis period. The figure further indicates that losers become winners and the winners become losers in the crisis period, which ratifies the investor’s contrarian strategies in Pakistan’s stock market.

**Figure 1.** The Portfolio of loser ACARs does not perform better than that of the winner ACARs.<sup>3</sup>



**Figure 2.** The Portfolio of loser ACARs does perform better than that of the winner ACARs.<sup>4</sup>

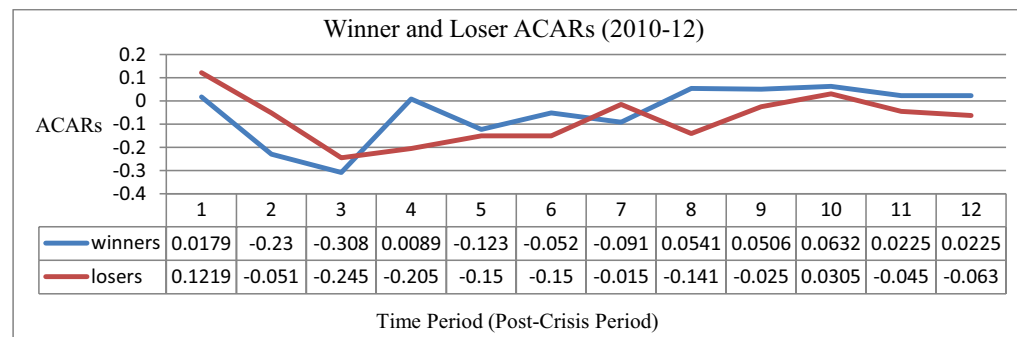


The **Figure 3** exhibits ACARs performance on Y-axis, whereas the periods (weeks) on X-axis. As presented in the graph, the loser portfolio of ACARs is lower in performance at point 04, 05, 06, 08, 09, 11, and 12 than that of the winner’s portfolio. The line graph indicates that losers stay losers and the winners remain winners in the post-crisis period which confirms momentum strategies of investors trading. Moreover, in few circumstances, the loser portfolios’ performance becomes equal to that of the winners’ portfolios. The results confirmed that investors who trade in Pakistan’s stock market do emphasize the news as well as on the external economic situations. So, they act according to the news at the time of trading in security market.

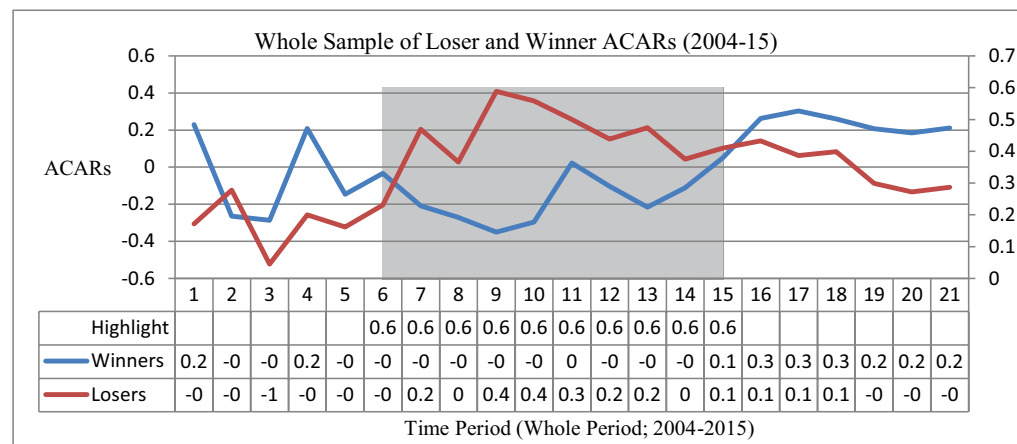
In the **Figure 4**, the highest performance of loser portfolios on weekly basis in the period of financial crisis is at point “9” while the worst performance of winners at point “9” on the X-axis is recorded as well. The magnitude recorded for the Pakistan stock market is less than that of the given studies in the existing literature and puts forward that the overreaction is low to some extent in this emerging stock market. Moreover, the investors’ overreaction exists for a long-run (almost three years) in the global financial crisis period.

As the overreaction hypothesis predicts that the winner portfolios performed poorly in the financial crisis period, while loser portfolios performed well, as the shaded area exhibits the investor behavior in the financial crisis period in a more transparent way. The results indicated that selling the winners and buying the losers trading strategy earned excess ACARs. Overall, the study concludes that the loser portfolios earned positive ACARs in the stock market which suggests

**Figure 3.** The Portfolio of loser ACARs does not perform better than that of the winner ACARs.<sup>5</sup>



**Figure 4.** The Portfolio of loser ACARs does perform better than that of the winner ACARs in the crisis period.<sup>6</sup>



that implementing contrarian strategies by buying losers' shares and selling winners' shares is likely to be a profitable strategy in the crisis period.

## 7. Robustness check of the study through unit-root tests

### 7.1. The above table confirms the stock prices of 70 firms (listed in PSX) that follow random walk

Table 6 shows the result of the Econometric ADF unit root test which is applied on the 2500 daily average stock prices to check random walk in 70 firms listed in PSX. The result revealed that the daily stock prices of the 70seventy firms are non-stationary at a level in which the value of the "tau" statistic is less than the critical values at 1% and 5% levels but exhibit stationarity at the first difference where the 'tau' statistic value is greater than the critical values.

The Table 7 exhibits the result of the Phillips-Perron unit root test which is applied on the 2500 daily average stock prices to check the random walk in the 70 firms listed PSX. The result indicated that the average stock prices are non-stationary at level but become stationary at first difference.

### 7.2. The above table confirms the stock prices of 70 firms (listed in PSX) that follow random walk

The above Table 8 shows KPSS test statistic that isare used after ADF and PP test to provide scrupulous and factual results. Henceforth, the results of these three different time series unit root tests exhibit that the Pakistan stock market follows random walk and proves that PSX is a weak form of an efficient market. The result of the study is consistent with the finding of the existing studies (see, for instance, Karan & Kapusuzoglu, 2010; & Mehmood et al., 2012).

## 8. Conclusion

The results revealed that stock returns demonstrate patterns and show consistency with investors' overreaction in Pakistan's stock market, particularly in the case of the global financial crisis period (2007–09). The portfolios of loser ACARs outperformed of the winner ACARs. The loser portfolios showed more positive returns than that of the winner portfolios during the financial crisis period. The outcomes are consistent with the results of existing literature (see, Wang et al., 2004; Ahmad & Tjan, 2004; Wiggernhorn & Madura, 2005; Sohail & Javid, ; and Soomro et al., 2016).

The study contributed to the existing literature in examining the investor's overreaction based on pre-crisis, within crisis, and post-crisis periods in an emerging market. Generally, the results of the study illustrate strong evidence in support of the presence of overreaction in Pakistan's stock market. The study is carried out in the weak form of the efficient market because in weak form the investors do not receive adequate and accurate information about security prices and market tradings in which fundamental analysis can easily earn abnormal returns through utilizing different stock valuation techniques. As a result, the investors do not retort rationally to the news and investors follow what other experts and proficient class of investors trade in the stock market, which resultantly causes overreaction.

Findings of the study showed that there is a distinct reversal for pre-crisis, amid crisis, and post-crisis periods. It further exposes low degree of any reaction in these different periods that may be attributable to the restrictive behavior of individual investors in the market. It could be inferred from the findings of the study that Pakistan as an emerging economy and has partial linkages to worldwide financial markets, as there is less financial innovation and liberalization. Thus being an emerging market, Pakistan stocks are not prevented from direct impact of financial crisis that

**Table 6. Augmented Dickey-Fuller (ADF) test**

Variable	Level	First Diff.	Mackinnon Critical Values for Rejection of Hypothesis of a Unit Root			Decision	Order of Int.
			1%	5%	10%		
Stock Prices	-1.591	-40.713	-3.961	-2.411	-3.127	Becomes stationary at first difference	I (1)



**Table 7. Phillips-Perron (PP) unit root test**

Variable	Level	First Diff.	Mackinnon Critical Values for Rejection of Hypothesis of a Unit Root			Decision	Order of Integ.
			1%	5%	10%		
Stock Prices	-1.684	-41.845	-3.961	-3.411	-3.127	Becomes stationary at first difference	I (1)

The above table confirms the stock prices of seventy firms (listed in PSX) that follow Random walk.

**Table 8. Kwiatkowski-Phillips-Schmidt-Shin test**

Variable	Level	First Diff.	Mackinnon Critical Values for Rejection of Hypothesis of a Unit Root in data			Decision	Order of Integ.
			1%	5%	10%		
Stock Prices	1.266	0.118	0.216	0.146	0.119	Becomes stationary at first difference	I (1)

**Table A. Sample of the selected firms listed in Pakistan stock exchange<sup>2</sup>**

Symbol	Company Name	Obs.	Symbol	Company Name	Obs.
ATBA	Atlas Battery Limited	2500	NBP	National Bank Pakistan Ltd	2500
CHCC	Cherat Cement Com. Limited	//	ECOP	Eco Pak	//
GHNL	Ghandhara Nissan Limited	//	MEEBL	Meezan Bank Limited	//
ABL	Alleid Bank Limited	//	FABL	Faisal Bank Limited	//
ABOT	Abbot Laboratory Pak Limited	//	GHGL	Ghani Glass Mills Limited	//
ACPL	Attock Cement Pak Limited	//	FCSC	First Capital Security C. Limited	//
INDU	Indus Motor Co. limited	//	FEROZ	Feroz Aziz Co. Limited	//
ADMM	Artistic Denim mills Limited	//	BERG	Berger Paint Industries	//
AGIL	Agritus Automobile and parts	//	ICI	Imperial Chemicals Industries	//

(Continued)

Symbol	Company Name	Obs.	Symbol	Company Name	Obs.
AGTL	AL ghazi tractors Limited	//	HCAR	Honda Atlas Car Pak. Limited	//
PTC	Pak Tele communi. Limited	//	SEPCO	Sukker Electric Power C. Limited	//
FFC	Fauji Fertilizers Co Limited	//	MCB	M. Commercial Bank Limited	//
DAWH	Dawood Hercules Cor. Limited	//	NATF	National Archives Trust Funds	//
KEL	K. Electric Limited	//	DNCC	Dandot Cement Co. Limited	//
ENGRO	Engro Corporation	//	BYCO	Byco Petroleum Co. Limited	//
ANL	Azgard Nine	//	DGKC	DGK Cement	//
APL	Attock	//	EFUG	EFU General Insurance	//
ATLH	Attock Refinery	//	EMCO	EMCO IND	//
ATRL	Bank Al Falah	//	FCCL	Fuaji Cement	//
BAFL	Bal Glass	//	FFBL	Fauji Fert. BinXD	//
BGL	Nishat Mills	//	GADT	Gadoon Textile	//
NML	National Refinery	//	GLAXO	GlaxoSmith	//
NRL	Pak Tobacco	//	GTYR	General Tyre	//
PAKT	P.I.A.C (A)	//	HABSM	Huffaz Pipe	//
PIAA	Bank Of Punjab	//	HSPI	Japan Power	//
BOP	Crescent Textile	//	JPGL	Kot Addu	//
CRTM	Dewan Motors	//	KAPCO	PowerSPOT	//
DFML	Dewan Cement	//	KOHC	Kohat Cement	//
DCL	Millat Tractors	//	LUCK	Lucky Cement	//
MTL			NCL	Nishat Chunain	//
JPL	Johnson and Philips Ltd	//	WSPL	WAVES Singer Pakistan Ltd	//
TCCL	Thatta Cement Company Ltd	//	NRL	Nimir Resins Limited	//
SCIL	Sardar Chemical Industries Ltd	//	JSBL	JSBill Limited	//
MSC	Metropolitan Steel Corporation	//	MISIL	Mughal Iron and Steels Ltd	//
ASC	Al-Shaheer Corporation	//	QFIL	Quice Food Industries Ltd	//

spillover worldwide. Conclusively, Pakistan is not well insulated against the contagion impact in the international financial market.

### 9. Future recommendations

Future studies may focus on different sectors of the economy to find out investors' responses whether they show overreaction or under-reaction. Secondly, research is needed to take other different micro- and macro-variables in the stock market that affect investor trading. Thirdly, a similar study may be carried out in different economies to compare the intensity, direction, and magnitude of the investor reaction. Fourthly, other countries' spillover impact can be checked in this stock market w.r.t to the U.S. Lastly, there is a need to investigate the impact of different

brain sections (include the amygdala, hippocampus, thalamus, hypothalamus, basal ganglia, and cingulate gyrus) roles and functions on the investment decisions.

#### Funding

The authors received no direct funding for this research.

#### Author details

Bahrawar Said<sup>1</sup>  
E-mail: [bahrawar.szabist@gmail.com](mailto:bahrawar.szabist@gmail.com)  
Shafiq Ur Rehman<sup>1</sup>  
Rizwan Ullah<sup>1</sup>  
E-mail: [rizwanullah33@yahoo.com](mailto:rizwanullah33@yahoo.com)  
Javed Khan<sup>1</sup>

<sup>1</sup> Department of Commerce and Management Sciences,  
University of Malakand, Malakand, Pakistan.

#### Cover Image

Source: Author.

#### Citation information

Cite this article as: Investor overreaction and global financial crisis: A case of Pakistan stock exchange, Bahrawar Said, Shafiq Ur Rehman, Rizwan Ullah & Javed Khan, *Cogent Economics & Finance* (2021), 9: 1966195.

#### Notes

1. ACARs are Average Cumulative Abnormal Returns mentioned in the concerned study which have been properly carried out in methodology section of the paper. For further explanation, the researcher first collected closing prices of firm securities listed on Pakistan Stock Exchange and the Actual Returns were calculated for those stocks. Later on the Abnormal Returns (ARs) and the Cumulative Abnormal Returns (CARs) were calculated. At the end, average was found out for the Cumulative Abnormal Returns.
2. Table A is the table with alphabet name and it shows the selected companies detail.
3. In the line-graph in Figure 1 first row 1, 2, 3, . . . . 11, and 12 are the weeks picked up from the concerned period which exist in the pre-crisis period (2004–06).
4. In the line-graph in Figure 2 first row 1, 2, 3, . . . . 11, and 12 are the weeks picked up from the concerned period which exist in the global financial crisis period (2007–09).
5. In the line graph in Figure 3 first row 1, 2, 3, . . . . 11, and 12 are the weeks picked from the concerned period which exist in the post-global financial crisis period (2010–12).
6. In the line graph in Figure 4 in first row 1, 2, 3, 4, . . . . 20, and 21 are the weeks picked from the concerned period which exist in the whole time period of the study (2004–15).

#### References

- Ahmad, Z., & Tjan, S. (2004). Short-run overreaction, stock prices and investors' irrationality in the Kuala Lumpur stock exchange. *International Journal of Management Studies*, 11(2), 1–19. <http://ejournal.uum.edu.my/index.php/ijms/article/view/9172>
- Ali, R., Ahmad, Z., & Anusakumar, S. V. (2011). STOCK MARKET OVERREACTION AND TRADING VOLUME: EVIDENCE FROM MALAYSIA. *Asian Academy of Management Journal of Accounting & Finance*, 7(2), 103–119. <http://web.usm.my/journal/aamjaf/7-2-4-2011.html>
- Alrabadi, D. W. H. (2012). Short-term stock price reaction to shocks: Evidence from Amman stock exchange. *Interdisciplinary Journal of Contemporary Research in Business*, 4(1), 770–780. <https://journal-archives18.webs.com/770-780.pdf>
- Bachelier, L. (1900). *Théorie de la Spéculation*. Gauthier-Villars. [http://www.numdam.org/item?id=ASENS\\_1900\\_3\\_17\\_21\\_0](http://www.numdam.org/item?id=ASENS_1900_3_17_21_0)
- Ball, R., Kothari, S. P., & Shanken, J. (1995). Problems in measuring portfolio performance An application to contrarian investment strategies. *Journal of Financial Economics*, 38(1), 79–107. [https://doi.org/10.1016/0304-405X\(94\)00806-C](https://doi.org/10.1016/0304-405X(94)00806-C)
- Ball, R., Kothari, S. P., & Shanken, J. (1995). Problems in measuring portfolio performance An application to contrarian investment strategies. *Journal of Financial Economics*, 38(1), 79–107. [https://doi.org/10.1016/0304-405X\(94\)00806-C](https://doi.org/10.1016/0304-405X(94)00806-C)
- Barber, B. M., & Odean, T. (2000). Trading is hazardous to your wealth: The common stock investment performance of individual investors. *The Journal of Finance*, 55(2), 773–806. <https://doi.org/10.1111/0022-1082.00226>
- Bhatta, N. T., & Shah, S. Z. A. (2014). Investors reaction to the implementation of corporate governance mechanisms. *Open Journal of Accounting*, 3(1), 1–8. <https://doi.org/10.4236/ojacct.2014.31002>
- Bowman, R. G., & Iverson, D. (1998). Short-run overreaction in the New Zealand stock market. *Pacific-Basin Finance Journal*, 6(5), 475–491. [https://doi.org/10.1016/S0927-538X\(98\)00021-3](https://doi.org/10.1016/S0927-538X(98)00021-3)
- Brown, K. C., & Harlow, W. V. (1988). Market overreaction: Magnitude and intensity. *Journal of Portfolio Management*, 14(2), 6–13. <https://doi.org/10.3905/jpm.1988.409137>
- Chang, C. H., Cheng, H. I., Huang, I. H., & Huang, H. H. (2011). Lead-lag relationship, volatility asymmetry and overreaction phenomenon. *Managerial Finance*, 37(1), 47–71. <https://doi.org/10.1108/03074351111092148>
- DeBondt, W. F., & Thaler, R. (1985). Does the stock market overreact? *The Journal of Finance*, 40(3), 793–805. <https://doi.org/10.1111/j.1540-6261.1985.tb05004.x>
- Fama, E. F. (1970). Efficient capital markets: A review of theory and empirical work. *The Journal of Finance*, 25(2), 383–417. <https://doi.org/10.2307/2325486>
- Hong, H., & Stein, J. C. (1999). A unified theory of underreaction, momentum trading and overreaction in asset markets. *The Journal of Finance*, 54(6), 2143–2184. <https://doi.org/10.1111/0022-1082.00184>
- Howe, J. S. (1986). Evidence on stock market overreaction. *Financial Analysts Journal*, 42(4), 74–77. <https://doi.org/10.2469/faj.v42.n4.74>
- Irshad, H., & Sarwar, G. (2013). Is Karachi stock market weak form efficient? *Journal of Commerce*, 5(1), 1–7.
- Jegadeesh, N., & Titman, S. (1993). Returns to buying winners and selling losers: Implications for stock market efficiency. *The Journal of Finance*, 48(1), 65–91. <https://doi.org/10.1111/j.1540-6261.1993.tb04702.x>
- Karan, M. B., & Kapusuzoglu, A. (2010). An Analysis of the random walk and overreaction hypotheses through optimum portfolios constructed by the nonlinear programming model. *Australian Journal of Basic and Applied Sciences*, 4(6), 1215–1220. <http://globalimpactfactor.com/australian-journal-of-basic-and-applied-sciences>

- Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement*, 30(3), 607–610. <https://doi.org/10.1177/001316447003000308>
- Lee, W. Y., Jiang, C. X., & Indro, D. C. (2002). Stock market volatility, excess returns, and the role of investor sentiment. *Journal of Banking and Finance*, 26(12), 2277–2299. [https://doi.org/10.1016/S0378-4266\(01\)00202-3](https://doi.org/10.1016/S0378-4266(01)00202-3)
- Malkiel, B. G. (2003). The efficient market hypothesis and its critics. *Journal of economic perspectives*, 17(1), 59–82. doi:10.1257/089533003321164958
- Mehmood, M. S., Mehmood, A., & Mujtaba, B. G. (2012). Stock market prices follow the random walks: Evidence from the efficiency of Karachi stock exchange. *European Journal of Economics, Finance and Administrative Sciences*, 51(1), 71–80. <http://www.eurojournals.com/EJEFAS.htm>
- Otchere, I., & Chan, J. (2010). Short-Term overreaction in the Hong Kong stock market: Can a contrarian trading strategy beat the market? *Journal of Behavioral Finance*, 4(3), 157–171. [https://doi.org/10.1207/S15427579JPFM0403\\_5](https://doi.org/10.1207/S15427579JPFM0403_5)
- Pompian, M. (2011). Behavioural finance and wealth management: How to build optimal portfolios that account for investor biases. *Financial Markets and Portfolio Management*, 21(4), 491–492. <http://dx.doi.org/10.5539/ijbm.v7n4p44>
- Poterba, J. M., & Summers, L. H. (1988). Mean reversion in stock prices: Evidence and implications. *Journal of financial economics*, 22(1), 27–59. [https://doi.org/10.1016/0304-405X\(88\)90021-9](https://doi.org/10.1016/0304-405X(88)90021-9)
- Smith, G. (2016). Overreaction of Dow stocks. *Cogent Economics & Finance*, 4(1), 1251831. <https://doi.org/10.1080/23322039.2016.1251831>
- Sohail, A., & Javid, A. Y. The global financial crisis and investors' behavior; Evidence from karachi stock exchange. (No. 2014: 106) Pakistan Institute of Development Economics. <https://pide.org.pk/pdf/Working%20Paper/WorkingPaper-106.pdf>
- Soomro, R. H., Ahmed, S. F., & Hussain, A. (2016). Contrarian strategy after testing overreaction hypothesis in cement sector companies listed in Karachi stock exchange. *Journal of Advanced Management Science*, 4(3), 250–254. <https://doi.org/10.12720/joams.4.3.250-254>
- Vardar, G., & Okan, B. (2008). Short term overreaction effect: Evidence on the Turkish stock market. *Emerging Economic Issues in a Globalizing World*, 9(7), 155–165. <https://EconPapers.repec.org/RePEc:izm:prcdng:200809>
- Wang, J., Burton, B. M., & Power, D. M. (2004). Analysis of the overreaction effect in the chinese stock market. *Applied Economics Letters*, 11(7), 437–442. <https://doi.org/10.1080/1350485042000248978>
- Wiggenhorn, J., & Madura, J. (2005). Impact of liquidity and information on the mispricing of newly public firms. *Journal of Economics and Finance*, 29(2), 203–220. <https://doi.org/10.1007/BF02761554>
- Yang, X., & Luo, Y. (2014). Rumor clarification and stock returns: Do bull markets behave differently from bear markets? *Emerging Markets Finance and Trade*, 50(1), 197–209. <https://doi.org/10.2753/REE1540-496X500111>
- Zhang, M., & Deng, Y. (2010). Is the mean return of hotel real estate stocks apt to overreact to past performance? *The Journal of Real Estate Finance and Economics*, 40(4), 497–543. <https://doi.org/10.1007/s11146-009-9223-x>



© 2021 The Author(s). This open access article is distributed under a Creative Commons Attribution (CC-BY) 4.0 license.

You are free to:

Share — copy and redistribute the material in any medium or format.

Adapt — remix, transform, and build upon the material for any purpose, even commercially.

The licensor cannot revoke these freedoms as long as you follow the license terms.

Under the following terms:

Attribution — You must give appropriate credit, provide a link to the license, and indicate if changes were made.

You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use.

No additional restrictions

You may not apply legal terms or technological measures that legally restrict others from doing anything the license permits.



***Cogent Economics & Finance* (ISSN: 2332-2039) is published by Cogent OA, part of Taylor & Francis Group.**

**Publishing with Cogent OA ensures:**

- Immediate, universal access to your article on publication
- High visibility and discoverability via the Cogent OA website as well as Taylor & Francis Online
- Download and citation statistics for your article
- Rapid online publication
- Input from, and dialog with, expert editors and editorial boards
- Retention of full copyright of your article
- Guaranteed legacy preservation of your article
- Discounts and waivers for authors in developing regions

**Submit your manuscript to a Cogent OA journal at [www.CogentOA.com](http://www.CogentOA.com)**

