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Stock overreaction to extreme market events

Pedro Piccoli [a,*], Mo Chaudhury [b], Alceu Souza [a], Wesley Vieira da Silva [a]

[a] Pontifical Catholic University of Parana, 1155, Imaculada Conceição St, Curitiba, PR, Brazil
[b] Desautels Faculty of Management, McGill University, 1001 Sherbrooke St W, Montreal, QC H3A 1G5, Canada

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ABSTRACT

The paper investigates the behavior of individual US stocks during the 21 trading days following the event of extreme movement in the market index on a day. We find that stocks tend to overreact after both positive and negative events, but in a more pronounced way in the latter case. This behavior is more intense when the market exhibits clustered extreme swings, indicating that the overreaction and market volatility are related. We also identify that the overreaction is driven by the performance of loser stocks that revert more strongly, even as they exhibit a lower market beta than winners.

1. Introduction

Stock market movements on some days can be considered unusually high compared to their fluctuations on most other days. If such extreme daily market movements represent an efficient/rational response to major value relevant information and events, trading the individual winning and losing stocks on such days should not offer profits in the days following. Alternatively, the extreme market movements may not be efficient in the sense that the immediate response is an overreaction meaning more than due adjustment in prices. If prices in the days following revert to the proper level, a contrarian strategy may generate abnormal trading profit. On the other hand, despite a large move, the immediate response may still represent an underreaction or the later adjustments may be delayed overreactions. In this case, a momentum style strategy may generate abnormal trading profit.

Despite an ever-growing literature on market efficiency/rationality and contrarian *versus* momentum strategies, there is a lack of empirical evidence in this regard in the context of extreme daily market movements. The common method in the literature (see Amini, Gebka, Hudson, & Keasey, 2013) is to investigate such behavior by observing the reaction of a particular security after experiencing a positive/negative shock, such as 5% or 10%. There are some drawbacks to this design. First, the one-size-fits-all threshold (e.g. 5% or 10%) biases the sample towards illiquid stocks since such major shocks are more easily found in less liquid securities (Cox & Peterson, 1994; Liang & Mullineaux, 1994). Second, according to the psychology

* Corresponding author.
E-mail addresses: pedro.guilherme@pucpr.br (P. Piccoli), mo.chaudhury@mcgill.ca (M. Chaudhury), alceu.souza@pucpr.br (A. Souza), welsey.silva@pucpr.br (W.V. da Silva).

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literature, the sentiment of surprise to an outcome is not only attributed to the magnitude of the event, but also to the way it contrasts with common expectations (Teigen & Keren, 2003). Therefore, a given movement such as 5% would be more surprising during a calm period than during a financial turmoil, for example. On the other hand, a less pronounced price move (such as 2%) in a placid market could be seen as surprising, leading to overreaction. This last type of event is completely lost in the common research design. Third, the stock specific focus, by definition, introduces idiosyncratic issues (size, earnings, book to market ratios, analyst coverage, uninformed events) that can bias the result toward over/underreaction.

Our research design aims to avoid these handicaps in two ways. First, by focusing on market-level events, comparing loser and winner portfolios during the following days, microstructure effects, such as bid-ask bounce (Cox & Peterson, 1994; Liang & Mullineaux, 1994) and event-coverage (Savor, 2012; Baule & Christian, 2014; Choi & Hui, 2014), have negligible effects in our results. Second, by employing a moving-window Value-at-Risk approach to define an extreme event, we take into account the contrast dimension of a surprising event, as recommended by the psychology literature.

Our results show that the US market overreacts for both positive and negative events, but more intensely in the latter case where the contrarian strategy reaches a statistically and economically significant abnormal return of 4.17% (50.04% annualized) by the end of the post-event window. We study subsamples such as the non-overlapping and overlapping events, and overlapping events of the same or opposite signals (signs) of extreme market movements, since the clustering of events can influence investor's behavior. We find an economically and statistically significant overreaction in all cases, even when the overlapping events are of the same sign what is quite puzzling since the portfolio should exhibit momentum once the subsequent event reinforces the earlier one.

The overreaction is of course stronger when the overlapping events are of opposite signals, with the contrarian strategy earning a Carhart 4 factor daily alpha of 0.19% (47.88% annualized) over the post-event window, and thus implying the possibility of volatility and overreaction being related. Indeed, the cumulative return of the contrarian strategy over the post-event window is 7.42% (1.99%), or 89.04% (23.88%) annualized, for the subsample of events with the highest (lowest) 30 percent instances of high market volatility.

We also investigate if the contrarian profits are driven by the reversal of the winner or the loser portfolios, and find that the return reversal is generally more consistent and stronger for the losers than for the winners. Such a result is quite unexpected for the non-overlapping events as well as for the overlapping events with the same signal since for both the loser stocks exhibit a lower market beta than the winners.

Overall, our results provide consistent and strong support for the overreaction hypothesis (De Bondt & Thaler, 1985; Shiller, 1981). Our finding of stock overreaction being very strong in the backdrop of high market volatility also lends support to the momentum strategy crashes in turbulent periods (Daniel & Moskowitz., 2013; Barroso and Santa-Clara, 2015). However, the overreaction of stocks cannot be explained by their systematic risk. Information based hypotheses such as the Uncertain Information Hypothesis (Brown, Harlow, & Tinic, 1988) or the Information Hypothesis (Baule & Tallay, 2014; Chan, 2003; Kang, Palmon, & Yezegel, 2015; Savor, 2012) are not supported either by our results. A more appealing explanation is the behavioral bias (Griffin & Tversky, 1992) that investors exhibit overconfidence in events that are sizable/grave in magnitude but low in frequency, and hence they overreact.

The remaining of this paper is organized as follows. Starting with a brief review of studies dealing with large stock price movements in Section 2, data and methodology are described in Section 3. The empirical results are presented in Section 4 and summary and concluding remarks follow in Section 5.

2. Literature review

The focus in this paper is on the short-term reaction of individual stocks to extreme movements in the broader market. To place the empirical evidence of this paper in perspective, it is nonetheless worthwhile to briefly review the prior findings where events are defined in terms of large movements in individual stock prices.[1]

Brown et al. (1988) found positive abnormal returns in the 60 days following an individual stock price change greater than 2.5% in magnitude, for both positive and negative shocks. They advocate that this supports the Efficient Market Hypothesis (EMH) since the positive abnormal returns simply reflect the increase in risk following the event. The authors name this framework as the Uncertain Information Hypothesis (UIH). It is to be noted that the abnormal returns should not persist after controlling for risk if the UIH holds. Also, according to the UIH, the post-event abnormal returns should be positive for both positive and negative initial events. In comparison, under momentum or return continuation, positive (negative) returns follow positive (negative) events, and under overreaction or return reversal, negative (positive) returns follow positive (negative) events.

Corrado and Jordan (1997) argue that the 2.5% event threshold of Brown et al. (1988) is too low, thus generating too many events. For example, assuming a Normal distribution, this threshold means that one event is expected to occur every ten days. Accordingly, Corrado and Jordan (1997) employed a much larger event filter of 10% price change and found that, consistent with the Overreaction Hypothesis (OH) of De Bondt and Thaler (1985), the negative (positive) events are followed by positive (negative) abnormal returns (AR). Similarly, Bremer and Sweeney (1991) reported a significant price reversal (above average returns), for the individual stocks of Fortune 500, in the days after a stock experiences a large price decline such as

[1] See Amini et al. (2013) for a review of the literature.