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Price reversals and price continuations following large price movements☆

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ABSTRACT

We concurrently examine price reversals and price continuations that follow extreme one-day price changes in the period 1986–2015. Consistent with the overreaction and underreaction hypotheses, we find that investors overreact to non-information-based price movements and underreact to public announcements containing firm-specific information. We also find that, consistent with the liquidity hypothesis, smaller firms and firms with lower institutional ownership are more likely to experience price reversals relative to price continuations. The magnitudes of reversals and continuations are also greater for smaller firms and firms with lower institutional ownership. Liquidity improvement following the post-decimalization period led to the reduction in the magnitudes of both, price reversals and continuations. These findings have implications for future debate about underlying reasons of observed price movements and the impact of decimalization on financial markets.

1. Introduction

The dynamics of security prices following large price movements have received significant attention in prior literature. The impetus for this line of inquiry has been the short-run predictability of stock return patterns following large price increases or decreases. The literature has offered several explanations for the observed pricing patterns following large price movements, including the liquidity, overreaction, and underreaction hypotheses.[2] A liquidity-provision-based explanation frames reversals and continuations in terms of compensation to liquidity providers for absorbing buy/sell order imbalances (Cheng, Hameed, Subrahmanyam, & Titman, 2017; Harris & Gurel, 1986; So & Wang, 2014).[3] The overreaction hypothesis posits that investors overweigh current information, causing excessive trading and initial price shocks that lead to price reversals (Daniel, Hirshleifer, & Subrahmanyam, 1998; De Bondt & Thaler, 1985; De Bondt & Thaler, 1987; Park, 1995; Tetlock, 2011). On the other hand, the underreaction explanation suggests that investors are slow to respond to relevant information, which leads to price continuations (Benou, 2003; Chan, 2003; Jegadeesh & Titman, 2001; Pritamani & Singal, 2001; Savor, 2012; Zhang, 2006).

In this paper, we concurrently explore the effects of the liquidity, under-, and overreaction hypotheses on both price reversals and continuations following large, one-day market-adjusted returns, both positive and negative, over the period from 1986 to 2015. To distinguish these hypotheses, we investigate how price reversals and continuations are associated with prior stock returns, excess trading volumes, liquidity variables, and firm-specific information. We first examine the likelihood of price reversals and continuations following large positive and negative price changes. The results, based on multivariate logistic regression, demonstrate significant support for the liquidity and under-(over-)reaction hypotheses. Consistent with the liquidity hypothesis, we

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[2] Amini, Gebka, Hudson, and Keasey (2013) provide a thorough review of related studies and discuss additional explanations, including risk aversion effects (Brown, Harlow, & Tinic, 1988), market liquidity effects (Grossman & Miller, 1988; Jegadeesh and Titman, 1995b), market microstructure effects (Cox & Peterson, 1994; Park, 1995) and non-synchronous trading effects (Lo & MacKinlay, 1990).

[3] Following Kaniel, Saar, and Titman (2008) and Hendershott, Jones, and Menkveld (2011) we use "liquidity providers" to refer to the broad category of investors, including designated market makers, institutions acting as quasi-market makers, other algorithmic traders, and even individual investors.

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find that reversals are more likely to occur among less liquid stocks with smaller market capitalization and lower institutional ownership. Consistent with the overreaction hypothesis, firms with larger price shocks on the event day are more likely to experience price reversals. Moreover, we observe that smaller cumulative abnormal returns and higher trading volumes prior to the event day are positively associated with the probability of price reversals following a one-day price shock. Consistent with the underreaction explanation, we show that return continuations are more likely to occur following earnings announcements. The results provide further support for findings from previous studies that show that firm-specific information has a significant effect on price continuations (Pritamani & Singal, 2001; Savor, 2012). Overall, our results indicate that markets underreact to news about firms' fundamentals and overreact to non-information-based price movements.

We next examine the factors that determine the magnitudes of price reversals and continuations subsequent to large price shocks. Our analysis reveals both similarities and differences in stock characteristics that affect the magnitudes of price reversals and continuations, confirming the liquidity and under-(over-)reaction hypotheses. First, our results confirm that stock liquidity is a significant determinant of price reversal and continuation magnitudes (Cheng et al., 2017). Specifically, we find that smaller firms and firms with lower institutional ownership experience greater reversals and continuations following large price shocks. Second, consistent with Daniel et al.'s (1998) argument that initial price changes reflect trading on private information and are positively associated with the level of overreaction, we find that the magnitude of price reversals is particularly strong for firms with large price shocks and firms with large cumulative returns prior to the event day. In sharp contrast, the magnitude of price continuations is relatively smaller when the initial price change is more extreme. Furthermore, stocks with greater abnormal trading volumes experience greater (lower) reversals (continuations). These findings also support the explanation of price reversals based on temporary liquidity pressure, as suggested by Grossman and Miller (1988) and Jegadeesh and Titman (1995). Our results suggest that volume increases could indicate price pressure that leads to subsequent price reversals (Campbell, Grossman, & Wang, 1993; Conrad, Hameed, & Niden, 1994; Pritamani & Singal, 2001). Finally, our findings are consistent across different price reversal and continuation horizons, including one, three, and ten days following large one-day price shocks.

Finally, we examine the effect of market microstructure changes on the magnitude of price reversals and continuations subsequent to major price shocks. Decimalization implemented in 2001 has led to decreased bid-ask spreads (Bessembinder, 2003).[4] Chordia, Sarkar, and Subrahmanyam (2005) document that market efficiency, quality, and liquidity have improved since decimalization (Blau & Griffith, 2016; Chakravarty, Harris, & Wood, 2001; Chakravarty, Wood, & Van Ness, 2004; Chordia, Roll, & Subrahmanyam, 2008).[5] Following Fang, Tian, and Tice (2014), we use decimalization as a measure of exogenous shock in market liquidity. Our findings suggest that decimalization leads to improved market efficiency in terms of decreased magnitudes of reversals and continuations.

Our study contributes to the literature in two respects. First, we extend prior literature with a concurrent examination of both price reversals and continuations following large negative and positive price shocks. Our study provides additional insights for the liquidity, overreaction, and underreaction explanations for price reversals and continuations following large one-day price changes. We confirm that investors underreact to public information and overreact both to private information which produces the initial price change (Daniel et al., 1998) and to pure, non-information-based, price movements (Hong & Stein, 1999). We find that reversals are less likely given public information and that the magnitudes of the reversals are greater for less liquid stocks and for stocks with larger initial price changes and abnormal trading volumes. In contrast, price continuations are more likely to occur in the presence of public information, suggesting that investors underreact to firm-specific public information. Second, we add to the literature that studies the effects of decimalization on market liquidity (Bessembinder, 2003; Chakravarty et al., 2004; Chakravarty, Van Ness, & Van Ness, 2005; Furfine, 2003). We find a significant decrease in returns associated with price reversals and continuations post decimalization, i.e., greater liquidity post-decimalization corresponds to reduced returns for the liquidity provision following large price shocks. This result is consistent with the observation that the number as well as the magnitude of extreme, one-day price changes declined significantly in the post-decimalization period relative to the pre-decimalization period, as improved market efficiency and trading costs reduced earning potential from the liquidity provision (Bessembinder, 2003).

2. Data

We use daily returns on stocks from January 1986 through December 2015 to identify firms with large one-day negative ($\leq -10\%$) and positive ($\geq 10\%$) market-adjusted returns in excess of the S&P 500 return.[6] Stock returns, share prices, and trading volumes are obtained from the Center for Research in Security Prices (CRSP) for all stocks traded on the New York Stock Exchange (NYSE), the American Stock Exchange (AMEX), and NASDAQ. Firms in the sample are screened according to two criteria. First, we include only common stocks with a price of at least $10 per share prior to the large one-day change, in order to reduce the incidence of price reversals caused by bid-ask price bound. Second, we eliminate observations where the closing prices reported on the day of the large return are based on the average of the closing bid and ask quotes rather than actual transaction prices.[7] We obtain the quarterly institutional holdings data from the Thomson Reuters Institutional (13F) Holdings Database for all common stocks in our sample. The institutional ownership for each stock is defined as the number of shares held by institutional investors divided by the stock's total number of shares outstanding.

We examine daily stock returns and trading volumes separately from 1986 through 2000, when fractional stock prices were used in U. S. stock markets, and from 2001 through 2015, when U.S. markets began reporting stock prices in decimals. Before decimalization, stock prices were reported in either eighths or sixteenths and the minimum price change, i.e., tick size for most stocks, was one-eighth of a dollar ($0.125) or one sixteenth of a dollar ($0.0625). Stock prices since decimalization have been reported in decimals and the minimum price change has been a penny. The NYSE and AMEX replaced the system of fractional pricing in January 2001, and NASDAQ changed it in April 2001. In our data, an observation falls into the post-decimalization period if it occurs after January 29, 2001 for NYSE or AMEX stocks and after April 9, 2001 for NASDAQ stocks. To eliminate time-series dependence, we use a maximum of one randomly selected observation per firm in each time period, i.e., one in the pre-decimalization period and

[4] In addition to bid-ask spreads, Chakravarty et al. (2004) also find that number of trades and trading volumes decreased due to decimalization. For additional literature on decimalization see Harris (1994); Chakravarty, Van Ness, and Van Ness (2005); Furfine (2003).

[5] Trading volumes have also increased, in part as a result of decreased trading costs (Bessembinder, 2003; Chakravarty, Panchapagesan, & Wood, 2005). For example, on the New York Stock Exchange, the value-weighted average monthly share turnover has increased from about 5% in 1993 to approximately 26% in 2008 (Chordia et al., 2011).

[6] A detailed procedure for defining market-adjusted returns is presented in the next section.

[7] CRSP occasionally reports stock returns based on the average of the closing bid and ask quotes rather than actual transaction prices (Bremer & Sweeney, 1991; Cox & Peterson, 1994).