Quantitative Finance and Economics

QFE, 1(2): 186-204
DOI: 10.3934/QFE.2017.2.186
Received date: 11 April 2017
Accepted date: 21 June 2017
Published date: 14 July 2017

http://www.aimspress.com/journal/QFE

Research article

Absolute Stock Returns and Trading Volumes: Psychological Insights

Andrey Kudryavtsev *

Economics and Management Department, The Max Stern Yezreel Valley College, P.O. Emek Yezreel, 19300, Israel

*** Correspondence:** Email: andreyk@yvc.ac.il; Tel: 972-54-564-5735.

Abstract: The present study explores the effect of anchoring on stock trading volumes. I hypothesize that if on the days when the market index rises (falls), a given stock's return is higher (lower) than the market return, potentially perceived as a psychological "anchor", then investors may treat that as a salient event and subsequently increase their trading activity in the stock. Employing a large sample of daily price and trading volume data, I find support for this hypothesis, documenting that average abnormal daily stock trading volumes are significantly higher on the days when absolute daily stock returns are higher than the contemporaneous absolute market returns. This effect is found to be stronger on the days of negative stock and market returns, suggesting that on these days, investors are probably more inclined to treat the market returns as anchors when making their trading decisions. The effect remains significant after controlling for other potentially influential factors, including contemporaneous and lagged actual and absolute stock and market returns, historical stock returns and volatilities, and company-specific events, like earnings announcements and dividend payments.

Keywords: anchoring; investment decisions; stock and market returns; trading volumes

1. Introduction

Trading is the essence of any market, including all the types of financial markets. Therefore, along with security prices, trading volumes represent one of the pivots of any kind of financial analysis.

A lot of effort has been invested by outstanding financial researchers into explaining the nature of trading activity. The previous literature suggests a number of factors that may potentially drive the trading process, including dispersion in investors' expectations and different interpretations of information events (e.g., Beaver, 1968; Karpoff, 1986, 1987; Kim and Verrecchia, 1991; Harris and Raviv, 1993; Kandel and Pearson, 1995), portfolio rebalancing reasons (e.g., DeLong et al., 1990;

Hong and Stein, 1999; Chordia et al., 2007), investors' expectations of the future stock price returns and exposure to the risk (e.g., Llorente et al., 2002; Lo and Wang, 2006), and presence of irrational traders (e.g., Baker and Stein, 2004; Hong and Yu, 2009).

Another conclusion that undoubtedly arises from the previous financial literature is that there exists an inextricable link between security prices and trading volumes. This strand of literature comprises a wide range of studies whose major findings indicate that absolute values of daily price changes and contemporaneous daily trading volumes are positively correlated for both market indices and individual stocks (e.g., Ying, 1966; Westerfield, 1977; Rutledge, 1984; Karpoff, 1987; Schwert, 1989; Gallant et al., 1992), there is also a positive relationship between absolute values of daily price changes and contemporaneous trading volume changes (e.g., Crouch, 1970; Epps and Epps, 1976; Harris, 1986; Pathirawasam, 2010), trading volumes tend to be higher when the stock prices are rising (e.g., Epps, 1975, 1977; Campbell et al., 1993; Saatccioglu and Starks, 1998; Llorente et al., 2002), and positive stock returns lead to higher subsequent trading volumes (e.g., Statman et al., 2006; Griffin et al., 2007; Glaser and Weber, 2008). Trading volume also tends to increase upon arrival of company-specific information, including the one which is incorporated in public disclosures, like earnings announcements (e.g., Varian, 1989; Holthausen and Verrecchia, 1990; Kandel and Pearson, 1995; Bamber et al., 1997, 2011; Barron et al., 2005; Garfinkel and Sokobin, 2006; Hong and Stein, 2007; Israeli, 2015) or dividend announcements and payments (e.g., Lakonishok and Vermaelen, 1986; Bajaj and Vijh, 1995; Xu et al., 2002; Tran and Mai, 2015; Ndjadingwe and Radikoko, 2015).

In the present study, I make an effort to shed light on an additional aspect of the relationship between the stock prices and trading volumes. I join the rapidly developing strand of literature that studies various behavioral factors affecting the trading volumes (e.g., Barber and Odean, 2008; Huddart et al., 2009; Kliger and Kudryavtsev, 2010) and analyze the effect of anchoring on the latter. Anchoring (Tversky and Kahneman, 1974) refers to people's tendency to make estimates with respect to future or uncertain events by considering an initial value and further adjusting it upwards or downwards to yield a final estimate. In many instances, such adjustments may be insufficient, and therefore, the final estimates may be biased in the direction of the initial "anchor" values. In this respect, I suggest that the daily stock market index returns may serve as "anchors" for a considerable number of investors. In the case that this is true, I expect that if on the days when the market index rises (falls), a given stock's return is higher (lower) than the market return, then investors may treat that as a salient event and subsequently increase their trading activity in the stock. In other words, I hypothesize that, all other things being equal, stock trading volumes should be higher on the days when the respective stock's returns are either more positive or more negative than the (respectively, positive or negative) contemporaneous market returns.

Employing the daily price and trading volume data for all the constituents of S&P 500 Index for the years 1990 to 2016, I find supportive evidence for the study's research hypothesis, documenting that average abnormal daily stock trading volumes are significantly higher on the days when absolute daily stock returns are higher than the contemporaneous absolute market returns. The effect appears to be more pronounced in the cases when the stock returns are lower than the contemporaneous negative market returns, possibly indicating that on the days of general market falls, investors are more inclined to treat the market returns as anchors when making their trading decisions. Furthermore, by running multifactor regressions, I document that the effect of anchoring on stock trading volumes persists and remains significant after controlling for other potentially influential

factors, including contemporaneous and lagged actual and absolute stock and market returns, historical stock returns and volatilities, and company-specific events, like earnings announcements and dividend payments.

The rest of the paper is structured as follows. Section 2 reviews the literature dealing with stock trading volumes and the anchoring bias. In Section 3, I formulate and explain the study's research hypothesis. In Section 4, I describe the database employed in this study. Section 5 provides the empirical tests and the results. Section 6 concludes and provides a brief discussion.

2. Literature review

2.1. Stock trading volumes and their connection to stock return

The literature on financial markets has traditionally focused more heavily on explaining asset prices, while trading activity has attracted relatively peripheral attention. Yet trading activity as an intrinsic feature of financial markets is intensive and continuously increasing, and, thus, warrants separate examination.

Previous studies suggest and discuss a number of factors that may explain and drive the trading activity. Beaver (1968) is the first to note that volume is a useful tool in determining how much disagreement exists with the arrival of new information. He argues that anything that causes investors to act can be described as information, whether or not it truly has any fundamental impact on the underlying valuation of the company. Karpoff (1986) demonstrates that trading volume results from dispersion in prior expectations and idiosyncratic interpretations of information events. He also shows that the increase in trading volume is positively correlated with the information “surprise”. According to Karpoff (1987)[1], if a "surprise" is followed by stock price revision in the direction corresponding to the quality of the "surprise", then the contemporaneous trading volume is higher, the greater the absolute value of the price change. Kim and Verrecchia (1991) continuing Karpoff's line of research, define a measure of market's information asymmetry as a ratio of volume to the absolute value of price change. Furthermore, they argue that volume may increase either with the absolute value of stock returns, reflecting the average change in investors’ expectations, or following an increase in information asymmetry. Harris and Raviv (1993) and Kandel and Pearson (1995) suggest that investors share the same public information, but interpret it differently, a scenario which results in trading activity.

Investors may also trade for portfolio rebalancing reasons, the fact that gives rise to liquidity (or noise) trading, which is not based on information. The volume of liquidity trading may be a function of past returns as predicted by a number of theoretical models (e.g., DeLong et al., 1990; Hong and Stein, 1999; Hirshleifer et al., 1994, 2006). Chordia et al. (2007) conclude that liquidity trading is based on stock visibility (proxied by firm size, age, price and the book-to-market ratio), portfolio rebalancing needs, differences of opinion (proxied by forecast dispersion and firm leverage), and uncertainty about fundamental values.

Llorente et al. (2002) propose a model, in which the trading process is driven by investor's

[1] Karpoff (1987) surveys a large amount of empirical studies documenting that the correlation between trading volume and absolute value of stock price change is positive, for example: Westerfield (1977), Wood et al. (1985), Jain and Joh (1986).

expectations of the future stock price returns and exposure to the risk in equilibrium conditions. Lo and Wang (2006) describe an intertemporal equilibrium model of stock trading and pricing with multiple assets and heterogeneous investors. In Baker and Stein (2004), high trading volume indicates the presence of irrational traders who push up prices (their model also involves short sale constraints). In Hong and Yu (2009), high volume indicates the presence of noise traders.

The concept of stock trading volume is closely related to the concepts of stock prices and returns. A well-known market saying states that "It takes volume to make price move" (Kapoff, 1987).

Studies on volume–price relation go back to 1950s. Osborne (1959) shows a theoretical relation between volume and price. The early studies on volume-price relation suggest that there are positive relations between the absolute value of daily price changes and daily volumes for both market indices and individual stocks (e.g., Ying, 1966; Westerfield, 1977; Rutledge, 1984; Karpoff, 1987; Schwert, 1989; Gallant et al., 1992). In addition, Epps (1975, 1977) shows that the ratio of volume to absolute price change is larger for transactions when a security price rises than when it falls, both in the stock and bond markets. Another group of studies document a positive relationship between absolute price changes and contemporaneous volume changes (e.g., Crouch, 1970; Epps and Epps, 1976; Harris, 1986).

More recent studies pay more attention to the lag relation between stock returns and trading volumes (e.g., Chen et al., 2001; Khan and Rizwan, 2001; Lee and Rui, 2002; Pisedtasalasai and Gunasekarage, 2008), and introduce additional relevant factors into their analysis. Saatccioglu and Starks (1998) find that volume leads stock price changes in four out of the six emerging markets. Blume et al. (1989) state that a portion of the losses on S&P stocks in October 1987 was related to the magnitude of the trading volume. Basci et al. (1996) report that stock price levels and trading volumes in Turkish stock market are co-integrated. Gervais et al. (2001) investigate the role of trading activity in terms of the information it contains about future prices, and find that individual stocks whose trading volume is usually large (small) over period of a day or a week, tend to experience large (small) returns over the subsequent month. Ziebart (1990) documents a positive relation between the volume and the absolute change in the mean forecast of analysts. Campbell et al. (1993) and Llorente et al. (2002) analyze the dynamic relation between volume and returns in the cross-section. Safvenblad (2000) finds that Swedish index returns exhibit high autocorrelation when trading volume is low. Griffin et al. (2007) investigate the dynamic relation between market-wide trading activity and returns in 46 markets and report a strong positive relationship between turnover and past returns. Statman et al. (2006) and Glaser and Weber (2009) document similar results.

Pathirawasam (2011) reveals that stock returns are positively related to the contemporary change in trading volume. Further, he finds that past trading volume change is negatively related to stock returns, and argues that investor misspecification about future earnings or illiquidity of low volume stocks can be the reason for this negative relationship. Caginalpa and Desantisa (2011) point out that if the stock price is growing, but the trading volume is declining, then stock price growth is considered by technical analysts as unstable. Remorov (2014) presents a model of stock price and volume behavior during market crashes and finds that trading volume is inversely proportional to the square of the stock price in the case of the sharp price declines, the result being empirically supported by price and volume data for major recent US stock bankruptcies and market crashes.

A vast strand of literature deals with the effects of company-specific events on stock trading volumes. Probably the most widely-discussed fact in this respect is the systematic and significant increase in the trading volumes following earnings announcements. Prior research identifies three

major sources of these abnormally high trading volumes, all stemming from some form of heterogeneity among investors: (i) differences in information (e.g., Varian, 1989; Holthausen and Verrecchia, 1990; Kim and Verrecchia, 1991, 1994, 1997; Barron et al., 2005); (ii) differing risk preferences (e.g., Beaver, 1968; Verrecchia, 1981), and (iii) differences in opinion, that is, differential interpretation of the earnings news (e.g., Harris and Raviv, 1993; Kandel and Pearson, 1995; Bamber et al., 1997, 1999; Garfinkel and Sokobin, 2006; Hong and Stein, 2007; Bamber et al., 2011). Israeli (2015) demonstrates that trading volume reactions to earnings announcements provide information about future returns that cannot be deduced from the price reactions or the magnitudes of earnings surprises.

Another company-specific factor whose influence on stock trading volumes is well-documented is made up of dividend announcements and payments. Lakonishok and Vermaelen (1986) report higher trading volumes before and after ex-dividend days. They also observe higher volume increases for those stocks with higher yields. Xu et al. (2002) conclude that public announcements on dividends are always accompanied by abnormal trading activity due to their pre-announcement disagreement and after-announcement agreement theory. Bajaj and Vijh (1995) also support the information assimilation view by showing that there is a lot of information generated around the announcement period. Therefore, abnormal trading and excess returns are attributed to dividend information. Tran and Mai (2015) document that dividend announcements lead to positive effects on stock prices and trading volumes. Similarly, Ndjadingwe and Radikoko (2015) reveal that there is a direct relationship between dividend announcement, ex-dividends, dividend pay-out ratio and volume of stock traded and the stock price.

In recent years more attention is paid to behavioral factors potentially affecting trading volumes. Barber and Odean (2008) document that investors are net buyers and professional investors are net sellers of stocks when attention to that stock is likely to be high, as indirectly measured by its presence in the news, high trading volume, and extreme returns. Subsequently, Huddart et al. (2009) find that trading volumes are strikingly higher, in both economical and statistical terms, when the current stock price is above (below) the previous fifty-two week high (low), the latter benchmarks being widely-reported in the business press, and conclude that the increase in volume is driven by increased investor attention when a stock exits its trading range. Kliger and Kudryavtsev (2010) document that abnormal trading volumes following analyst recommendation upgrades (downgrades) are significantly higher if the latter are issued on the days when the general stock market index rises (falls). They explain this finding by the availability heuristic (Tversky and Kahneman, 1973)[2], suggesting that stock market index returns of the same sign make the respective recommendation revisions look more salient, or more available from investors' viewpoint.

In the present study, I make an effort to contribute to this strand of literature by testing the effect of anchoring on stock trading volumes.

[2] The availability heuristic refers to the phenomenon of determining the likelihood of an event according to the ease of recalling similar instances. In other words, the availability heuristic may be described as a rule of thumb people use to estimate the probability of an outcome based on how easy that outcome is to imagine.

2.2. Anchoring

Human judgments fall prey to a variety of systematic biases and distortions (for an overview, see, for example, Kahneman, et al. (1982)). Tversky and Kahneman (1974) propose that in assessing the likelihood of uncertain events and predicting or recalling certain values or outcomes, people rely on a number of simplifying rules of decision-making, called heuristics. One of the heuristics they discuss is the process of anchoring (or anchoring bias). They argue that in many situations people make estimates by considering an initial value that they adjust upwards or downwards to yield a final estimate. Such adjustments are often insufficient, leaving judgments biased in the direction of the initial "anchor" value. In what is probably the best-known demonstration of this effect, Tversky and Kahneman (1974) first ask their research participants whether the percentage of African nations in the United Nations (target number) is higher or lower than an arbitrary number (the anchor) which is randomly determined by spinning a wheel of fortune (e.g., 65% or 10%). Participants are then asked to give their best estimate of this percentage. Absolute judgments are assimilated to the provided anchor value so that the mean estimate of participants who received the high anchor was 45%, compared to 25% for participants who received the low anchor.

Anchoring effects have proved to be a truly ubiquitous phenomenon that has been observed in a broad array of different judgmental domains (for review, see, for example, Mussweiler and Strack (1999a), English (2008)). Jacowitz and Kahneman (1995) ask students a number of general knowledge questions (like length of Mississippi or height of Everest), and report that participants who are given high anchors provide higher estimates than those who are given low anchors. Similar results are also obtained by Strack and Mussweiler (1997) and Mussweiler and Strack (1999b). Cervone and Peake (1986) document that people receiving high anchors subsequently estimate their own capabilities higher than those who are given low anchors. Plous (1989) argues that the anchoring bias affects people's probability assessments. Furthermore, Chapman and Johnson (1994) ask people to evaluate a number of lotteries varying in their expected values and ranges, and find that the higher the anchor they are given, the higher the minimal sum for which they would sell the lottery. Ehrbeck and Waldman (1996) concentrate on the existing evidence that professional forecasters in various domains make predictable forecast errors persisting over time, and construct a formal behavioral model implying that making repeated forecasts, the forecasters may be anchored towards their own previous forecasts and the prediction patterns typical of able forecasters. English (2008) asks a group of students to estimate the average price of a German midsize car, after providing them both a standard anchoring and some additional, relevant or irrelevant, information, and finds that the estimates are biased towards the anchor and that relevant knowledge decreases the effect of anchoring. Bowman and Bastedo (2011) analyze the anchoring effects in assessments of institutional reputation, and document that world university rankings published by Times Higher Education Supplement influence peer assessments of reputation in subsequent surveys.

Not only is the anchoring effect influential in a plethora of laboratory and real-world settings, this influence is also remarkably robust. In particular, anchoring is independent of many potentially moderating variables. For one thing, anchoring occurs even if the anchor values are clearly uninformative for the critical estimate, for example because they were randomly selected (e.g., Mussweiler and Strack, 2000; Tversky and Kahneman, 1974). Moreover, anchoring remains uninfluenced by the extremity of the anchor (e.g., Chapman and Johnson, 1994; Strack and Mussweiler, 1997) so that even implausibly extreme values yield an effect. Furthermore, anchoring

effects appear to be independent of participants' motivation (e.g., Wilson et al., 1996). Specifically, the attempts to improve accuracy by awarding a prize for the best estimate prove unsuccessful. In addition, it has been demonstrated that anchoring occurs independently of participants' expertise (Englich and Mussweiler, 2001). Furthermore, anchoring effects are characterized by an exceptional temporal robustness and persist over fairly long periods of time (e.g., Mussweiler, 2001). Probably the most striking demonstration of the robustness of the phenomenon, however, stems from research demonstrating that explicit instructions to correct for a potential influence of an anchor do not mitigate the effect (Wilson et al., 1996). Even explicitly forewarning judges about the potential distortion and informing them about its direction does not diminish the effect. This suggests that anchoring is an exceptionally robust phenomenon that is difficult to avoid.

The vast research on anchoring originates from psychology, and takes roots in a number of fields and domains. Still, by the present moment, the applications of the effect of anchoring that may be classified as "economic" are relatively scarce.

Gruen and Gizycki (1993) use anchoring to explain the widely-observed anomaly that forward discounts do not properly explain subsequent exchange rate movements. The anchoring phenomenon may be relevant to the "sticky prices" that are so talked about by macroeconomists. So long as past prices are taken as suggestions of new prices, the new prices will tend to be close to the past prices. The more ambiguous the value of a commodity, the more important a suggestion is likely to be, and the more important anchoring is likely to be for price determination. Fischer and Statman (2000) suggest that stock market analysts may employ mean historical dividend yields and price-earnings ratios as anchors for forecasts of future dividend yields and price-earnings ratios, though historical figures diverge from their means by wide margins, and so may the future figures.

Galinsky and Mussweiler (2001) explore the role of anchoring in buyers' and sellers' behavior and their subsequent profits. They show that first offers may influence the final negotiation outcomes, because they serve as judgmental anchors to which the final outcomes are assimilated. They also demonstrate that whichever party, the buyer or the seller, makes the first offer obtains a better outcome from her viewpoint. Biswas and Burton (1993) suggest that price claims in advertisements influence consumer behavior, because they function as anchors in product evaluation. Simonson and Drolet (2004) report the effect of anchoring on consumers' willingness-to-pay and willingness-to-accept. Beggs and Graddy (2009) document anchoring effect in art auctions by showing that art works may be sold at much higher prices in "hot" markets when the auction buyers may be anchored by high prices that were previously set.

Zielonka (2004) carries an experiment involving financial analysts, and finds that certain historical peaks and lows in security and index quotes serve as mental anchors in technical analysis. Campbell and Sharpe (2009) detect that expert consensus forecasts of monthly economic releases from Money Market Services surveys are biased towards the values of previous months' data releases, which in some cases results in sizable predictable forecast errors. Furthermore, it appears that bond yields react only to the residual, or unpredictable, component of the surprise incorporated in the releases, and not to the expected piece of the forecast error apparently induced by anchoring, which suggests that market participants anticipate the anchoring bias embedded in expert forecasts. Kudryavtsev and Cohen (2010a) document that when recalling economic and financial information people exhibit significantly stronger bias in cases when the anchor is presented as a category, which is perceived as similar to the one that is recalled. Furthermore, in a similar setting, Kudryavtsev and Cohen (2010b) find that the anchoring bias is more strongly pronounced for relatively more difficult

questions. Cen et al. (2013) find that analysts make optimistic (pessimistic) forecasts when a firm's forecasted earnings per share are lower (higher) than the industry median, which serves as an anchor, and therefore, firms whose forecasted earnings per share are higher (lower) than the industry median experience abnormally high (low) future stock returns. Leung and Tsang (2013) analyze the effects of anchoring and loss aversion on house price dynamics, and observe that when both cognitive biases are present, price dispersion and trading volume are pro-cyclical, and that if the magnitude of anchoring bias decreases with time, then the price dispersion and trading volume are higher for transactions whose previous purchase is more recent.

3. Research hypothesis

As discussed in the previous Section, there exists a close interdependence between stock prices and returns, on the one hand, and stock trading volumes, on the other hand. The present study analyzes another aspect of the relationship between these mutually dependent concepts.

I suggest that since daily stock market index returns are continuously reported and represent a highly available category from the investors' viewpoint (as arises, for example, from the results presented by Kliger and Kudryavtsev (2010)), their values may also serve as "anchors" for a considerable proportion of investors. Assuming that this may be true, one may expect that if on a given day, a given stock's price moves in the same direction as the general market index, but with a greater magnitude, so that the absolute value of the stock return is higher than the absolute value of the "anchor" (market return), then investors may treat this stock price move as a salient event. And since, as discussed in the previous Section, company-specific events and information flows intensify stock trading activity, one may expect that, after controlling for all other relevant factors, on this given day the given stock's trading volume should be abnormally high.

Therefore, I hypothesize that, all other things being equal, a stock's trading volume should be higher:

1. If on the days when the stock market return is positive, the stock's contemporaneous daily return is higher than the market return.

and

2. If on the days when the stock market return is negative, the stock's contemporaneous daily return is lower than the market return.

In other words, I suggest that the fact that on a given day, a given stock's return is either more positive or more negative than the (respectively, positive or negative) contemporaneous daily market return may represent an additional (qualitative) factor explaining the stock's trading volume, even after accounting for other explanatory factors. The hypothesis is tested in Section 5.

4. Data description

In my empirical analysis, I employ the adjusted daily price and trading volume data for all the constituents of S&P 500 Index as of December 31, 2016, as recorded at www.finance.yahoo.com. The sampling period for each given stock starts on January 1, 1990 or at the first day of the stock's trading history, and ends on December 31, 2016, yielding an overall sample of 2,425,650 stock-days. Daily values of the S&P 500 Index, which I use as a proxy for the general stock market index, are downloaded from the same website.

For each trading day t, I calculate the daily returns of all the stocks and of the market index.

Furthermore, for each stock i, I normalize the abnormal trading volume in the time series, that is, calculate:

$$ABVOL_{it} = \frac{Vol_{it} - AVol_i}{STDVol_i} \quad (1)$$

where: $ABVOL_{it}$ is stock i's abnormal trading volume on day t, Vol_{it} is stock i's abnormal trading volume on day t, $AVol_i$ is stock i's average trading volume over 250 trading days preceding day t, and $STDVol_i$ is the standard deviation of stock i's average trading volume over 250 trading days preceding day t. Both Vol_{it} and $AVol_i$ are adjusted for stock splits.

Finally, for all the stocks in our sample, I record the dates of the dividend payments, and of the quarterly earnings announcements, the latter being provided by Thomson First Call.

5. Research methodology and Results

5.1. Anchoring effect on stock trading volumes: Comparative analysis

First, I perform a simple test of both conditions of the study' research hypothesis, that is, check if a stock's trading volume is higher:

1. If on the days when the market return is positive, the stock's contemporaneous daily return is higher than the market return.

and

2. If on the days when the market return is negative, the stock's contemporaneous daily return is lower than the market return.

The respective results are reported in Table 1. Panel A of the table comprises average abnormal trading volumes on the days when the market return (MR) is positive (1,221,321 stock-days), and separately, for the days when the contemporaneous stock return (SR) is higher than the market return, that is, SR>MR>0, and for other days; while Panel B presents similar statistics for the days when the market return is negative (1,204,329 stock-days), and separately, for the days when the contemporaneous stock return is lower than the market return, that is, SR<MR<0, and for other days.

The results corroborate the study's hypothesis. Average abnormal volume on the days when SR>MR>0 is 1.124, compared to 0.928 on other days with MR>0, and symmetrically, average abnormal volume on the days when SR<MR<0 is 1.131, compared to 0.915 on other days with MR<0, both differences being highly statistically significant. So, as predicted, stock trading volumes tend to be higher on the days when the respective absolute stock returns are higher than the contemporaneous absolute market returns, as the latter might potentially serve as a kind of psychological anchor. Another observation is that the abnormal trading volume difference is slightly higher for the days when MR<0, possibly indicating that on the days of general market falls, investors are more inclined to treat the market returns as anchors when making their trading decisions.

5.2. Anchoring effect on stock trading volumes: Multifactor regression analysis

After documenting that stock trading volumes tend to be higher on the days when the respective stock returns are either more positive or more negative than the contemporaneous market returns, the

next stage is to check if this result holds when other potentially influential factors are controlled for.

Stock returns, both actual and absolute, obviously represent a factor which is most strongly correlated with stock trading volumes (e.g., Harris, 1986; Karpoff, 1987; Schwert, 1989; Gallant et al., 1992). Therefore, actual and absolute stock returns are also the first factor to be controlled for in order to verify that the results reported in the previous Subsection are not simply driven by the well-documented correlation between stock trading volumes and returns. In order to do that, I run the following two (alternative) regressions based on the panel data of stock trading volumes and returns over the sampling period:

$$ABVOL_{it} = \alpha_i + \beta_{1i} High\_dum_{it} + \beta_{2i} Low\_dum_{it} + \beta_{3i} SR_{it} + \varepsilon_{it} \quad (1)$$

$$ABVOL_{it} = \alpha_i + \beta_{1i} High\_dum_{it} + \beta_{2i} Low\_dum_{it} + \beta_{3i} |SR_{it}| + \varepsilon_{it} \quad (2)$$

where: SR_{it} is stock i's log return on day t; $|SR_{it}|$ is the absolute value of stock i's log return on day t; $High\_dum_{it}$ is the dummy variable, taking the value 1 if on the day t, stock i's return is higher than the contemporaneous market return, which is positive, that is, if $SR_{it} > MR_t > 0$, and 0 otherwise; and Low_dum_{it} is the dummy variable, taking the value 1 if on the day t, stock i's return is lower than the contemporaneous market return, which is negative, that is, if $SR_{it} < MR_t < 0$, and 0 otherwise.

Tables 2 and 3 depict the results of regressions (1) and (2), respectively, indicating that:

- First of all, the coefficient estimates of $High\_dum_t$ and Low_dum_t are positive and highly significant. This represents a strong support for the study's hypothesis, demonstrating that the fact that a stock's daily return is either more positive or more negative than the contemporaneous market return significantly increases the stock's daily trading volume beyond the well-documented positive correlation of the latter with the actual and absolute stock returns.
- Consistently with the previous Subsection's findings, the coefficient estimates of Low_dum_t are slightly higher than those of $High\_dum_t$, suggesting that on the days of general market falls, investors may be even more inclined to treat the market returns as psychological anchors when making their trading decisions.
- In line with the previous literature, the coefficient estimates of SR_t and $|SR_i|$ are positive, the latter being both higher and more statistically significant. This suggests that stock trading volumes are positively correlated with the actual, and even more with the absolute stock returns. Still, we may note that in both regressions, the effects of the anchoring-driven dummy variables on the trading volumes are much more significant than those of the stock returns.

Furthermore, I test if the effect of anchoring on stock trading volumes persists after controlling for other potentially influential factors, in addition to contemporaneous stock returns. Namely, I consider lagged stock returns (e.g., following the findings by Chen et al., 2001; Khan and Rizwan, 2001; Lee and Rui, 2002; Pisedtasalasai and Gunasekarage, 2008); contemporaneous and lagged market returns (in order to explicitly account for their effects on the trading volumes); historical performance of the stock prices, including both returns and their volatility (e.g., following the findings by Griffin et al., 2007; Caginalpa and Desantisa, 2011; Remorov, 2014); companies' earnings announcements (e.g., following the findings by Kandel and Pearson, 1995; Barron et al., 2005; Hong and Stein, 2007; Bamber et al., 2011; Israeli, 2015); and dividend payments (e.g.,

following the findings by Bajaj and Vijh, 1995; Xu et al., 2002; Tran and Mai, 2015).

Once again, I run two panel data regressions alternatively based on actual and absolute values of stock and market returns. The regressions are specified as follows:

$$\begin{aligned} ABVOL_{it} &= \alpha_i + \beta_{1i} High\_dum_{it} + \beta_{2i} Low\_dum_{it} + \beta_{3i} SR_{it} + \beta_{4i} SR_{it-1} + \\ &+ \beta_{5i} MR_t + \beta_{6i} MR_{t-1} + \beta_{7i} CumSR_{it} + \beta_{8i} STDevSR_{it} + \beta_{9i} EarnAnn_{it} + \\ &+ \beta_{10i} Div_{it} + \varepsilon_{it} \end{aligned} \quad (3)$$

$$\begin{aligned} ABVOL_{it} &= \alpha_i + \beta_{1i} High\_dum_{it} + \beta_{2i} Low\_dum_{it} + \beta_{3i} |SR_{it}| + \beta_{4i} |SR_{it-1}| + \\ &+ \beta_{5i} |MR_t| + \beta_{6i} |MR_{t-1}| + \beta_{7i} CumSR_{it} + \beta_{8i} STDevSR_{it} + \beta_{9i} EarnAnn_{it} + \\ &+ \beta_{10i} Div_{it} + \varepsilon_{it} \end{aligned} \quad (4)$$

where: MR_t is log market return on day t; $|MR_{it}|$ is the absolute value of log market return on day t; $CumSR_{it}$ is stock i's cumulative return over 250 trading days (approximately one year) preceding day t; $STDevSR_{it}$ is the standard deviation of stock i's returns over 250 trading days preceding day t; $EarnAnn_{it}$ is the dummy variable, taking the value 1 if on day t there was an earnings announcement published by firm i, and 0 otherwise; and Div_{it} is the dummy variable, taking the value 1 if day t represents an ex-dividend day for firm i, and 0 otherwise.

Tables 4 and 5 refer to regressions (3) and (4), respectively, and contain a number of important results:

- The coefficient estimates of $High\_dum_t$ and Low_dum_t remain positive and highly significant, indicating that the effect of anchoring on stock trading volumes is not driven by other relevant contemporaneous company-specific and market-specific factors. Once again, the coefficient estimates of Low_dum_t are slightly higher than those of $High\_dum_t$, suggesting that the effect of anchoring may be more pronounced on the days when the stock market index falls.
- The coefficient estimates of SR_t, SR_{t-1}, $|SR_i|$ and $|SR_{i-1}|$ are positive and significant, demonstrating that both contemporaneous and lagged stock returns are positively correlated with stock trading volumes. Again, it should be noted that the effects of the absolute stock returns are stronger pronounced and more significant than those of the actual stock returns.
- The coefficient estimates of MR_t, MR_{t-1}, $|MR_i|$ and $|MR_{i-1}|$ are non-significant. This is an important results, since it suggests that the main effect which is in the focus of this study is not driven by any (positive or negative) correlation between stock trading volumes and market returns, but rather by a psychological comparison that investors may perform between absolute daily stock and market returns.
- Daily stock trading volumes are positively and significantly correlated with the stocks' historical returns and return volatilities, and consistently with the previous literature, tend to be higher on the days of earnings announcements and on ex-dividend days.

6. Conclusion

In the present study, I make an effort to contribute to the strand of literature which deals with behavioral factors affecting stock trading volumes. Namely, I hypothesize that contemporaneous

market returns may serve as psychological anchors, and if so, daily stock trading volumes may be higher on the days when the respective stocks' absolute returns are higher than the absolute market returns, the fact that may create a psychological feeling of stocks/companies undergoing salient events.

Employing a large sample of daily price and trading volume data, I find support for the study's research hypothesis, documenting that average abnormal daily stock trading volumes are significantly higher on the days when the stock returns are either more positive or more negative than the contemporaneous market returns. This effect is found to be stronger on the days of negative stock and market returns, suggesting that on these days, investors are probably more inclined to treat the market returns as anchors when making their trading decisions. Moreover, the multifactor regression analysis, explicitly accounting for the contemporaneous and lagged stock and market returns, demonstrates that this effect is not driven by a pure correlation between the trading volumes and the returns, but rather by a psychological comparison that investors may perform between absolute daily stock and market returns. Finally, the effect also remains significant after controlling for historical stock returns and volatilities, and company-specific events, like earnings announcements and dividend payments.

The results of the present study may have a number of important practical implications. First, they imply that investors do compare between stock and market returns, even over some very short time intervals (days), suggesting an additional important role played by stock market indexes, and calling for further research that would test, for example, if the results hold for other countries, over longer time periods and for other kinds of indexes (e.g., branch rather than general stock market indexes). Second, if investors intensify their trading activity following this kind of (not quite rational) considerations, it means that in addition to the documented effect on the trading volumes, there may also be an effect on the stock prices, which is not justified by other relevant factors. This may result in stocks' mispricing in the short run and create premises for the subsequent stock price "corrections". Therefore, in this respect, it might be interesting to test for the existence of stock price reversals following the days characterized by the anchoring-driven abnormally high trading volumes.

Conflict of Interest

All authors declare no conflict of interest.

References

Bajaj M, Vijh AM (1995) Trading Behavior and the Unbiasedness of the Market Reaction to Dividend Announcement. *J Finance* 50: 255-279.

Baker M, Stein J (2004) Market Liquidity as a Sentiment Indicator. *J Financ Mark* 7: 271-299.

Bamber LS, Barron OE, Stober TL (1997) Trading Volume and Different Aspects of Disagreement Coincident with Earnings Announcements. *The Account Rev* 72: 575-597.

Bamber LS, Barron OE, Stober TL (1999) Differential Interpretations and Trading Volume. *J Financ Quant Anal* 34: 369-386.

Bamber LS, Barron OE, Stevens DE (2011) Trading Volume around Earnings Announcements and Other Financial Reports: Theory, Research Design, Empirical Evidence, and Directions for Future Research. *Contemp Account Res* 28: 431-471.

Barber BM, Odean T (2008) All That Glitters: The Effect of Attention and News on the Buying Behavior of Individual and Institutional Investors. *Rev Financ Stud* 21: 785–818.

Barron OE, Harris DG, Stanford M (2005) Evidence That Investors Trade on Private Event-Period Information around Earnings Announcements. *Account Rev* 80: 403-421.

Basci E, Ozyildinm S, Aydogan K (1996) A Note on Price–Volume Dynamics in an Emerging Stock Market. *J Banking Finance* 20: 389–400.

Beaver WH (1968) The Information Content of Annual Earnings Announcements. Empirical Research in Accounting: Selected Studies, Supplement to *J Account Res* 6: 67–92.

Beggs A, Graddy K (2009) Anchoring Effects: Evidence from Art Auctions. *Am Econ Rev* 99: 1027-1039.

Biswas A, Burton S (1993) Consumer Perceptions of Tensile Price Claims in Advertisements: An Assessment of Claim Types across Different Discount Levels. *J Acad Mark Sci* 21: 217–229.

Blume ME, Mackinlay AC, Terker B (1989) Order Imbalances and Stock Movements on October 19 and 20, 1987. *J Finance* 44: 827–848.

Bowman NA, Bastedo MN (2011) Anchoring Effects in World University Rankings: Exploring Biases in Reputation Scores. *Higher Educ* 61: 431-444.

Caginalpa G, Desantisa M (2011) Stock Price Dynamics: Nonlinear Trend, Volume, Volatility, Resistance and Money Supply. *Quant Finance* 11: 849-861.

Campbell JY, Grossman SJ, Wang J (1993) Trading Volume and Serial Correlation in Stock Returns. *Q J Econ* 108: 905–939.

Campbell SD, Sharpe SA (2009) Anchoring Bias in Consensus Forecasts and its Effect on Market Prices. *J Financ Quant Anal* 44: 369-390.

Cen L, Hilary G, Wei KCJ (2013) The Role of Anchoring Bias in the Equity Market: Evidence from Analysts' Earnings Forecasts and Stock Returns. *J Financ Quant Anal* 48: 47-76.

Cervone D, Peake PK (1986) Anchoring, Efficacy, and Action: The Influence of Judgmental Heuristics on Self-Efficacy Judgment and Behavior. *J Pers Soc Psychol* 50: 492–501.

Chapman GB, Johnson EJ (1994) The Limits of Anchoring. *J Behav Decis Making*, 7: 223–242.

Chen G, Firth M, Rui OM (2001) The Dynamic Relation between Stock Returns, Trading Volume and Volatility. *Financ Rev* 36: 153-174.

Chordia T, Huh S-W, Subrahmanyam A (2007) The Cross-Section of Expected Trading Activity. *Rev Financ Stud* 30: 709-740.

Crouch RL (1970) A Nonlinear Test of the Random-Walk Hypothesis. *Am Econ Rev* 60: 199-202.

De Long B, Shleifer A, Summers L, Waldmann R (1990) Positive Feedback Investment Strategies and Destabilizing Rational Speculation. *J Finance* 45: 379-386.

Ehrbeck T, Waldman R (1996) Why are Professional Forecasters Biased? Agency Versus Behavioral Explanations. *Q J Econ* 111: 21-40.

English B (2008) When Knowledge Matters—Differential Effects of Available Knowledge in Standard and Basic Anchoring Tasks. *Eur J Soc Psychol* 38: 896-904.

English B, Mussweiler T (2001) Sentencing under Uncertainty: Anchoring Effects in the Courtroom. *J Appl Soc Psychol* 31: 1535–1551.

Epps TW (1975) Security Price Changes and Transaction Volumes: Theory and Evidence. *Am Econ Rev* 65: 586–597.

Epps TW (1977) Security Price Changes and Transaction Volumes: Some Additional Evidence. *J Financ Quant Anal* 12: 141–146.

Epps TW, Epps ML (1976) The Stochastic Dependence of Security Price Changes and Transaction Volumes: Implications for the Mixture-of-Distributions Hypothesis. *Econometrica* 44: 305-321.
Fisher KL, Statman M (2000) Cognitive Biases in Market Forecasts. *J Portf Manage* 27: 72-81.
Galinsky AD, Mussweiler T (2001) First Offers as Anchors: The Role of Perspective-Taking and Negotiator Focus. *J Pers Soc Psychol* 81: 657–669.
Gallant R, Rossi P, Tauchen G (1992) Stock Prices and Volume. *Rev Financ Stud* 5: 199-242.
Garfinkel JA, Sokobin J (2006) Volume, Opinion Divergence, and Returns: A Study of Post-Earnings Announcement Drift. *J Account Res* 44: 85-112.
Gervais S, Kaniel R, Mingelgrin DH (2001) The High Volume Return Premium. *J Finance* 56: 877–919.
Glaser M, Weber M (2009) Which Past Returns Affect Trading Volume? *J Financ Mark* 12: 1-31.
Griffin M, Nardari F, Stulz RM (2007) Do Investors Trade More When Stocks Have Performed Well? Evidence from 46 Countries. *Rev Financ Stud* 20: 905–951.
Gruen DK, Gizycki MC (1993) Explaining Forward Discount Bias: Is It Anchoring? Princeton University Woodrow Wilson School Discussion Paper in Economics 164.
Harris L (1983) The Joint Dislrihuiion of Speculative Prices and of Daily Trading Volume. Working Paper, University of Southern CA.
Harris M, Raviv A (1993) Differences of Opinion Make a Horse Race. *Rev Financ Stud* 6: 473-506.
Hirshleifer D, Subrahmanyam A, Titman S (1994) Security Analysis and Trading Patterns When Some Investors Receive Information before Others. *J Finance* 49: 1665-1698.
Hirshleifer D, Subrahmanyam A, Titman S (2006) Feedback and the Success of Irrational Investors. *J Financ Econ* 81: 311-338.
Holthausen RW, Verrecchia RE (1990) The Effect of Informedness and Consensus on Price and Volume Behavior. *Account Rev* 65: 191-208.
Hong H, Stein JC (1999) A Unified Theory of Underreaction, Momentum Trading, and Overreaction in Asset Markets. *J Finance* 54: 2143-2184.
Hong H, Stein JC (2007) Disagreement and the Stock Market. *J Econ Perspect* 21: 109-128.
Hong H, Yu J (2009) Gone Fishin': Seasonality in Trading Activity and Asset Prices. *J Financ Mark* 12: 672-702.
Huddart S, Lang M, Yetman MH (2009) Volume and Price Patterns around a Stock's 52-Week Highs and Lows: Theory and Evidence. *Manage Sci* 55: 16-31.
Israeli D (2015) Trading Volume Reactions to Earnings Announcements and Future Stock Returns. Working Paper, Interdisciplinary Center Herzliya.
Jacowitz KE, Kahneman D (1995) Measures of Anchoring in Estimation Tasks. *Pers Soc Psychol Bull* 21: 1161–1166.
Jain PC, Joh G-H (1986) The Dependence between Hourly Prices and Trading Volume. Working Paper, The Wharton School, University of Pennsylvania.
Kahneman D, Slovic P, Tversky A (1982) Judgment under Uncertainty: Heuristics and Biases, New York: Cambridge University Press.
Kandel E, Pearson N (1995) Differential Interpretation of Public Signals and Trade in Speculative Markets. *J Polit Econ* 103: 831-872.
Karpoff JM (1986) A Theory of Trading Volume. *J Finance*, 41: 1069-1087.
Karpoff JM (1987) The Relation between Price Changes and Trading Volume: A Survey. *J Financ Quant Anal* 22: 109-126.

Khan SU, Rizwan F (2008) Trading Volume and Stock Returns: Evidence from Pakistan's Stock Market. *Int Rev Bus Res Pap* 4: 151-162.

Kim O, Verrecchia RE (1991) Market Reaction to Anticipated Announcements. *J Financ Econ* 30: 273-309.

Kim O, Verrecchia RE (1994) Market Liquidity and Volume around Earnings Announcements. *J Account Econ* 17: 41–67.

Kim O, Verrecchia RE (1997) Pre-Announcement and Event-Period Private Information. *J Account Econ* 24: 395-419.

Kliger D, Kudryavtsev A (2010) The Availability Heuristic and Investors' Reaction to Company-Specific Events. *J Behav Finance* 11: 50-65.

Kudryavtsev A, Cohen G (2010a) Illusion of Relevance: Anchoring in Economic and Financial Knowledge. *Int J Econ Res* 1: 86-101.

Kudryavtsev A, Cohen G (2010b) Anchoring and Pre-Existing Knowledge in Economic and Financial Settings. *Am J Soc Manage Sci* 1: 164-180.

Lakonishok J, Vermaelen T (1986) Tax-Induced Trading around Ex-Dividend Days. *J Financ Econ* 16: 287-319.

Lee SB, Rui OM (2002) The Dynamic Relationship between Stock Return and Trading Volume: Domestic and Cross-Country Evidence. *J Banking Finance* 26: 51-78.

Leung TC, Tsang KP (2013) Anchoring and Loss Aversion in the Housing Market: Implications on Price Dynamics, *China Econ Rev* 24: 42-54.

Llorente G, Michaely R, Saar G, Wang J (2002) Dynamic Volume-Return Relation of Individual Stocks. *Rev Financ Stud* 15: 1005-1047.

Lo AW, Wang J (2006) Trading Volume: Implications of an Intertemporal Capiral Asset Pricing Model. *J Finance* 61: 2805–2840.

Mussweiler T (2001) The Durability of Anchoring Effects. *Eur J Soc Psychol* 31: 431–442.

Mussweiler T, Strack F (1999a) Comparing is Believing: A Selective Accessibility Model of Judgmental Anchoring, In: Stroebe W, Hewstone M, *European review of social psychology*, Chichester: Wiley, 10: 135-167.

Mussweiler T, Strack F (1999b) Hypothesis-Consistent Testing and Semantic Priming in the Anchoring Paradigm: A Selective Accessibility Model. *J Exp Soc Psychol* 35: 136–164.

Mussweiler T, Strack F (2000) Numeric Judgment under Uncertainty: The Role of Knowledge in Anchoring. *J Exp Soc Psychol* 36: 495–518.

Ndjadingwe E, Radikoko I (2015) Investigating the Effects of Dividends Pay-out on Stock Prices and Traded Equity Volumes of BSE Listed Firms. *Int J Innovation and Econ Dev* 1: 24-37.

Osborne MFM (1959) Brownian Motion in the Stock Market. *Oper Res* 1: 145-173.

Pathirawasam C (2011) The Relationship between Trading Volume and Stock Returns. *J Competitiveness* 3: 41-49.

Pisedtasalasai A, Gunasekarage A (2007) Causal and Dynamic Relationships among Stock Returns, Return Volatility and Trading Volume: Evidence from Emerging Markets in South-East Asia. *Asia-Pac Financ Mark* 14: 277-297.

Plous S (1989) Thinking the Unthinkable: The Effects of Anchoring on Likelihood Estimates of Nuclear War. *J Appl Soc Psychol* 19: 67–91.

Remorov R (2014) Stock Price and Trading Volume during Market Crashes. *Int J Mark Stud* 6: 21-30.

Rutledge DJS (1984) Trading Volume and Price Variability: New Evidence on the Price Effects of Speculation, In: Peck AE, *Selected Writings on Futures Markets: Research Directions in Commodity Markets*, Chicago: Chicago Board of Trade, 237-251.

Saatccioglu K, Starks LT (1998) The Stock Price–Volume Relationship in Emerging Stock Markets: The Case of Latin America. *Int J Forecast* 14: 215–225.

Safvenblad P (2000) Trading Volume and Autocorrelation: Empirical Evidence from the Stockholm Stock Exchange. *J Banking Finance* 24: 1275–1287.

Schwert W (1989) Why Does Stock Market Volatility Change Over Time? *J Finance* 44: 1115-1155.

Simonson I, Drolet A (2004) Anchoring Effects on Consumers' Willingness-to-Pay and Willingness-to-Accept. *J Consum Res* 31: 681-690.

Statman M, Thorley S, Vorkink K (2006) Investor Overconfidence and Trading Volume. *Rev Financ Stud* 19: 1531-1565.

Strack F, Mussweiler T (1997) Explaining the Enigmatic Anchoring Effect: Mechanisms of Selective Accessibility. *J Pers Soc Psychol* 73: 437–446.

Tran QT, Mai YD (2015) Stock Market Reaction to Dividend Announcements from a Special Institutional Environment of Vietnamese Stock Market. *Int J Econ Finance* 7: 50-58.

Tversky A, Kahneman D (1973) Availability: A Heuristic for Judging Frequency and Probability. *Cognit Psychol* 4: 207–232.

Tversky A, Kahneman D (1974) Judgment under Uncertainty: Heuristics and Biases. *Sci* 185: 1124-1131.

Varian HR (1989) Differences of Opinion in Financial Markets. In *Financial Risk: Theory, Evidence and Implications: Proceedings of the 11th Annual Economic Policy Conference of the Federal Reserve Bank of St. Louis*, 3–37.

Verrecchia RE (1981) On the Relationship between Volume Reaction and Consensus of Investors: Implications for Interpreting Tests of Information Content. *J Account Res* 19: 271-283.

Westerfield R (1977) The Distribution of Common Stock Price Changes: An Application of Transactions Time and Subordinated Stochastic Models. *J Financ Quant Anal* 12: 743-765.

Wilson TD, Houston C, Etling KM, Brekke N (1996) A New Look at Anchoring Effects: Basic Anchoring and its Antecedents. *J Exp Psychol: Gen* 125: 387–402.

Wood RA, McInish TH, Ord KJ (1985) An Investigation of Transactions Data for NYSE Stocks. *J Finance* 40: 723-739.

Xu P, Rui OM, Kim S (2002) Risk Shift Following Dividend Change Announcement: The Role of Trading. *Rev Quant Finance Account* 19: 45-63.

Ying CC (1966) Stock Market Prices and Volumes of Sales. *Econometrica* 34: 676-686.

Ziebart DA (1990) The Association between Consensus of Beliefs and Trading Activity Surrounding Earnings Announcements. *Account Rev* 65: 477-488.

Zielonka P (2004) Technical Analysis as the Representation of Typical Cognitive Biases. *Int Rev Financ Anal* 13: 217-225.

Appendix: Tables

Table 1. Average abnormal trading volumes classified by the contemporaneous relationship between stock and market returns

Panel A: Average abnormal trading volumes for the days when MR>0 (1,221,321 stock-days)

Days when SR>MR>0	*Other days*	*Difference (t-statistic)*
1.124	0.928	***0.196 (8.75)

Panel B: Average abnormal trading volumes for the days when MR<0 (1,204,329 stock-days)

Days when SR<MR<0	*Other days*	*Difference (t-statistic)*
1.131	0.915	***0.216 (11.41)

Asterisks denote two-tailed p-values: ****p*<0.001.

Table 2. Regression analysis: The effect of anchoring on stock trading volumes (Dependent variable – ABVOL)

Explanatory variables	*Coefficient estimates (t-statistics)*
Intercept	***0.756 (18.67)
High_dumt	***0.176 (9.23)**
Low_dumt	***0.214 (12.68)**
SRt	*1.296 (1.70)

Asterisks denote 2-tailed p-values: *p<0.10; ***p<0.01

Table 3. Regression analysis: The effect of anchoring on stock trading volumes (Dependent variable – ABVOL)

Explanatory variables	*Coefficient estimates (t-statistics)*
Intercept	***0.747 (17.88)
High_dumt	***0.178 (9.67)**
Low_dumt	***0.219 (12.91)**
|SRt|	**1.872 (2.15)

Asterisks denote 2-tailed p-values: **p<0.05; ***p<0.01

Table 4. Multifactor regression analysis: The effect of anchoring on stock trading volumes (Dependent variable – ABVOL)

Explanatory variables	*Coefficient estimates (t-statistics)*
Intercept	***0.547 (15.74)
High_dumt	***0.161 (8.78)**
Low_dumt	***0.207 (10.96)**
SRt	*0.935 (1.68)
SRt-1	*0.468 (1.66)
MRt	-0.087 (-0.68)
MRt-1	0.105 (0.97)
CumSRt	**0.156 (1.98)
STDevSRt	**0.178 (2.05)
EarnAnnt	***0.104 (5.82)
Divt	***0.086 (5.12)

Asterisks denote 2-tailed p-values: *p<0.10; **p<0.05; ***p<0.01

Table 5. Multifactor regression analysis: The effect of anchoring on stock trading volumes (Dependent variable – ABVOL)

Explanatory variables	*Coefficient estimates (t-statistics)*
Intercept	***0.538 (15.23)
High_dumt	***0.166 (8.99)**
Low_dumt	***0.213 (11.12)**
|SRt|	**0.935 (2.07)
|SRt-1|	**0.527 (2.01)
|MRt|	0.077 (0.51)
|MRt-1|	-0.065 (-0.42)
CumSRt	**0.142 (1.96)
STDevSRt	**0.164 (2.00)
EarnAnnt	***0.106 (5.87)
Divt	***0.089 (5.19)

Asterisks denote 2-tailed p-values: *p<0.10; **p<0.05; ***p<0.01

AIMS Press