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Reference Prices and Turnover: Evidence from Small-Capitalization Stocks

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Abstract: A large amount of literature in the field of social psychology and product pricing discusses the role of reference prices in affecting buyer's price perception and purchase intention. Reference price denotes a standard against which the consumer compares the offer price of a product. In this paper, we investigate whether reference prices play any role in affecting the trading decision of stock market investors. We use firm-level, fixed-effect panel data methodology to empirically investigate whether investors respond to a violation of their internalized reference price range by executing a trading decision. Our results, based on a sample of Indian firms with small capitalization, show that investors respond to a violation of their internalized reference price range by executing a trading decision. However, consistent with the prior findings that investors suffer from myopic loss aversion, they continue to hold the positions when the reference price range is violated on the downside but sell stocks that have violated the high point of the reference price range. Our findings are robust for the reference price ranges that are constructed using the prior day's trading prices, prior week's trading prices, and prior year's trading prices. The portfolio managers can develop a better understanding of expected trading intensity by incorporating reference price range in their models. The policymakers can use our results to find ways to improve the liquidity and efficiency of financial markets.

Keywords: reference price; turnover; liquidity; asset pricing; behavioral finance; disposition effect

JEL Classification: G40; G12; G14

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1. Introduction

A large amount of literature in the field of social psychology and product pricing discusses the role of reference prices in affecting buyer's price perception and purchase intention. Reference price denotes a standard against which the consumer compares the offer price of a product (Monroe 1973). The formation of reference price is influenced by prior experience of the buyer, current purchase environment, and buyer-specific attributes (Briesch et al. 1997; Kalyanaram and Winer 1995). The theoretical background for this conceptualization comes from adaptation-level theory (Helson 1964), assimilation–contrast theory (Sherif et al. 1958), and range–frequency theory (Volkmann 1951; Parducci 1965). The adaptation-level theory suggests that human beings evaluate a stimulus conditional upon the prior level of their exposure to the same stimulus. The assimilation–contrast theory posits that a consumer has a distribution of reference prices that are considered acceptable. The recent price information is assimilated only when the observed price is conceived to be a part of the hypothesized distribution. The range–frequency theory refines the proposition of assimilation–contrast theory. It suggests that the assimilation of price information depends on the endpoints of the price distribution (Janiszewski and Lichtenstein 1999) and the frequency distribution of prices (Niedrich et al. 2001). In this paper, we investigate whether reference prices play any role in affecting the trading decision of stock market investors. We examine whether the research findings for consumption-oriented product categories from the marketing literature are relevant to a very different asset class. We intend to understand the motivations behind trading decisions and not the ultimate "buy and hold" gains received from a trade. In the spirit of Thaler (1983), we focus on the investor's perception of transaction utility rather than acquisition utility. To this effect, we study the relationship between the reference price and trading volumes rather than focusing on stock returns that bear no relationship with immediate purchase intention.

The role of nominal prices should be irrelevant in predicting the stock market dynamics. Classical theory on the value of a firm and the efficient market hypothesis postulate that the price of a stock, in isolation, should not have any effect on the firm value. The managers and board of directors of a firm have the option to split shares, issue bonus shares, or effect a share buyback to alter the number of outstanding shares (and consequently the price per share). However, none of these actions should affect the aggregate value of the firm, and hence stock returns must be independent of nominal price per share. A small number of studies arguing against the notion of the irrelevance of nominal stock price have appeared in the finance literature (Green and Hwang 2009; Baker et al. 2009; Weld et al. 2009; Bali et al. 2011; Birru and Wang 2016; Singal and Tayal 2018). The motivations for the reliance of an investor on nominal prices have not been fully substantiated. Some of the explanations offered include lottery-like characteristics[1] of low priced stocks (Kumar 2009), the relationship of price with trading costs (Angel 1997), signaling behavior of managers (Asquith et al. 1989), and desire of managers to cater to a nominal price band that commands a premium from investors (Weld et al. 2009; Baker et al. 2009). Investor's limited attention, memory, and processing capability lead to heuristic simplification and result in salience and availability effects (Kahneman and Tversky 1979 henceforth KT). An arbitrarily chosen reference point to understand gains or losses can result in narrow framing and mental accounting (KT; Thaler 1999). We argue that a retail investor, in the absence of either price-related information or ability to accurately process information, may rely on mental heuristics and focus on a simpler metric like the violation of reference price range. The recent stock price history would serve as a reference price in this regard. Further, the deal-seeking behavior that an individual so frequently engages in his routine purchase activities is unlikely to be curbed completely when making a trading decision. Since there are not any promotional activities associated with stocks, the bargain-seeking behavior of a retail investor should be focused entirely on price movements from the reference price. Building upon the conceptual framework offered by the adaption-level theory, assimilation–contrast theory, and range–frequency theory, we hypothesize that investors will form a range of reference price based on the distribution of historical prices and deem any violation of the reference price range as an actionable trading stimulus. Our empirical results show that this is indeed the case. The investors respond to a violation of their internalized reference price range by executing a trading decision. However, consistent with the prior findings that investors suffer from myopic loss aversion, they continue to hold the positions where the reference price range is violated on the downside but sell stocks that have violated the high point of the reference price range.

Our study makes three important contributions to the asset pricing and behavioral finance literature. Firstly, we address the role of the reference price range in explaining market microstructure, an open issue that we believe has not been addressed to date. While other studies have examined the relation of volume with specific cross-sectional characteristics of firms, the role of reference price range has not been addressed in the literature. The conceptualization of reference price with other cross-sectional characteristics in the same empirical framework allows us to examine the incremental effect of reference price on liquidity considerations. Secondly, we provide another piece of empirical evidence for the disposition effect and overconfidence hypothesis (Shefrin and Statman 1985; Odean 1998). The disposition effect documents an investor bias where investors realize gains by

[1] Such characteristics emanate from investor's naïve presumption that low priced stocks entail limited losses (worst case being stock price going down from a low value to zero) and the probability of very high gains. This mental simplification ignores the fact that total investment is the relevant metric to evaluate "value at risk" and not the nominal share price.

selling stocks that have appreciated but delay the realization of losses on stocks that have depreciated. Odean (1998) posits that the increased confidence of investors is reflected in excessive trading volume. While prior studies have focused solely on the role of 52-week trading range (Huddart et al. 2009), we demonstrate that the behavioral bias exists even when we consider the truncated history of past prices. Lastly, we synthesize a theoretical framework to understand investor behavior in the context of past prices. Using literature from the field of social psychology and consumer product pricing, we offer an integrative explanation for the role of nominal prices in influencing trading volume. The rest of paper is organized as follows. In Section 2, we develop the hypothesis using a theoretical framework. Section 3 discusses the sample and research design. Section 4 reports our results from the test of hypotheses. In Section 5, we conclude our main findings, discuss limitations, and suggest directions for future research.

2. Hypothesis Development

Thaler (1983) proposed that consumers derive two kinds of utility from a transaction namely consumption utility and transaction utility. The transaction utility is the perceived value of the "deal", and it is some function of the difference between the transaction price and the reference price. In the normative economic theory of transaction, the decision to transact is contingent entirely upon the relative difference between the market price of good, p, and the reservation price, p'. In instances where $p < p'$ ($p > p'$), a consumer (seller) will buy (sell) the good. However, the introduction of reference price, p^*, introduces additional complexity in the decision making process. There exists a possibility that a seller does not sell the good even in instances where $p > p'$. This is a plausible scenario in situations where $p^* > p'$. Similarly, Bell and Bucklin (1999) study the effect of reference price on the purchase timing. Relying upon Loewenstein's (1988) framework of intertemporal choice, they suggest that the consumers compare the relative attractiveness of buying with perceived benefits from postponing the purchase. A perceived gain results in purchase acceleration. In contrast to the realm of consumer purchase decisions, where buyers derive additional utility from bargain shopping, a stock investor will derive a similar heightened utility in instances where he or she is able to sell his or her holdings above the conceptualized reference price. Odean (1998) posits that the increased confidence of investor is reflected in trading turnover. Hence, the following hypothesis is given.

Hypothesis 1 (H1). *Investors are more likely to trade a stock that has a price outside their reference price range as compared to the stock which has a price within their reference price range.*

The retail investors are known to be suffering from myopic loss aversion with a greater sensitivity to losses than to gains (KT; Thaler et al. 1997). The asymmetry between buying and selling prices is recorded by Kahneman et al. (1991) as the endowment effect. They attribute this behavior to the general underweighting of opportunity costs. The endowment effect results in situations where the opportunity to sell is viewed as a gain while the opportunity to purchase the same good is viewed as a loss. Bell and Bucklin (1999) provide evidence that the frequency of purchase postponement that results from a perceived loss (actual price exceeds reference price) is higher than the frequency of purchase acceleration form a perceived gain. Further, there are research findings documenting the importance of prior highs and the disposition effect. The prior maximum serves as an important determinant in trading decisions of retail investors (Grinblatt and Keloharju 2001; Heath et al. 1999). We, therefore, hypothesize that investors are only likely to sell a stock that has breached the high end of their reference price range. Hence, the following hypothesis is given.

Hypothesis 2 (H2). *Investors are more likely to trade a stock that has a price outside the high end of their reference price range as compared to the stock which has a price outside the low end of their reference price range.*

The concept of a range of prices implies extreme stimulus values on the high and the low end for a particular stock. According to Monroe (1979), three different price stimuli, namely the adaptation level price, the lowest price, and the highest price, affect price judgments. The theoretical framework suggests that the recent price information draws the adaptation level price in its direction, similar to Bayesian updating. We argued earlier in this paper that an investor has limited attention, memory, and processing capability. Investors will need to retrieve stock-specific reference prices to make a trading decision. Prior studies have proposed that the retrieval processes rely on simplifying heuristics (Schwarz and Vaughn 2002). Monroe and Lee (1999) argue that price memory is implicit, and the consumer makes a purchase decision without being explicitly aware of the input information. Menon and Raghubir (2003) similarly show that consumers use "ease of retrieval" as a heuristic to ascertain the correctness of the retrieved information. Because the retrieval of stock prices is a complex mental exercise, investors are more likely to draw prices either from recent history or prices that are easily available in the public domain. We find it difficult to rationalize that an investor will engage in complex algorithms to arrive at a precise estimate of the reference price. We find it more plausible that investors will use simple heuristics, easily available information, and recent memory to arrive at a point or range estimate of the reference price. We, therefore, consider the prior day's trading range, prior week's trading range, and the 52-week price range as three distinct dimensions of reference price in our study.

3. Study Design

3.1. Data

We select all stocks that are part of the National Stock Exchange Small Cap Index (NIFTY Smallcap 50 Index) in India and tabulate daily price movements and turnover for these stocks along with other cross-sectional characteristics. Our choice of an emerging country, India, as a situs for our study is influenced by the role of institutional frameworks in accentuating investor biases. Schmeling (2009) suggests that investor biases are likely to be country-specific as the institutional frameworks and investor psychology differ across countries. Institutional settings that restrict short-sellers may result in arbitrageurs' reluctance to actively intervene and timely remove price anomalies. In India, many restrictions are imposed on short-selling. De Roon et al. (2001) argue that developing countries offer limited avenues for portfolio diversification due to the restrictions on short sales. The lack of benefits from portfolio diversification may reduce the level of participation of institutional money managers in India. Furthermore, the number of securities where short-selling is allowed in India is restrictive and constraints are imposed by market-wide position limits and the stock's monthly turnover. These restrictions may accentuate investor biases for small stocks that are followed extensively by retail investors who are more prone to biases. We select companies belonging to the National Stock Exchange Small Cap Index instead of a broad-based index to capture higher participation of the retail investor in trading of shares with small capitalization. Kumar and Lee (2006) suggest that different investor groups have a preference to trade within different natural "habitats", or groups of stocks. They also report that retail investors spend lesser time on investment analysis, engage often in attention-based trading, and use a different set of information as compared to their professional counterparts. We, therefore, believe that the use of simple heuristics and mental accounting will be more common in retail investors. We tabulate data for all trading days starting from May 2015 until March 2020. Our final sample has 60,900 daily price-related observations for NIFTY Smallcap 50 Index stocks.

3.2. Empirical Approach

In order to investigate the effect of the violation of reference price range on turnover, it is essential to control for standard determinants of turnover (TV). Many studies in the asset pricing literature have focused on identifying the determinants of turnover. We rely on these studies to develop an empirical model for the estimation of expected turnover and the subsequent investigation of the role of reference price in affecting turnover. Lo and Wang (2010) reviewed the quantity implications of an equilibrium model of asset prices under uncertainty and specified a set of economically motivated variables. We use Lo and Wang (2010) as the starting point for specifying our model and include four variables from their specification. The first variable that we incorporate in our model is the abnormal return (ALPH) represented by the intercept coefficient from the 250 trading day rolling time-series regression of stock's excess return on the value-weighted market excess return. If the excess return is driven by the liquidity premium (Amihud and Mendelson 1986), it will result in a negative relationship between abnormal return and turnover. However, if the excess return is a result of information heterogeneity, the nature of the relationship between abnormal return and turnover will be dependent on the nature of information heterogeneity (He and Wang 1995). Hartian and Sitorus (2015) document a positive relationship between liquidity and stock returns in developing countries in contrast to a negative relationship in developed countries. Since our study pertains to a developing country, we hypothesize a positive sign for the coefficient of ALPH. The second variable that we include in our model is the systematic risk (BETA) represented by the slope coefficient of the rolling time-series regression of stock's excess return on the value-weighted market excess return. The Beta represents the volatility of realized returns and should be positively related to the turnover (Chen et al. 2001; Lo and Wang 2000). The third cross-sectional determinant in our model is the annual dividend yield (YLD) of the stock. We expect a positive relationship between dividend yield and turnover due to empirically established relationships (Baker and Wurgler 2004) and dividend capture behavior (Green 1980; Graham and Kumar 2006). The fourth explanatory variable that we incorporate in the model is the natural logarithm of stock's market capitalization (SIZE). The motivation behind the inclusion of market capitalization is to capture the diversity of the shareholding base (Merton 1987) and the relationship between market capitalization and stock return (Banz 1981). A diverse shareholding will result in higher trading volume. Similarly, excess returns from size based factors will also result in higher trading volume. We hypothesize a positive relationship between turnover and SIZE. We do not include natural logarithm of share price in our model. The rationale for including share price-related variable in the prior studies is to capture the effect of trading costs that were historically inversely related to price levels. However, the recent innovations in the market microstructure and the advent of online brokerages offering fixed commission fee structure weaken the relevance of price related variables in predicting trading volume. The asymmetric effect of positive return and negative return on trading volume is documented by Statman et al. (2006). In a similar spirit, we include positive returns (PRET) and negative returns (NRET) individually in our model as explanatory variables. The next two explanatory variables in the model are the percentage of institutional shareholding (INST) and the percentage of promoter shareholding pledged with the financial institutions (PLDG). The institutional shareholders behave differently from the retail shareholders and initiate positions based on trend following behavior but terminate their positions using a contrarian approach (Kumar 2008). The institutional ownership and turnover are hypothesized to be positively related in accordance with the findings of Tkac (1999). The phenomenon where promoters pledge their shareholding with the financial institutions as collateral for a general-purpose loan is unique to India. The promoters generally use the proceeds of loans to fund the expansion of the firm's operations and increase their proportional shareholding. Since the quantity of pledged shares is not available for regular trading, we hypothesize a negative relationship between PLEDG and turnover. Our last variable in the model is a binary variable representing a breach of the reference price range. In line with the previous discussion, we consider the prior day's trading range, the prior week's trading range, and the 52-week price range as three distinct dimensions of reference price in our study. We name these three variables as BRCH_{d}, where d takes the value of one day, one week, and one year. If the relevant temporal range of reference price is breached, the variable takes a value of 1 and 0 otherwise. Further, we classify the breach of the low point of the range separately from the high point of the range to test our second hypothesis. We name these two binary variables as $LBRCH_d$ and $HBRCH_d$, respectively, where d again takes the value of one day, one week, and one year. Our final model specifications are as follows:

$$TV_{i,t} = \beta_0 + \beta_1 ALPH_{i,t} + \beta_2 BETA_{i,t} + \beta_3 YLD_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 PRET_{i,t} + \beta_6 NRET_{i,t} + \beta_7 INST_{i,t} + \beta_8 PLDG_{i,t} + \beta_9 BRCH_{di,t} + \varepsilon_{i,t} \quad (1)$$

$$TV_{i,t} = \beta_0 + \beta_1 ALPH_{i,t} + \beta_2 BETA_{i,t} + \beta_3 YLD_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 PRET_{i,t} + \beta_6 NRET_{i,t} + \beta_7 INST_{i,t} + \beta_8 PLDG_{i,t} + \beta_9 HBRCH_{di,t} + \varepsilon_{i,t} \quad (2)$$

$$TV_{i,t} = \beta_0 + \beta_1 ALPH_{i,t} + \beta_2 BETA_{i,t} + \beta_3 YLD_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 PRET_{i,t} + \beta_6 NRET_{i,t} + \beta_7 INST_{i,t} + \beta_8 PLDG_{i,t} + \beta_9 LBRCH_{di,t} + \varepsilon_{i,t} \quad (3)$$

The dependent variable TV in each of the above equations is the ratio of trading volume to the total outstanding shares. We use firm-level fixed-effect panel data methodology to control for time-invariant variables. Since each company covered in the NIFTY Smallcap 50 Index may have its own firm-specific characteristics that potentially can influence turnover, the fixed effects method is more appropriate for our study. Our preference for the fixed effects method is also motivated by a desire to avoid endogeneity issues due to omitted variable bias. However, we do rely on the implicit assumption that there are no changes over time in the variables that were not explicitly controlled in the regression specification. In absence of correlation of time invariant characteristics across firms, reverse simultaneity, absence of measurement errors, and absence of temporal variation in omitted variables, our estimators from the fixed-effects regression should be an unbiased estimate. The summary statistics and correlation summary for our key variables of interest in this study are provided in Tables 1 and 2, respectively.

Table 1. Summary Statistics.

Variable	Mean	Std. Dev.	Min	Max
ALPH	0.0000	0.0020	−0.0113	0.0094
BETA	1.1216	0.4241	−0.1742	2.5691
YLD	1.0472	1.6825	0.0000	34.7700
SIZE	10.7607	0.5866	8.6282	13.1895
PRET	0.0132	0.4016	0.0000	63.7186
NRET	−0.0097	0.0264	−1.0000	0.0000
INST	24.2484	15.7897	0.0000	77.3800
PLDG	4.5675	11.5773	0.0000	78.0700
$BRCH_{1DAY}$	0.7133	0.4522	0.0000	1.0000
$BRCH_{1WEEK}$	0.5241	0.4994	0.0000	1.0000
$BRCH_{1YEAR}$	0.1701	0.3758	0.0000	1.0000
TV	0.0055	0.0119	0.0000	0.5314

Notes: ALPH is the intercept from the OLS rolling market regression of stocks' return on the value weighted market return for 250 most recent trading days. BETA is the slope coefficient the OLS rolling market regression of stocks' return on the value weighted market return for 250 most recent trading days. YLD is the annualized dividend yield of the stock based on daily closing price. PRET is the daily positive return, and NRET is the daily negative return, as applicable. INST is the percentage shareholding of institutional shareholders that are not promoters of the company. PLDG is the percentage of promoter shareholding pledged with the financial institutions. $BRCH_{1DAY}$, $BRCH_{1WEEK}$, and $BRCH1_{YEAR}$ are binary variables that take the value of 1 if the reference price range established using prior day's price, prior week's price, and prior year's price is breached during the trading day and zero otherwise. TV is the ratio of shares traded to the total shares outstanding for the company.

Table 2. Correlation Summary.

Variable	ALPH	BETA	YLD	SIZE	PRET	NRET	INST	PLDG	$BRCH_{1DAY}$	$BRCH_{1WEEK}$	$BRCH_{1YEAR}$
ALPH	1.0000										
BETA	0.0832	1.0000									
YLD	−0.1757	−0.1460	1.0000								
SIZE	0.1106	0.1108	−0.0390	1.0000							
PRET	0.0164	0.0431	0.0080	−0.0018	1.0000						
NRET	0.0165	−0.0368	−0.0256	0.0197	0.0121	1.0000					
INST	−0.0783	−0.1620	0.0567	0.1862	−0.0029	0.0242	1.0000				
PLDG	−0.1111	0.0876	−0.0295	−0.1226	0.0006	−0.0185	−0.0840	1.0000			
$BRCH_{1DAY}$	−0.0191	0.0256	−0.0007	0.0276	0.1056	−0.0952	0.0413	−0.1102	1.0000		
$BRCH_{1WEEK}$	−0.0285	0.0100	0.0051	0.0233	0.1620	−0.1263	−0.0128	0.0620	0.0769	1.0000	
$BRCH_{1YEAR}$	0.0342	−0.0112	0.0129	0.0188	0.1466	−0.1178	−0.0806	0.1636	−0.3903	0.4371	1.0000

Notes: ALPH is the intercept from the OLS rolling market regression of stocks' return on the value weighted market return for 250 most recent trading days. BETA is the slope coefficient the OLS rolling market regression of stocks' return on the value weighted market return for 250 most recent trading days. YLD is the annualized dividend yield of the stock based on daily closing price. PRET is the daily positive return, and NRET is the daily negative return, as applicable. INST is the percentage shareholding of institutional shareholders that are not promoters of the company. PLDG is the percentage of promoter shareholding pledged with the financial institutions. $BRCH_{1DAY}$, $BRCH_{1WEEK}$, and $BRCH_{1YEAR}$ are binary variables that take the value of 1 if the reference price range established using prior day's price, prior week's price, and prior year's price is breached during the trading day and zero otherwise. TV is the ratio of shares traded to the total shares outstanding for the company.

4. Results, Discussion, and Additional Tests

The estimation results from the test of the first hypothesis using model (1) are summarized in Table 3.

Table 3. Results from fixed effects regression. Model: $TV_{i,t} = \beta_0 + \beta_1 ALPH_{i,t} + \beta_2 BETA_{i,t} + \beta_3 YLD_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 PRET_{i,t} + \beta_6 NRET_{i,t} + \beta_7\, INST_{i,t} + \beta_8 PLDG_{i,t} + \beta_9 BRCH_{di,t} + \varepsilon_{i,t}$, where $BRCH_d$ is $BRCH_{1DAY}$ for the estimates included in the left panel, $BRCH_{1WEEK}$ for the estimates included in the middle panel, and $BRCH_{1YEAR}$ for the estimates included in the right panel.

Variable	Left Panel (Daily Reference Price Range)				Middle Panel (Weekly Reference Price Range)				Right Panel (Yearly Reference Price Range)			
	Coeff.	*t* Stat.	Prob.		Coeff.	*t* Stat.	Prob.		Coeff.	*t* Stat.	Prob.	
ALPH	0.2818	1.1700	0.2500		0.2916	1.2000	0.2380		0.2492	1.0400	0.3050	
BETA	0.0031	2.8000	0.0080	**	0.0031	2.8000	0.0080	**	0.0031	2.8700	0.0060	**
YLD	0.0000	−0.0700	0.9480		0.0000	−0.0500	0.9610		0.0000	−0.2000	0.8450	
SIZE	0.0001	0.2100	0.8360		0.0001	0.1700	0.8640		0.0002	0.3000	0.7690	
PRET	0.1968	5.4500	0.0000	**	0.1897	5.3800	0.0000	**	0.1899	5.3200	0.0000	**
NRET	−0.0775	−4.5300	0.0000	**	−0.0718	−4.4300	0.0000	**	−0.0719	−4.3100	0.0000	**
INST	0.0001	0.7900	0.4330		0.0000	0.7600	0.4530		0.0000	0.6900	0.4950	
PLDG	0.0000	0.2800	0.7800		0.0000	0.2700	0.7880		0.0000	0.2800	0.7820	
$BRCH_{1DAY}$	0.0005	4.8000	0.0000	**								
$BRCH_{1WEEK}$					0.0015	6.7300	0.0000	**				
$BRCH_{1YEAR}$									0.0033	5.8300	0.0000	**
Adjusted R Squared	0.4111				0.4143				0.4152			

Notes: TV is the dependent variable and is ratio of shares traded to the total shares outstanding for the company. ALPH is the intercept from the OLS rolling market regression of stocks' return on the value weighted market return for 250 most recent trading days. BETA is the slope coefficient the OLS rolling market regression of stocks' return on the value weighted market return for the 250 most recent trading days. YLD is the annualized dividend yield of the stock based on daily closing price. PRET is the daily positive return, and NRET is the daily negative return, as applicable. INST is the percentage shareholding of institutional shareholders that are not promoters of the company. PLDG is the percentage of promoter shareholding pledged with the financial institutions. $BRCH_{1DAY}$, $BRCH_{1WEEK}$, and $BRCH_{1YEAR}$ are binary variables that take the value of 1 if the reference price range established using prior day's price, prior week's price, and prior year's price is breached during the trading day and zero otherwise. Estimates from firm-fixed effects regression are based on 40,580 daily observations for 45 companies. Robust (HAC) standard errors are estimated using Arellano (1987). ** indicates significance at 1%. Results are reported up to four decimal places, since the dependent variable is a small ratio resulting in small numerical value of coefficients. The daily turnover, defined as ratio of shares traded to the total shares outstanding for the company, is less than 1% for small capitalization stocks.

The left panel of Table 3 shows that turnover is higher when the reference price range established using the prior day's trading range is breached. The middle panel shows that the coefficient of $BRCH_{1week}$ is positive, indicating that a violation of weekly reference price range also results in a higher volume. The right panel of Table 3 shows results when the reference price range is established using last 52 weeks trading history. The turnover is higher when the reference price range established using the prior year's trading range is breached. Our results provide evidence that the investors use past prices when evaluating the appropriateness of current prices. Prior research suggests that consumers have a poor understanding of the time value of money (Bates and Gabor 1986; Kemp 1991) and underestimate trends in evaluating time series data due to anchoring effects (Wagenaar and Sagaria 1975; Harvey and Bolger 1996). The underestimation of time value of money results in an overestimation of investor profits and prompts a trading decision. The systematic risk proxied by BETA and asymmetric returns emerge as three other important determinants of turnover in our analysis. We test our second hypothesis using a combination of model (2) and model (3). The estimation results are summarized in Tables 4 and 5.

Table 4. Results from fixed effects regression. Model: $TV_{i,t} = \beta_0 + \beta_1 ALPH_{i,t} + \beta_2 BETA_{i,t} + \beta_3 YLD_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 PRET_{i,t} + \beta_6 NRET_{i,t} + \beta_7\ INST_{i,t} + \beta_8 PLDG_{i,t} + \beta_9 HBRCH_{di,t} + \varepsilon_{i,t}$ where $HBRCH_d$ is $HBRCH_{1DAY}$ for the estimates included in the left panel, $HBRCH_{1WEEK}$ for the estimates included in the middle panel, and $HBRCH_{1YEAR}$ for the estimates included in the right panel.

Variable	Left Panel (Daily Reference Price Range)				Middle Panel (Weekly Reference Price Range)				Right Panel (Yearly Reference Price Range)			
	Coeff.	*t* Stat.	Prob.		Coeff.	*t* Stat.	Prob.		Coeff.	*t* Stat.	Prob.	
ALPH	0.2755	1.1400	0.2610		0.2582	1.0700	0.2900		0.1663	0.7200	0.4740	
BETA	0.0031	2.8000	0.0080	**	0.0031	2.8200	0.0070	**	0.0032	2.9000	0.0060	**
YLD	0.0000	−0.0700	0.9430		0.0000	0.0000	0.9970		0.0000	−0.0400	0.9670	
SIZE	0.0001	0.2100	0.8370		0.0001	0.1100	0.9140		0.0001	0.1600	0.8760	
PRET	0.1904	5.3000	0.0000	**	0.1763	5.1900	0.0000	**	0.1849	5.2700	0.0000	**
NRET	−0.0823	−4.6800	0.0000	**	−0.0826	−4.6700	0.0000	**	−0.0788	−4.6100	0.0000	**
INST	0.0001	0.8000	0.4300		0.0001	0.8200	0.4140		0.0001	0.7900	0.4340	
PLDG	0.0000	0.2800	0.7790		0.0000	0.2500	0.8070		0.0000	0.2400	0.8090	
$HBRCH_{1DAY}$	0.0007	4.2800	0.0000	**								
$HBRCH_{1WEEK}$					0.0024	6.3800	0.0000	**				
$HBRCH_{1YEAR}$									0.0057	5.6800	0.0000	**
Adjusted R Squared	0.4115				0.4165				0.4178			

Notes: TV is the dependent variable and is ratio of shares traded to the total shares outstanding for the company. ALPH is the intercept from the OLS rolling market regression of stocks' return on the value weighted market return for the 250 most recent trading days. BETA is the slope coefficient the OLS rolling market regression of stocks' return on the value weighted market return for 250 most recent trading days. YLD is the annualized dividend yield of the stock based on daily closing price. PRET is the daily positive return, and NRET is the daily negative return, as applicable. INST is the percentage shareholding of institutional shareholders that are not promoters of the company. PLDG is the percentage of promoter shareholding pledged with the financial institutions. $HBRCH_{1DAY}$, $HBRCH_{1WEEK}$, and $HBRCH_{1YEAR}$ are binary variables that take the value of 1 if the high end of reference price range established using prior day's price, prior week's price, and prior year's price is breached during the trading day and zero otherwise. Estimates from firm-fixed effects regression are based on 40,580 daily observations for 45 companies. Robust (HAC) standard errors are estimated using Arellano (1987). ** indicates significance at 1%. Results are reported up to four decimal places, since the dependent variable is a small ratio resulting in small numerical value of coefficients. The daily turnover, defined as ratio of shares traded to the total shares outstanding for the company, is less than 1% for small capitalization stocks.

We find evidence that investors trade more when the high end of the reference price range is violated. The results are consistent for the reference price range constructed using the prior day's prices (left panel of Table 4), the prior week's prices (middle panel of Table 4), and the prior year's prices (right panel of Table 4). However, we do not find any evidence for increased trading volume when the low end of the reference price range is violated. This evidence is again consistent for the reference price range constructed using the prior day's prices (left panel of Table 5), the prior week's prices (middle panel of Table 5), and the prior year's prices (right panel of Table 5). A joint analysis of results from Tables 4 and 5 provides evidence in support for our second hypothesis. The disposition effect, where investors show bias by realizing gains on profitable trading positions but delay the realization of losses on loss-making trading positions, is clearly evident from our results.

Table 5. Results from fixed effects regression. Model: $TV_{i,t} = \beta_0 + \beta_1 ALPH_{i,t} + \beta_2 BETA_{i,t} + \beta_3 YLD_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 PRET_{i,t} + \beta_6 NRET_{i,t} + \beta_7\ INST_{i,t} + \beta_8 PLDG_{i,t} + \beta_9 LBRCH_{di,t} + \varepsilon_{i,t}$, where $LBRCH_d$ is $LBRCH_{1DAY}$ for the estimates included in the left panel, $LBRCH_{1WEEK}$ for the estimates included in the middle panel, and $LBRCH_{1YEAR}$ for the estimates included in the right panel.

Variable	Left Panel (Daily Reference Price Range)				Middle Panel (Weekly Reference Price Range)				Right Panel (Yearly Reference Price Range)			
	Coeff.	*t* Stat.	Prob.		Coeff.	*t* Stat.	Prob.		Coeff.	*t* Stat.	Prob.	
ALPH	0.2793	1.1500	0.2540		0.2810	1.1600	0.2520		0.2835	1.1800	0.2460	
BETA	0.0031	2.8000	0.0080	**	0.0031	2.7900	0.0080	**	0.0031	2.7900	0.0080	**
YLD	0.0000	−0.0700	0.9430		0.0000	−0.0700	0.9410		0.0000	−0.0900	0.9290	
SIZE	0.0002	0.2300	0.8200		0.0002	0.2300	0.8190		0.0002	0.2400	0.8100	
PRET	0.1986	5.5100	0.0000	**	0.1987	5.5000	0.0000	**	0.1982	5.4900	0.0000	**
NRET	−0.0785	−4.4900	0.0000	**	−0.0780	−4.5100	0.0000	**	−0.0779	−4.4600	0.0000	**
INST	0.0001	0.7900	0.4340		0.0001	0.7900	0.4360		0.0000	0.7700	0.4430	
PLDG	0.0000	0.2800	0.7800		0.0000	0.2800	0.7800		0.0000	0.2800	0.7790	
$LBRCH_{1DAY}$	0.0000	0.2400	0.8110									
$LBRCH_{1WEEK}$					0.0001	0.8900	0.3780					
$LBRCH_{1YEAR}$									0.0004	1.0600	0.2930	
Adjusted R Squared	0.4108				0.4108				0.4108			

Notes: TV is the dependent variable and is ratio of shares traded to the total shares outstanding for the company. ALPH is the intercept from the OLS rolling market regression of stocks' return on the value weighted market return for 250 most recent trading days. BETA is the slope coefficient the OLS rolling market regression of stocks' return on the value weighted market return for 250 most recent trading days. YLD is the annualized dividend yield of the stock based on daily closing price. PRET is the daily positive return, and NRET is the daily negative return, as applicable. INST is the percentage shareholding of institutional shareholders that are not promoters of the company. PLDG is the percentage of promoter shareholding pledged with the financial institutions. $LBRCH_{1DAY}$, $LBRCH_{1WEEK}$, and $LBRCH_{1YEAR}$ are binary variables that take the value of 1 if the low end of reference price range established using prior day's price, prior week's price, and prior year's price is breached during the trading day and zero otherwise. Estimates from firm-fixed effects regression are based on 40,580 daily observations for 45 companies. Robust (HAC) standard errors are estimated using Arellano (1987). ** indicates significance at 1%. Results are reported up to four decimal places, since the dependent variable is a small ratio resulting in small numerical value of coefficients. The daily turnover, defined as ratio of shares traded to the total shares outstanding for the company, is less than 1% for small capitalization stocks.

Gneezy (2005) shows that the prior maximum is a commonly-reported statistic and is likely to be more relevant to the traders. This may be especially true in situations where investors do not recall the purchase price due to a long holding period or the initial purchase price is not comparable nominally due to stock dividends, stock splits, or reverse mergers. We, therefore, investigate whether the violation of prior day's price range and prior week's price range provides additional information about expected turnover in the presence of a variable that captures the violation of prior year's price range. We use the following six specifications to investigate this enquiry.

$$TV_{i,t} = \beta_0 + \beta_1 ALPH_{i,t} + \beta_2 BETA_{i,t} + \beta_3 YLD_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 PRET_{i,t} + \beta_6 NRET_{i,t} + \beta_7 INST_{i,t} + \beta_8 PLDG_{i,t} + \beta_9 BRCH_{1DAYi,t} + \beta_{10} BRCH_{1YEARi,t} + \varepsilon_{i,t} \quad (4)$$

$$TV_{i,t} = \beta_0 + \beta_1 ALPH_{i,t} + \beta_2 BETA_{i,t} + \beta_3 YLD_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 PRET_{i,t} + \beta_6 NRET_{i,t} + \beta_7 INST_{i,t} + \beta_8 PLDG_{i,t} + \beta_9 HBRCH_{1DAYi,t} + \beta_{10} HBRCH_{1YEARi,t} + \varepsilon_{i,t} \quad (5)$$

$$TV_{i,t} = \beta_0 + \beta_1 ALPH_{i,t} + \beta_2 BETA_{i,t} + \beta_3 YLD_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 PRET_{i,t} + \beta_6 NRET_{i,t} + \beta_7 INST_{i,t} + \beta_8 PLDG_{i,t} + \beta_9 LBRCH_{1DAYi,t} + \beta_{10} LBRCH_{1YEARi,t} + \varepsilon_{i,t} \quad (6)$$

$$TV_{i,t} = \beta_0 + \beta_1 ALPH_{i,t} + \beta_2 BETA_{i,t} + \beta_3 YLD_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 PRET_{i,t} + \beta_6 NRET_{i,t} + \beta_7 INST_{i,t} + \beta_8 PLDG_{i,t} + \beta_9 BRCH_{1WEEKi,t} + \beta_{10} BRCH_{1YEARi,t} + \varepsilon_{i,t} \quad (7)$$

$$TV_{i,t} = \beta_0 + \beta_1 ALPH_{i,t} + \beta_2 BETA_{i,t} + \beta_3 YLD_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 PRET_{i,t} + \beta_6 NRET_{i,t} + \beta_7 INST_{i,t} + \beta_8 PLDG_{i,t} + \beta_9 HBRCH_{1WEEKi,t} + \beta_{10} HBRCH_{1YEARi,t} + \varepsilon_{i,t} \quad (8)$$

$$TV_{i,t} = \beta_0 + \beta_1 ALPH_{i,t} + \beta_2 BETA_{i,t} + \beta_3 YLD_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 PRET_{i,t} + \beta_6 NRET_{i,t} + \beta_7 INST_{i,t} + \beta_8 PLDG_{i,t} + \beta_9 LBRCH_{1WEEKi,t} + \beta_{10} LBRCH_{1YEARi,t} + \varepsilon_{i,t} \quad (9)$$

The estimation results from the above models are summarized in Tables 6 and 7.

Table 6. Results from fixed effects regression. Model 1: $TV_{i,t} = \beta_0 + \beta_1 ALPH_{i,t} + \beta_2 BETA_{i,t} + \beta_3 YLD_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 PRET_{i,t} + \beta_6 NRET_{i,t} + \beta_7\ INST_{i,t} + \beta_8 PLDG_{i,t} + \beta_9 BRCH_{1DAYi,t} + \beta_{10} BRCH_{1YEARi,t} + \varepsilon_{i,t}$. Model 2: $TV_{i,t} = \beta_0 + \beta_1 ALPH_{i,t} + \beta_2 BETA_{i,t} + \beta_3 YLD_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 PRET_{i,t} + \beta_6 NRET_{i,t} + \beta_7\ INST_{i,t} + \beta_8 PLDG_{i,t} + \beta_9 HBRCH_{1DAYi,t} + \beta_{10} HBRCH_{1YEARi,t} + \varepsilon_{i,t}$. Model 3: $TV_{i,t} = \beta_0 + \beta_1 ALPH_{i,t} + \beta_2 BETA_{i,t} + \beta_3 YLD_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 PRET_{i,t} + \beta_6 NRET_{i,t} + \beta_7\ INST_{i,t} + \beta_8 PLDG_{i,t} + \beta_9 LBRCH_{1DAYi,t} + \beta_{10} LBRCH_{1YEARi,t} + \varepsilon_{i,t}$.

Variable	(1)				(2)				(3)		
	Coeff.	***t* Stat.**	**Prob.**		**Coeff.**	***t* Stat.**	**Prob.**		**Coeff.**	***t* Stat.**	**Prob.**
ALPH	0.2514	1.0500	0.3000		0.1672	0.7300	0.4720		0.2837	1.1800	0.2450
BETA	0.0031	2.8700	0.0060	**	0.0032	2.9000	0.0060	**	0.0031	2.7900	0.0080
YLD	0.0000	−0.1900	0.8500		0.0000	−0.0400	0.9670		0.0000	−0.0900	0.9290
SIZE	0.0002	0.2800	0.7800		0.0001	0.1500	0.8850		0.0002	0.2400	0.8100
PRET	0.1891	5.2900	0.0000	**	0.1806	5.1400	0.0000	**	0.1984	5.4900	0.0000
NRET	−0.0712	−4.2600	0.0000	**	−0.0810	−4.6500	0.0000	**	−0.0777	−4.3700	0.0000
INST	0.0000	0.6900	0.4940		0.0001	0.7900	0.4320		0.0000	0.7700	0.4430
PLDG	0.0000	0.2800	0.7820		0.0000	0.2400	0.8080		0.0000	0.2800	0.7790
$BRCH_{1DAY}$	0.0003	3.1800	0.0030	**							
$BRCH_{1YEAR}$	0.0033	5.7400	0.0000	**							
$HBRCH_{1DAY}$					0.0004	2.5900	0.0130	**			
$HBRCH_{1YEAR}$					0.0055	5.5000	0.0000	**			
$LBRCH_{1DAY}$									0.0000	0.1400	0.8860
$LBRCH_{1YEAR}$									0.0004	1.0400	0.3020
Adjusted R Squared	0.4152				0.4180				0.4108		

Notes: TV is the dependent variable and is ratio of shares traded to the total shares outstanding for the company. ALPH is the intercept from the OLS rolling market regression of stocks' return on the value weighted market return for 250 most recent trading days. BETA is the slope coefficient the OLS rolling market regression of stocks' return on the value weighted market return for 250 most recent trading days. YLD is the annualized dividend yield of the stock based on daily closing price. PRET is the daily positive return, and NRET is the daily negative return, as applicable. INST is the percentage shareholding of institutional shareholders that are not promoters of the company. PLDG is the percentage of promoter shareholding pledged with the financial institutions. $BRCH_{1DAY}$ and $BRCH1_{YEAR}$ are binary variables that take the value of 1 if the reference price range established using prior day's price and prior year's price is breached during the trading day and zero otherwise. $HBRCH_{1DAY}$ and $HBRCH_{1YEAR}$ are binary variables that take the value of 1 if the high end of reference price range established using prior day's price and prior year's price is breached during the trading day and zero otherwise. $LBRCH_{1DAY}$ and $LBRCH_{1YEAR}$ are binary variables that take the value of 1 if the low end of reference price range established using prior day's price and prior year's price is breached during the trading day and zero otherwise. Estimates from firm-fixed effects regression are based on 40,580 daily observations for 45 companies. Robust (HAC) standard errors are estimated using Arellano (1987). ** indicates significance at 1%.

Table 7. Results from fixed effects regression. Model 1: $TV_{i,t} = \beta_0 + \beta_1 ALPH_{i,t} + \beta_2 BETA_{i,t} + \beta_3 YLD_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 PRET_{i,t} + \beta_6 NRET_{i,t} + \beta_7\ INST_{i,t} + \beta_8 PLDG_{i,t} + \beta_9 BRCH_{1WEEKi,t} + \beta_{10} BRCH_{1YEARi,t} + \varepsilon_{i,t}$. Model 2: $TV_{i,t} = \beta_0 + \beta_1 ALPH_{i,t} + \beta_2 BETA_{i,t} + \beta_3 YLD_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 PRET_{i,t} + \beta_6 NRET_{i,t} + \beta_7\ INST_{i,t} + \beta_8 PLDG_{i,t} + \beta_9 HBRCH_{1WEEKi,t} + \beta_{10} HBRCH_{1YEARi,t} + \varepsilon_{i,t}$. Model 3: $TV_{i,t} = \beta_0 + \beta_1 ALPH_{i,t} + \beta_2 BETA_{i,t} + \beta_3 YLD_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 PRET_{i,t} + \beta_6 NRET_{i,t} + \beta_7\ INST_{i,t} + \beta_8 PLDG_{i,t} + \beta_9 LBRCH_{1WEEKi,t} + \beta_{10} LBRCH_{1YEARi,t} + \varepsilon_{i,t}$.

Variable	(1)				(2)				(3)		
	Coeff.	***t* Stat.**	**Prob.**		**Coeff.**	***t* Stat.**	**Prob.**		**Coeff.**	***t* Stat.**	**Prob.**
ALPH	0.2640	1.0900	0.2800		0.1737	0.7500	0.4550		0.2844	1.1800	0.2450
BETA	0.0031	2.8600	0.0060	**	0.0032	2.8900	0.0060	**	0.0031	2.7900	0.0080
YLD	0.0000	−0.1600	0.8760		0.0000	0.0100	0.9920		0.0000	−0.0900	0.9300
SIZE	0.0002	0.2400	0.8120		0.0001	0.0800	0.9340		0.0002	0.2400	0.8110
PRET	0.1848	5.2700	0.0000	**	0.1715	5.1100	0.0000	**	0.1985	5.4800	0.0000
NRET	−0.0678	−4.2200	0.0000	**	−0.0817	−4.6500	0.0000	**	−0.0774	−4.4100	0.0000
INST	0.0000	0.6800	0.5000		0.0001	0.8100	0.4200		0.0000	0.7700	0.4440
PLDG	0.0000	0.2700	0.7870		0.0000	0.2300	0.8230		0.0000	0.2800	0.7780
$BRCH_{1WEEK}$	0.0011	5.1700	0.0000	**							
$BRCH_{1YEAR}$	0.0028	4.7600	0.0000	**							
$HBRCH_{1WEEK}$					0.0018	4.6500	0.0000	**			
$HBRCH_{1YEAR}$					0.0045	4.5600	0.0000	**			
$LBRCH_{1WEEK}$									0.0001	0.6600	0.5110
$LBRCH_{1YEAR}$									0.0004	0.9300	0.3560
Adjusted R Squared	0.4171				0.4205				0.4108		

Notes: TV is the dependent variable and is ratio of shares traded to the total shares outstanding for the company. ALPH is the intercept from the OLS rolling market regression of stocks' return on the value weighted market return for 250 most recent trading days. BETA is the slope coefficient the OLS rolling market regression of stocks' return on the value weighted market return for 250 most recent trading days. YLD is the annualized dividend yield of the stock based on daily closing price. PRET is the daily positive return and NRET is the daily negative return, as applicable. INST is the percentage shareholding of institutional shareholders that are not promoters of the company. PLDG is the percentage of promoter shareholding pledged with the financial institutions. $BRCH_{1WEEK}$ and $BRCH1_{YEAR}$ are binary variables that take the value of 1 if the reference price range established using prior week's price and prior year's price is breached during the trading day and zero otherwise. $HBRCH_{1WEEK}$ and $HBRCH_{1YEAR}$ are binary variables that take the value of 1 if the high end of reference price range established using prior week's price and prior year's price is breached during the trading day and zero otherwise. $LBRCH_{1WEEK}$ and $LBRCH_{1YEAR}$ are binary variables that take the value of 1 if the low end of reference price range established using prior week's price and prior year's price is breached during the trading day and zero otherwise. Estimates from firm-fixed effects regression are based on 40,580 daily observations for 45 companies. Robust (HAC) standard errors are estimated using Arellano (1987). ** indicates significance at 1%.

Our results show that the violation of a reference price range established using the prior day's price and the prior week's price provides additional information in estimating turnover. Further, our results using revised model specifications are consistent with our main results. While a violation of the high end of the reference price range is associated with a higher turnover, a violation of the low end of the reference price range is not.

5. Conclusions

We hypothesized that investors will form a range of reference prices based on the distribution of historical prices and will deem any violation of the reference price range as an actionable trading stimulus. The investors should respond to a violation of their internalized reference price range by executing a trading decision. The conceptualization of reference price with other cross-sectional characteristics in the same empirical framework allowed us to examine the incremental effect of reference price range on turnover. Our findings, based on observations from a portfolio of small-capitalization Indian stocks over a five-year period, provide evidence that investors are more likely to trade a stock that has a price outside their reference price range as compared to a stock that has a price within their reference price range. We also report that in instances where the reference price range is violated by daily price movement, price movements that violate the high end of the reference price range generate more volume. The violation of the low end of the reference price range is not associated with increased trading volume. Our above-reported results are consistent for the reference price ranges that are constructed using the prior day's price history, prior week's price history, and prior year's price history. Our findings are consistent with the prior findings that investors suffer from myopic loss aversion. They continue to hold the positions when the stock prices decrease but are more willing to sell stocks that have appreciated. Our findings also provide empirical evidence for the disposition effect and the overconfidence hypothesis. This paper extends the discussion on unsolved nominal prize puzzle and offers evidence that besides dollar prices, price range also incorporates investor preferences that affect traded volume. We offer a theoretical explanation for differences in turnover that systematically amalgamates diverse findings from the product pricing and social psychology literature. Our findings have implications for traders and policymakers. The portfolio managers can develop a better understanding of expected trading intensity by incorporating reference price range in their models. Improved estimation of market liquidity will assist traders in devising efficient trading strategies. Policymakers can use our results to find ways to improve the liquidity and efficiency of financial markets.

Our study suffers from two limitations. Firstly, our study is situated in a single-country setting. Extant literature in the behavioral finance suggests that investors in different socio-cultural settings process information signals differently and may have different biases. We, therefore, advocate that our study is replicated in a multiple-country setting to validate the robustness of findings. Secondly, the study presents a theoretical explanation for the observed investor behavior but an experimental study can provide confirmation and offer additional insights. We, therefore, advocate that our study is replicated in an experimental setup using retail day traders as subjects. The subjects can be exposed to a varying degree of range violation under different scenarios of market index performance. Such an experimental study will lead to a better understanding of underlying motivations and biases of retail traders towards the reference price range. The proposed study will also be helpful in addressing the effect of investor heterogeneity, market conditions, and individualism on liquidity considerations.

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