Investor Behavior at the 52 Week High[☆]

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Abstract

We extend upon the previous studies of the 52 week high and explain how household disposition effect and anchoring behavior is responsible for both the volume spikes at the 52 week high and the return continuation following it. Our data set allows recognition of household and institutional stock trading, from which we show households strongly sell with latent limit orders placed at the 52 week high price. This behavior is strengthened when the high is more salient and with market wide uncertainty. This household limit order selling provides the liquidity for the post event momentum style returns we see following the 52 week high. This anchoring behavior is very costly to households and fruitful to institutions who act as the counter-party to these trades.

Keywords: 52 week high, limit orders, household behavior

JEL classification: G11, G12, G41

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1. Introduction

In this study, we explore the trading of individual investors with institutional investors around a salient and prominent anchor, the 52 week high (the 52WH, henceforth) (George and Hwang, 2004; Huddart et al. 2009). For an investor with prospect theory preferences, the 52WH represents a signal to sell, as the stock is likely to be in the domain of gains (Shefrin and Statman, 1985), and provides an anchor for the highest past price (Kahneman, 1992). However, the 52WH does not represent value-relevant information in a weak-form efficient market. Thus, this selling pressure perceived by household investors at the 52WH dampens upward price movement (George and Hwang, 2004; Grinblatt and Han, 2005), leading to subsequent but delayed return continuation.

This paper examines the extent to which individual investors are responsible for the 52WH effect, these investors' order submission strategies, and how they contribute to subsequent return drift. Using clearinghouse-level data from Finland (e.g., Grinblatt and Keloharju, 2001), which allow us to identify all trades made by individuals and institutions, we explore between-group trader interaction for 100 stocks over the period 2004–2009. We uncover a series of new findings.

First, on days when stocks open near the 52WH (specifically, within 3 percent of the 52WH), the individual-institutional trade imbalance (reflecting the net buying of individuals with institutions) is -17.5 percent, compared with 0 percent for days when stocks are not trading at the 52WH. Thus, for a trade between an individual and an institution on the 52WH day, there is a 58.8 percent chance that the individual investor is on the sell side, compared with an even chance for non-52WH days. Thus, our paper presents clear evidence that trade at the 52WH involves systematic selling by individuals to institutions. The volume spikes identified by Huddart et al.

(2009) therefore likely represent transfers between ownership groups - household to institution.

Second, the 52WH appears to induce limit order submission in this selling by individuals. This supports the findings that uninformed investors generally prefer to place limit orders when selling (e.g., Kaniel and Liu, 2006; Linnainmaa, 2010). Individuals also appear to cluster limit orders around attention-grabbing or novel prices (Bhattacharya et al., 2012). However, Bian et al. (2018) suggest that individuals order submission strategies are more aggressive, they prefer to take liquidity, when realizing gains rather than losses. In contrast, we find that individuals prefer to use limit orders on 52WH days, when they provide liquidity/use limit orders on 49.5 percent of sell trades, which is significantly higher than the 45.7 percent of sell trades on non-52WH days.

Third, limit order selling by individuals appears to be primarily responsible for the return continuation at the 52WH identified by George and Hwang (2004). We find that stocks at the 52WH earn 60-day cumulative abnormal risk-adjusted returns of .158 percent (0.64 percent per annum). In the 60 days after the 52WH day, we find that high (top-quartile) limit order usage on the 52WH subsumes the return continuation. Thus, we argue that the 52WH phenomenon, under closer inspection, is driven by household provision of liquidity, which drives adverse selection by informed institutional investors.

Our findings also reveal that these effects are stronger for new 52WHs (when the stock is at the 52WH for the first time in 14 days), where the individual-institutional trade imbalance is -36.3 percent, suggesting that capital gains overhang (Grinblatt and Han, 2005) further drives selling by individuals. The effects are stronger also during periods of high market volatility, when individuals are more likely to rely on anchors in making their sales decisions (Kumar, 2009). For robustness, we undertake an event study, on the 5 days prior to and following the 52WH day, to determine whether the 52WH day itself is the unique point of interest. We find that the 52WH day itself is the focal point of the high household selling and limit order execution, after which investor behavior (both selling and limit order usage) returns to pre-52WH day levels.

Overall, our findings using investor-level trade data contribute to the literature on the poor performance of household investors (Odean, 1998, Barber and Odean, 2008) and the role of anchors in financial markets (Bhattacharya et al., 2012) and provide a clear identification and explanation of both the volume spikes and the post-event returns observed at the 52WH (George and Hwang, 2004, Huddart et al., 2009).

This paper proceeds as follows. Section 2 discusses the related literature and presents the hypothesis. Section 3 introduces the data and the method utilized to identify the 52WH and measure investor behavior. Section 4 reports the key findings of the study and discusses their significance in relation to the literature. Finally, section 5 presents a summary of the results of the study and offers an outline for future studies.

2. Related Literature

Prior empirical research exploring individual investor behavior identifies a number of facts. Household investors tend, for example, to be net buyers of stocks that have captured their attention (e.g., Barber and Odean (2008)), with institutional investors being the counterparties in these trades.

Households tend to be contrarian investors, particularly in their selling behavior.

On average, households sell stocks following positive news announcements and buy stocks subject to negative news (e.g., Hirshleifer et al. (2008), Kaniel et al. (2008)). Individuals tend to exhibit the disposition effect, which renders them particularly prone to selling winning stocks and holding losers(Odean, 1998). As a result of their trading activity, they underperform the market and institutional investors (Odean, 1999).

Individual investors have also been shown to rely on anchors when making their trading decisions (Jegadeesh and Titman, 1993, Li and Yu, 2012, Bhootra and Hur, 2013). Anchors that have been identified as influencing investor decisions include a stock's purchase price (e.g., Shefrin and Statman, 1985; Odean, 1998; Ben-David and Hirshleifer, 2012), its historical high price (e.g., Huddart et al., 2009; Li and Yu, 2012), and the 52WH, as in George and Hwang (2004). The latter anchor is the focus of this study.

A stock's 52WH ratio is defined as follows:

$$52WeekHighRatio_{i,t} = \frac{Price_{i,t}}{HighPrice_{i,t}}, \tag{1}$$

where $HighPrice_{i,t}$ is the highest daily closing price for stock i over the past year $(t-252, t)$, and t is measured in days, while $Price_{i,t}$ is the current stock price. The ratio therefore represents the nearness, in percentage terms, of the current stock's price to its 52WH price.

A number of authors, beginning with George and Hwang (2004), demonstrate that the 52WH ratio is a significant driver of momentum profits (Jegadeesh and Titman, 1993). Anchoring at the 52WH has also been shown to play a key role in predicting trading volume. Huddart et al. (2009), for instance, find that past price extremes influence investor trading in aggregate and that there are volume spikes when a stock crosses its 52WH price.

2.1. Causes of the 52 Week High Effect

There are several proposed causes of the 52WH effect, which stem primarily from individual investor behavior. The key explanations are related to the disposition effect, anchoring bias, and expectational errors.

First, nearness to the 52WH price may proxy for the level of capital gains that investors are holding at any given time, which is also known as the capital gains overhang (e.g., Grinblatt and Han, 2005; Hur et al., 2010; An, 2016; Wang et al., 2017). High levels of capital gains overhang induce selling behavior among individual investors, particularly those who are susceptible to the disposition effect. These investors are keen to sell near the 52WH because the stock is, in aggregate, in the domain of gains for investors with prospect theory preferences.

Second, the day of the 52WH may act as a key attention-grabbing anchor (e.g., Aragon and Dieckmann, 2011; Yuan, 2015). Huddart et al. (2009) find that trading volume rises sharply when stock prices pass the 52WH threshold. This effect is amplified for smaller stocks, those with more valuation uncertainty, and those with a greater proportion of individual holdings. Tversky and Kahneman (1974) noted that individuals are more likely to rely on heuristics, including anchors, when problems are uncertain, while Daniel et al. (1998) noted that behavioral biases are amplified in times of uncertainty. Peng and Xiong (2006) suggest that, due to limited attention, investors will prioritize certain anchors and attention-grabbing events over others. As the 52WH is reported by news outlets and brokers, it is a salient anchor for investors trading stocks. The 52WH will likely be incorporated by individuals seeking to sell, particularly for stocks that have a degree of valuation ambiguity.

Third, errors in expectations may be amplified at the 52WH (e.g., Baker et al., 2012; Birru, 2015), because both analyst and investor return expectations are driven down for stocks near the 52WH, as evidenced by price targets and earnings surprises. Thus, investors may prefer to sell stocks near the 52WH because they believe that future returns are likely to be lower based on erroneous analyst reports and their own skewness expectations. Indeed, recent evidence suggests that stocks trading near the 52WH demonstrate no premium for skewness (e.g., Blau et al., 2018), unlike stocks far from the 52WH.

2.2. Trade type at the 52 Week High

While prior studies have examined the impact of trade at the 52WH, generally finding volume increases and return continuation, there has been little direct investigation into the identification of who is trading at the 52WH. Studies have typically implied that individual selling behavior is responsible for the 52WH effect; however, this has not yet been clearly measured.

Individuals generally prefer to use limit orders for trading. For instance, Black (1986) suggests that uniformed traders place orders based on either an exogenous liquidity requirement or noise that is immaterial to the true fair value of an asset. Due to their lack of private information, individuals are generally considered uninformed investors. Indeed, Baker and Stein (2004) note that the information content of trades can be measured via an individual's willingness to supply liquidity, which households prefer to do.

Building on these findings, Kaniel et al. (2008) show that individuals prefer to place limit orders to earn a 'liquidity premium' from institutional investors seeking execution immediacy. This liquidity premium varies over time with market-wide uncertainty (Nagel, 2012). However, the literature does not appear to address individual order submission behavior being anchored to the 52WH. Several authors (e.g., Linnainmaa, 2010; Kelley and Tetlock, 2013) find that individuals tend to place latent, unsupervised limit orders; such orders are placed at prices at which investors plan to buy or sell a stock in the future. This latent price is of crucial importance, as it suggests that individuals could place latent limit orders at key anchors such as the 52WH. Kelley and Tetlock (2013) further find that individual investors' tendency to use limit orders helps to supply liquidity and immediacy to institutional investors trading via market orders. In addition, Bhattacharya et al. (2012) find that individual investors utilize limit orders to anchor trades to milestone nominal prices and that individuals anchor to the left-most digit of a price, i.e., \$6.99 versus \$7.00. Sell limit orders are shown to cluster around round numbers, suggesting that individuals anchor to salient price points with liquidity-providing orders.

In relative contrast, Bian et al. (2018) relate order aggressiveness to prior returns; retail investors on the Shanghai Stock Exchange are more aggressive in submitting sell orders for stocks that have experienced gains. However, a negative quadratic term indicated that investors were less aggressive in selling stocks that experienced strong rather than moderate gains. While this does not provide specific predictions for stocks at the 52WH, it does demonstrate that prior returns appear to influence individuals' order submission strategies.

2.3. Trade Between Individuals and Institutions

While individual investors have been shown to generally underperform in their trades (e.g., Barber et al., 2008), less attention has been paid to the counterparties of these trades. Among the exceptions, Stoffman (2014) uses Finnish data and analyzes the stock trades between 'groups', classified as household and institutional investors. When within-group trading occurred (e.g., households with households), despite it being quite common, there was little price effect. However, when institutions and individuals engage in trade, individuals tend to be on the losing side. For example, when individuals sell to institutions, prices tend to increase at short horizons. Consistent with this, Fong et al. (2014) find that orders submitted through discount broker channels (presumably, those of individuals) are less informative than those of full-service brokers. This effect is particularly pronounced for market orders vis-à-vis limit orders, implying that individuals are likely better off supplying, rather than demanding, liquidity.

2.4. Hypotheses

In the literature, there appears to be little exploration of the role of investors in causing the observed 52WH effect and the costs associated with this behavior. Thus, by using our rich data set, we are able to analyze household trading behavior (buying/selling and limit order usage) with institutions and the stock returns following the 52WH. Our above review of the literature gives rise to clear, testable hypotheses:

Hypothesis 1: Individual investors exhibit strong anchoring to the 52WH price and strong selling behavior at and around the 52WH day.

Hypothesis 2: Households will be more likely to use limit orders when selling at the 52WH.

Hypothesis 3: Households anchor more to the the 52WH when it is more salient and during uncertain periods, as shown by greater limit order usage.

Hypothesis 4: Households will suffer as a result of this anchoring behavior in the form of post-event return continuation following the 52WH day.

3. Data and Methods

To explore how households trade around the 52WH, we use trades obtained directly from the Helsinki NASDAQ OMXH (OMXH). The data come from the Nordic Central Securities Depository (NCSD). This data set contains the official records of trades, including identifiers that designate trader group identity (domestic institutions, foreign institutions, households, and others).The data include the raw daily trades from 1 January 2004 to 31 December 2009 [1] on the OMXH. We apply filters to include only the top 100 companies based on market capitalization from the end of the sample[2]. Additionally, the data are aggregated to the daily level by group, and trading is then split into either household or institutional trades (this includes foreign institutions, domestic institutions and other investors – see table 1) to observe the interaction between investor classes as performed by Stoffman (2014). Within-group trading is removed from the main sample, as we are unable to extract trade direction or trade type from such observations. In addition to the trade data, we merge the price, volume, share characteristics, and European volatility index (VIX) from *Compustat* for the sample period.

3.1. Variable Construction

3.1.1. 52 Week High Metrics

The 52WH ratio is the ratio of the current stock price to the maximum daily closing price over the previous year, as described in equation 1. We identify days on which the stock opens at the 52WH as follows. If the 52WH ratio at the current

[1] We end the sample in 2009 because the NCSD no longer provides intra-day trading between institutions but rather aggregates the trades at day's end. Thus, we are no longer able to identify, with the same accuracy, the trade imbalance and taking rate between groups.

[2] Including only the top 100 stocks by market capitalization is done to ensure that the sample is widely held by both institutional and household investors and is not illiquid or thinly traded.

Table 1: Allocation of investors to groups

The table shows the allocation of the investor groups to group 1 (Households) and group 2 (Institutions). The two groups are identified in the data and all trades within groups net to zero, all between groups trades are reported in the subsequent tables and figures.

Group 1: Households	**Group 2: Institutions**
Households	Foreign Institutions
	Domestic Institutions
	Trusts
	Others

day's open is at or above 97%, then we consider the current day to be a 52WH day. This may capture days for which the stock does not breach the 52WH threshold, but this would be observable to an investor *ex ante*.

To estimate the impact of capital gains overhang (that is, whether investors have likely sold their prior winners), we calculate the *New 52WH*. To do so we categorize a *New 52WH* if the price has not been at or above the 52WH price in the prior 14 calendar days, following Huddart et al. (2009).[3]

3.1.2. Investor Behavior Metrics

To measure the rate of 'between-group' trading, we use a novel measure of trade imbalance. This measure reports the relative buying of stock i on day t by households against institutions. It is an extension of the order imbalance measure developed by Chordia et al. (2002) for buying and selling intensity.

$$TradeImbalanceHH_{i,t} = \sum_{i=1}^{n} \frac{VBuys_{i,t} - VSells_{i,t}}{VBuys_{i,t} + VSells_{i,t}}, \tag{2}$$

[3]Subsequent analysis using lags of 30 calendar days showed no significant difference relative to the 14-day lag.

where $TradeImbalanceHH_{i,t}$ is the household's trade imbalance, and $VBuys_{i,t}$ is the volume of buys and $VSells_{i,t}$ is the volume of sells in stock i on day t. Intuitively, this measure offers a ratio of the relative direction of trade in a given stock between households and institutions. The value of $TradeImbalanceHH$ is bounded between -1 and $+1$, where larger positive values indicate a greater share of buying by households relative to institutions. As this includes only between-group trading, we do not report the corresponding measure for institutions, which is the opposite-signed value.

Next, we construct measures of order aggressiveness. First, we identify limit orders and market orders using the Lee and Ready (1991) algorithm, based on order execution relative to the midpoint of the bid-ask spread.

We then utilize the Bloomfield et al. (2009) measure *Taking RateHH* to determine the relative amount of market orders to total orders by households. Specifically,

$$TakingRateHH_{i,t,d} = \frac{MarketOrderHH_{i,t,d}}{MarketOrdersHH_{i,t,d} + LimitOrdersHH_{i,t,d}}, \qquad (3)$$

where $MarketOrdersHH_{i,t,d}$ is the volume of *executed* market orders and $LimitOrdersHH_{i,t,d}$ is the volume of executed limit orders by households in stock i at time t, and d indicates direction (either buying or selling). The measure $TakingRateHH$ takes values between 0 and 1, where 0 indicates that households traded only using limit orders. The complement of this metric $(1-TakingRateHH)$ would indicate the the liquidity providing rate of households.

3.1.3. Additional Controls

We follow Bian et al. (2018) and include risk and liquidity controls, as they may contribute to the variation in trade imbalance and taking rate. We calculate a stock-specific risk measure (Handa and Schwartz, 1996) as the lagged 20 trading day standard deviation of returns. Stock-specific risk should increase the bid-ask spread and, thus, increase adverse selection risks when using limit orders (e.g., Glosten and Milgrom, 1985).

$$RISK_{i,t} = \left(\left(\frac{1}{N-1} \right) \sum_{i=1}^{20} (R_{i,t} - \bar{R}_{i,t}) \right)^{1/2}, \tag{4}$$

where $\bar{R}_{i,t}$ is the average of the daily return R_i on stock i for the 20 prior trading days. Thus, $RISK$ is the standard deviation of the daily return over the 20 days prior to day t.

We utilize the Amihud (2002) illiquidity measure as a control for the daily price impact of trades. We compute an average Amihud illiquidity measure, as the lagged 20-day average daily value,

$$AMIHUD_{i,t} = \sum_{i=1}^{20} \frac{|R_{i,t-1}|}{20 * DVOL_{i,t-1}}, \tag{5}$$

where $R_{i,t}$ is the return of stock i on day t, and $DVOL_{i,t-1}$ is the trading volume in euros on day $t - i$. A high Amihud measure is an indicator of low liquidity because it reflects the movements in a stock price for a given level of volume. All other controls, such as market capitalization, EuroVIX, volume and contemporaneous price, are obtained from Compustat.

4. Results

4.1. 52 Week High Ratio

To observe the effect of the 52WH on investor behavior, we first establish the benchmarks for the investor behavior metrics across our sample. On any given day, we see that the rate of trade imbalance between groups is near zero, suggesting that households neither buy nor sell to institutions over the period. We find that the taking rates for buys and sells are between 0.50 and 0.56. This shows that across the sample, households tend to use market orders when trading with institutions. Additionally, between-group trading accounts for approximately 1/3 of all volume across all size terciles; this is slightly higher than the rate found by Kumar and Lee (2006) in the U.S. market. Households also tend to trade small-cap stocks among themselves (57% of turnover), while institutions tend to trade large stocks among themselves (66% of turnover). This supports prior expectations that households are more active in smaller cap stocks.

Our first analysis is to determine the general effect of the 52WH price on trading behavior; to do so, we first sort stocks into deciles based on their 52WH ratio, ascending from furthest from to nearest to the 52WH. Table 3 and figure 1 depict a clear monotonic decrease in the household trade imbalance ratio as stocks approach the 52WH. This decrease is indicative of higher rates of selling behavior both due to the 52WH ratio and at the 52WH price. The near 52WH decile is as much as 32% points lower than the far 52WH decile in trade. This supports the expectation in Grinblatt and Han (2005) that the likelihood that households will sell a stock increases as it begins to accumulate capital gains. In addition, the $near-9$ portfolio shows a 10% increase in the trade imbalance ratio, which indicates that the 52WH price is as an anchor for individuals to sell, in excess of the disposition effect.

Table 2: Summary statistics by size tercile

This table reports the summary statistics for the main investor behavior and stock characteristics. For each daily observation We report the mean, standard deviation, 25th percentile, median and 75th percentile of the sample sorted into terciles by market capitalization at the end of the sample. Trade Imbalance HH is the daily balance of household trade with institutions (I.I). Taking rate sells is the ratio of household market order usage when selling to institutions. Between Turnover HH is the ratio of household to institution trade relative to all volume. Within Turnover I.I is the ratio of institution to institution trade relative to all volume. Within Turnover HH is the ratio of household to household trade relative to all volume. Market capitalization is the price*shares outstanding/100 million. The sample period is from January 2004 to December 2009

Market Capitalization	Variable	Mean	Std Dev	25th Pctl	Median	75th Pctl
Small	Trade Imbalance Ratio HH	-0.010	0.873	-1.000	0.000	1.000
	Taking Rate Sells HH	0.557	0.430	0.000	0.650	1.000
	Between Turnover HH (%)	0.358	0.420	0.000	0.230	0.619
	Within Turnover I.I (%)	0.075	0.415	0.000	0.000	0.203
	Within Turnover HH (%)	0.567	0.450	0.125	0.558	1.000
	Market Capitalization	3.546	2.617	1.713	2.938	4.806
Medium	Trade Imbalance Ratio HH	-0.049	0.781	-0.904	-0.097	0.791
	Taking Rate Sells HH	0.543	0.377	0.179	0.564	0.963
	Between Turnover HH (%)	0.392	0.372	0.109	0.325	0.588
	Within Turnover I.I (%)	0.284	0.463	0.000	0.260	0.645
	Within Turnover HH (%)	0.324	0.372	0.033	0.168	0.513
	Market Capitalization	18.154	9.590	11.132	15.886	23.242
Large	Trade Imbalance Ratio HH	-0.027	0.561	-0.442	-0.017	0.380
	Taking Rate Sells HH	0.524	0.265	0.361	0.524	0.689
	Between Turnover HH (%)	0.272	0.849	0.091	0.188	0.357
	Within Turnover I.I (%)	0.656	1.087	0.554	0.782	0.895
	Within Turnover HH (%)	0.072	0.289	0.003	0.012	0.045
	Market Capitalization	409.915	1081.570	64.908	128.403	254.745

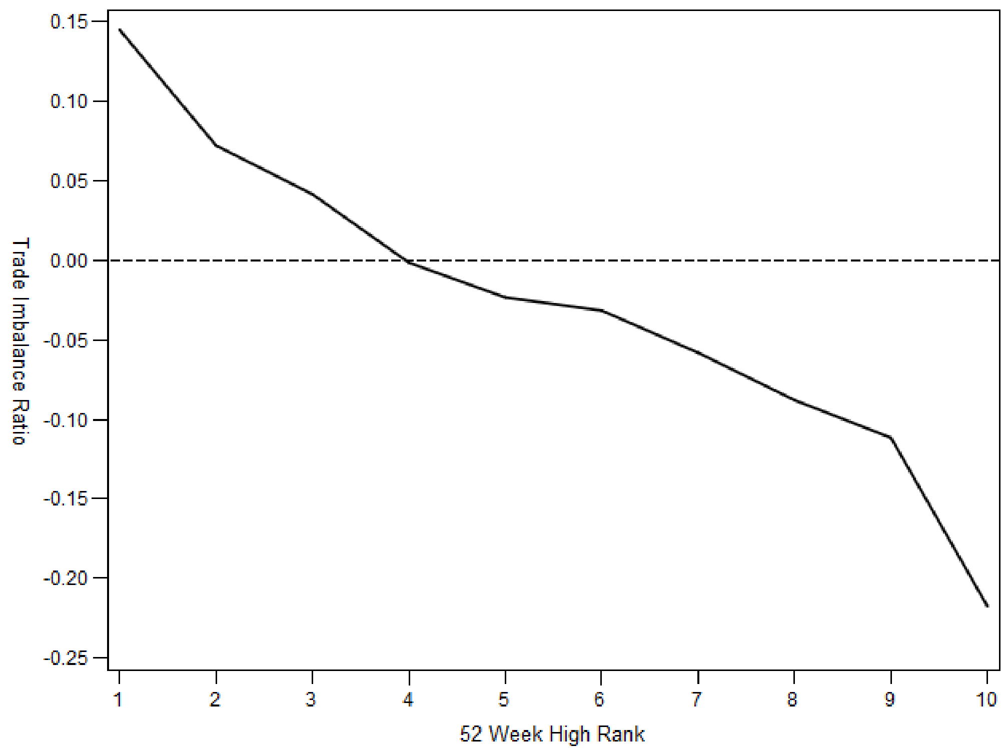


Figure 1: Household Trade Imbalance by 52 week high rank

The figure plots the household average daily trade imbalance ratio with institutions for the top 100 stocks sorted into deciles based on the stocks current price/ 52 week high price. 52 week high rank is sorted from 1 (farthest from 52WH price) to 10 (nearest to the 52WH price)

Next, we examine individual investors' sell taking rate, and we observe fairly flat usage of sell limit orders by 52WH decile. Between the 9th and near deciles, we observe a strong increase in household limit order selling. We find a statistically significant increase in limit order usage for both the $near - far$ deciles and the near less 9th deciles. This provides preliminary support for the hypothesis that households anchor their limit order selling to the 52WH price.

The general effect of the 52WH ratio is that households tend to sell their stocks as they approach the 52WH, and this is consistent with disposition effect (Shefrin and Statman, 1985) and accumulated capital gains effect (Grinblatt and Han, 2005).

Second, this behavior is intensified at the near 52WH decile, which shows that households may anchor their selling behavior to the 52WH price in combination with increased limit order usage to sell down their positions.

Table 3: Household trading behavior by nearness to the 52 week high price

We first sort stocks by day into 52 week high into deciles, we then report the household between groups trading on a stock by stock basis. Panel A reports the mean daily rate over the sample period 2004-2009 for household trading based on the relevant 52WH decile. Panel B reports the difference between the near minus far decile and the near minus 9 for their respective HH trading. The t statistics are presented in parenthesis, ***, **, *, indicate significance at the 1%, 5% and the 10% level, respectively.

	Trade Imbalance HH		Taking Rate Sells HH	
52 Week High Rank	Mean	Std Dev	Mean	Std Dev
Panel A: Investor behavior by 52 week high rank				
1 (Far)	0.095	0.612	0.534	0.314
2	0.078	0.640	0.547	0.315
3	0.043	0.647	0.539	0.315
4	0.012	0.655	0.543	0.314
5	-0.007	0.648	0.544	0.314
6	-0.022	0.652	0.540	0.315
7	-0.035	0.656	0.535	0.318
8	-0.087	0.653	0.524	0.320
9	-0.130	0.652	0.515	0.320
10 (Near)	-0.231	0.628	0.505	0.309
	Mean		Mean	
Panel B: Mean difference in investor behavior				
Near - Far	-0.327**		-0.030**	
	(-34.786)		(-6.510)	
Near - 9	-0.102**		-0.010**	
	(-10.713)		(-2.223)	

4.2. The 52 Week High Price

Having observed that individual investors are sensitive to the general effect of the 52WH ratio, we explore investor behavior on the days during which the stock opens at or within 3% of the 52WH price; we consider this being at the 52WH price/ the 52WH day. We also add additional specificity to the 52WH by introducing, similarly to Huddart et al. (2009), a *new 52WH*. We recognize a new 52WH if the stock has not breached the 52WH price in the 14 days prior to the current 52WH. This allows for a distinction between high-momentum stocks that are continually increasing in price and forming consecutive 52WH days and those that have established and just broken through a new 52WH. Finally, we introduce volatility to determine whether increases the salience of an anchor as predicted by the literature (Tversky and Kahneman, 1992, 1974).

To explore investor behavior on the 52WH day, we undertake three sorts:

1. Average day vs. 52WH day
2. New 52WH day vs. Old 52WH day
3. Low VIX on the 52WH day vs. High VIX on the 52WH day

We first report the general effect of the 52WH day, the results of which are presented in table 4, panel A. We show that the trade imbalance on the 52WH day is, on average, -0.175; this means households are selling 17 percentage points more than they are buying. Households tend to use significantly more limit orders at the 52WH (50% vs. 54% otherwise). This, in combination with the trade imbalance finding, strongly supports the hypothesis that individuals are strong sellers at the 52WH and do so with anchoring-style limit orders.

Having established the general role of the 52WH price on household behavior, we next test the relative effect of the new 52WH against the old 52WH in table 4, panel b. We, again in support of our hypothesis, find a very strong trade imbalance ratio at the new 52WH, of as much as -0.363, which is almost 20% points lower than at the old 52WH. Limit order usage is also very strong at the new 52WH: we observe that the sell taking rate significantly drops from the old 52WH rate of 0.50 to the new 52WH rate of 0.46. This finding again strongly supports the role of the

Table 4: Investor Behavior on the 52 Week High Day

This table presents the results of the daily investor behavior metrics of trade Imbalance ratio , taking rate sells and Taking rate buys between household and institutions. The sample covers the 2004 to 2009 period for the top 100 stocks on the OMXH Helsinki Index. Panel A firstly sorts stocks by day if they are not at the 52WH and those that are at or within 3% of the 52WH price (at 52WH) at the day's open. We report the investor behavior mean and standard deviation (std dev) metrics and the mean difference. Panel B firstly identifies stocks by day if they are within 3% of the 52WH price and have been at the 52WH within the last 14 trading days (Old 52WH) and those that are within 3% of the 52WH and the stock price has not surpassed the 52WH in the past 14 trading days (New 52WH).We report the investor behavior mean and standard deviation (std dev) metrics and the mean difference. Panel C firstly sorts stock days into quartiles by the level of EuroVIX, we report the high and low vix quartile and then identify stocks by day if they are within 3% of the 52WH price.We report the investor behavior mean and standard deviation (std dev) metrics and the mean difference. The t statistics are presented in parenthesis, ***, **, *, indicate significance at the 1%, 5% and the 10% level, respectively.

Panel A: Average Day Vs 52 Week High Day					
	Average Day		52WH Day		52WH Day - Average Day
	Mean	Std Dev	Mean	Std Dev	
Trade Imbalance Ratio HH	-0.007	0.738	-0.175	0.685	-0.168**
					(-75.043)
Taking Rate Sells HH	0.543	0.351	0.505	0.327	-0.038**
					(-32.212)
Panel B:Old Vs New 52 Week High					
	Old 52WH Day		New 52WH Day		New - Old 52WH
	Mean	Std Dev	Mean	Std Dev	
Trade Imbalance Ratio HH	-0.166	0.687	-0.363	0.623	-0.197**
					(-35.702)
Taking Rate Sells HH	0.507	0.328	0.460	0.302	-0.047**
					(-15.671)
Panel C: Low Vs High VIX on 52 Week High Day					
	Low VIX on 52WH Day		High VIX on 52WH Day		High - Low VIX
	Mean	Std Dev	Mean	Std Dev	
Trade Imbalance Ratio HH	-0.18	0.638	-0.301	0.639	-0.121**
		HH			(-13.396)
Taking Rate Sells HH	0.5	0.297	0.523	0.337	0.023**
					(5.028)

52WH as an anchor around which individual investors place latent limit orders in expectation of a 52WH approach or breakthrough. The relative increase in limit orders at the new 52WH suggests that individuals require time to build up their limit order books in advance of the 52WH price (Kaniel et al., 2008).

In panel c, we next introduce market-wide volatility to determine whether the 52WH price as an anchor is strengthened by volatility. We compare stocks at the 52WH in a low-volatility market to those in a high-volatility market. To do so, we sort stocks into quartile portfolios based on the daily EuroVIX index price and then report the stocks that are at the 52WH price. Further supporting our hypothesis, high uncertainty results in far greater selling behavior (12 percentage points greater) by households. We observe lower usage of limit orders to sell when volatility is high, suggesting that households are less likely to provide liquidity when liquidity is more expensive. Glosten and Milgrom (1985) show that as uncertainty increases, relative spreads and adverse selection risks increase. As such, this finding suggests that individuals are both sensitive to the 52WH as an anchor and sensitive to the adverse selection risks associated with the higher volatility.

4.3. Further Specifications

To offer further support for our hypotheses, we conduct a series of four OLS regressions for household trade imbalance on the dummy variables for $52WHMax_{i,t}$ and $New52WHMax_{i,t}$ with interactions and control variables for size, price, market volatility, liquidity and risk.

$$\begin{aligned} TradeImbalanceHH_{i,t} = b_0 &+ b_1 52WHIndicator_{i,t} + b_2 New52WHIndicator_{i,t} \\ &+ b_3 52WHRatio_{i,t} + Interactions + Controls + \epsilon_{i,t} \end{aligned} \tag{6}$$

Where $TradeImbalanceHH_{i,t}$ is the ratio of household net buying in stock i at time t when trading with institutions. $52WHIndicator_{i,t}$ is an indicator variable that takes value one if the stock i is at the 52WH on day t, zero otherwise. $New52WHIndicator_{i,t}$ is an indicator variable that takes value one if the stock i is at the New 52WH on day t, zero otherwise. $52WHRatio_{i,t}$ is the ratio of the price of stock i at time t to the stock's 52WH price. $TakingRateSellsHH_{i,t}$ is the ratio of sell market orders by households to that of institutions in stock i price at time t. $TakingRateSellsHHLowQuartile_{i,t}$ is an indicator variable that takes value one if the household taking rate of stock i at time t is in the lowest quartile, zero otherwise. The variable $interactions$ is $TakingRateSellsHHLowQuartile_{i,t}*52WHIndicator_{i,t}$ takes a value of one when stock i at time t is both at the 52WH and has experienced sell limit orders in the highest quartile for the day. The controls include $MktCap_{i,t}$, which is the log market capitalization of stock i at time t; $AverageVIX[t_{-20}, t]$, which is the average EuroVIX for the days t-20 to t; *price* is the log price of stock i at time t; and $AMIHUD$ and $RISK$ are as defined in equation 5 and equation 4, respectively.

The results of the above regressions are presented in table 5. We undertake a stepwise approach to examine the marginal effect of the new 52WH and the 52WH ratio on the 52WH max price. We first examine the effect of the 52WH max price and, as expected, observe a strong negative coefficient (-0.158), which is indicative of anchoring at the 52WH. The marginal effect of the new 52WH is a very large increase in household selling, as predicted, and net selling increases by -0.239%; thus, salience increases the strength of the anchor. When controlling for the 52WH ratio We see that the 52WH ratio has a negative relationship with the trade imbalance and represents an independent source of increased selling by households, most likely proxying for the disposition effect.

Finally, we introduce the interaction variable $TakingRateSellsHH$ $LowQuartile_{i,t}$* $52WHIndicator$. This coefficient indicates that when households use limit orders at the top quartile for the 52WH, it strongly drives a negative trade imbalance. Thus, latent limit order usage is in part responsible for the strong selling behavior that we observe at the 52WH. We find consistent negative coefficients around our 52WH-based variables. The 52WH ratio provides a strong proxy for disposition effect behavior. However, the 52WH max price and the new 52WH exhibit much larger negative coefficients, which reveal the marginal effect of being at the 52WH and it being very salient, respectively. These results are robust to risk and liquidity measures, which suggests that the observed selling behavior is driven by behavioral measures.

Table 5: Regression of the Investor Behavior on the 52 Week High Day

This table presents results from the OLS regression 6, with trade imbalance ratio as the dependent variable. The 52WH Indicator is an indicator variable with a value of one, if the stock i price opens within 3% of the 52WH price, zero otherwise. The New 52WH Indicator is an indicator variable with a value of 1, if stock i price opens within 3% of the 52WH price and has not been at the 52WH in the 14 calendar days prior, zero otherwise. The $52WHratio$ is the ratio of stock i price at time t relative to the 52WH price. Taking rate sells is the rate of market order usage by households to sell stock i at time t. $TakingRateSellsLowQuartile$ * $52WHIndicator$ is in indicator variable that has a value of one, if the taking rate sells in stock i are in the lowest quartile on day t and the stock is at the 52WH, zero otherwise.$MktCap$ is the log Market capitalization of stock i at time t. $VIX[t-20,t]$ is the average value for the EuroVIX index for the prior 20 trading days. $AMIHUD$ is the lag 20 day average value of the Amihud (2002) measure for stock i. $RISK$ is the lag 20 day average standard deviation of returns in stock i. The t statistics are reported in brackets below the coefficients , ***, **, *, indicate significance at the 1%, 5% and the 10% level, respectively.

	Trade Imbalance Ratio			
	I	II	III	IV
Intercept	-0.052	-0.052	0.154***	-1.411***
	(-1.56)	(-1.57)	(4.52)	(-43.96)
52WH Indicator	-0.158***	-0.148***	-0.092***	-0.167***
	(-25.00)	(-23.04)	(-13.49)	(-25.55)
New 52WH Indicator		-0.239***		
		(-8.50)		
52 Week High Ratio			-0.296***	
			(-25.67)	
Taking Rate Sells				-0.005
				(-0.65)
Taking Rate Sells Low Quartile * 52 WH Indicator				-0.087***
				(-6.72)
Mkt Cap	-0.006***	-0.006***	-0.004**	0.058***
	(-3.36)	(-3.35)	(-2.19)	(34.23)
VIX [t-20, t]	0.005***	0.005***	0.003***	0.006***
	(27.35)	(27.40)	(15.96)	(31.01)
Log Price	0.026***	0.026***	0.028***	0.005**
	(10.27)	(10.19)	(11.08)	(2.13)
AMIHUD	-0.656***	-0.656***	-0.537***	-3.211***
	(-3.19)	(-3.19)	(-2.62)	(-14.30)
RISK	0.001	0.001	0.001	0.001**
	(1.42)	(1.49)	(1.47)	(2.02)
Obs	88,686	88,686	88,686	88,686
R-Square	0.0190	0.0198	0.0262	0.0445
Adj R-Sq	0.0189	0.0197	0.0262	0.0444

To provide further support for our hypothesis that individuals anchor to the 52WH with limit orders, we use the following series of OLS regressions on the dummy variables for the 52WH and the new 52WH with interactions, liquidity and risk controls.

$$\begin{aligned} TakingRateSellsHH_{i,t} = b_0 + b_1 52WHIndicator_{i,t} + b_2 New52WHIndicator_{i,t} \\ + b_3 52WHRatio_{i,t} + Interactions + Controls + \epsilon_{i,t} \end{aligned} \tag{7}$$

Where $TakingRate_{i,t}$ is the ratio of executed sell market orders to total sells for stock i at time t that are executed against institutional investors. Other interaction and control variables are as defined in regression 7.

The results for regression 7 are presented in table 6. We follow a similar stepwise protocol to observe the effect of the 52WH, the new 52WH and the 52WH ratio on household order submission strategy. We first find that the 52WH price causes increased limit order usage by households. We observe an additional effect of the new 52WH, which has a coefficient of -0.047 and indicates that households use approximately 4.5 percentage points more limit orders to sell stocks when the anchor becomes more salient, at the new 52WH. We then report the effect of the 52WH ratio, which is non-significant and does not reduce the effect of the 52WH, thus suggesting that the use of limit orders is more closely related to anchoring at the 52WH rather than to a need to sell down accumulated capital gains. Finally, we introduce the interaction of days when the VIX is in the highest quartile and at the 52WH max price. This causes a small but significant increase in market order usage, thus furthering our previous observation that uncertainty reduces limit order usage generally, most likely due to the the adverse selection costs that households have to bear with limit orders. Our controls are consistent across all models, and we find that households use limit orders more in small stocks, a higher price results in more market orders (i.e., as a result of the decline in the relative tick size), and risk increases market order usage, as expected.

Overall, the regressions continue to support our hypotheses. First, households are sensitive to the 52WH as a sell signal, and they sell using limit orders. This selling behavior is also intensified under uncertainty and when the anchor is more salient. Thus, we continue to obtain direct support for the notion that the selling behavior is as a result of latent limit orders placed at the 52WH (Kelley and Tetlock, 2013, Bhattacharya et al., 2012).

Table 6: Regression of Investor Behavior on the 52 Week High Day

This table presents results from the OLS regression 7, with taking rate sells as the dependent variable. The 52WH Indicator is an indicator variable with a value of one, if the stock i price opens within 3% of the 52WH price, zero otherwise. The New 52WH Indicator is an indicator variable with a value of 1, if stock i price opens within 3% of the 52WH price and has not been at the 52WH in the 14 calendar days prior, zero otherwise. The $52WHratio$ is the ratio of stock i price at time t relative to the 52WH price. $HighquartileVIX$ * $52WHIndicator$ is an indicator variable that has a value of one, if the EuroVix index value is in the highest quartile, over the past year, on day t and the stock is at the 52WH, zero otherwise. $MktCap$ is the log Market capitalization of stock i at time t. $VIX[t-20,t]$ is the average value for the EuroVIX index for the prior 20 trading days. $Price$ is the log price of stock i at time t. $AMIHUD$ is the lag 20 day average value of the Amihud (2002) measure for stock i. $RISK$ is the lag 20 day average standard deviation of returns in stock i. The t statistics are reported in brackets below the coefficients , ***, **, *, indicate significance at the 1%, 5% and the 10% level, respectively.

	Taking Rate Sells			
	I	II	III	IV
Intercept	0.634***	0.634***	0.630***	0.635***
	(37.75)	(37.76)	(36.43)	(37.81)
52WH Indicator	-0.036***	-0.034***	-0.037***	-0.066***
	(-11.53)	(-10.69)	(-11.04)	(-7.24)
New 52WH Indicator		-0.047***		
		(-3.44)		
52 Week High Ratio			0.006	
			(1.03)	
High quartile VIX *52 WH Indicator				0.002***
				(3.53)
MktCap	-0.004***	-0.004***	-0.004***	-0.004***
	(-4.55)	(-4.55)	(-4.59)	(-4.56)
VIX [t-20, t]	-0.001***	-0.001***	-0.001***	-0.002***
	(-15.17)	(-15.15)	(-13.69)	(-15.53)
Price	0.007***	0.007***	0.007***	0.007***
	(5.30)	(5.27)	(5.28)	(5.44)
AMIHUD	0.176	0.176	0.174	0.176
	(1.47)	(1.48)	(1.46)	(1.47)
RISK	0.001**	0.001**	0.001**	0.001**
	(2.24)	(2.28)	(2.24)	(2.25)
Obs	80,283	80,283	80,283	80,283
R-Square	0.0044	0.0046	0.0044	0.0046
Adj R-Sq	0.0044	0.0045	0.0044	0.0045

4.4. Event Analysis

Having identified the importance of the 52WH day, we next explore stock and investor behavior before and after the high. This is done, first, to ensure that the 52WH day itself is the novel event rather than just the approximate time period when the price is high and, second, to investigate the behavior of investors prior to and following the high. Because the 52WH may be relatively predictable as the price rises in the days prior, we expect that investors may begin acting in preparation for the high. Additionally, following the 52WH, investors may respond or adjust their behavior after redeeming their gains on the event date. To undertake the analysis, we employ event study methodology (MacKinlay, 1997) with an event time frame of t_{-5} to t_{+5} trading days around the 52WH price being reached. To extend the previous findings, the trade imbalance ratio and the taking rate are of key importance. Additionally, we include the abnormal return (AR) and cumulative abnormal return (CAR) for the event windows to determine the economic cost of anchoring to the 52WH for households in the short run.

$$AR_{i,t} = R_{i,t} - R_{m,t} \tag{8}$$

$AR_{i,t}$ refers to the AR on stock i at time t, $R_{i,t}$ is the daily return on stock i at time t, and $R_{m,t}$ is the daily return on the OMXH market at time t. $AR_{i,t}$ allows us to determine the return on the stock in excess of the market return.

$$CAR_{i,t} = \sum_{t=1}^{n} AR_{i,t} \tag{9}$$

$CAR_{i,t}$ refers to the CAR for stock i from time t to time n. To determine the importance of the event window, we need to aggregate the abnormal returns to draw any conclusions regarding the event of interest. The reported $CAR_{i,t}$ is the equally weighted aggregated AR by stock surrounding the 52WH day event.

Figure 2 and table 7 depict both the AR and investor behavior pattern around the new and old 52WH. We first observe the increased selling behavior that is typical of stocks with a high 52WH ratio. In addition, we find that selling peaks at the 52WH day, ranging from approximately -15% to as low as -35% for stocks at the new 52WH, after which selling returns to pre-event levels. We observe a very similar pattern of limit order selling, whereby limit order selling peaks at the 52WH day and reverts to baseline levels thereafter. This analysis addresses the potential counterfactual that the 52WH is itself just a state of high prices, as we show that household selling and sell limit orders peak at the 52WH day and recede thereafter.

To test the hypothesis that individuals suffer as a result of this anchoring behavior, we identify the AR and calculate the CAR for the pre- and post-event periods. We find that the AR rises leading up to the event as is required to meet the 52WH price; this suggests that the stocks reaching the 52WH are doing so in excess of potential market-led rallies. We find that stocks are experiencing significant CAR in the pre-event period at the old and new 52WH of 5.91% and 3.27%, respectively. As expected, individuals are selling down these stocks as the price approaches the 52WH. We observe a significant AR at the event date and CAR over the 5-day forward period for the old 52WH, suggesting that households are missing out on significant post-event-period returns, of as much as 5.5%. This is not the case for the new 52WH, which does not exhibit return continuation on the the event day or in the post-event return but rather return reversion. Thus, this finding shows that in the short term, individual investors are in fact not losing out when selling at the new 52WH but only when they sell at the old 52WH.

Our hypothesis that households are anchoring to the 52WH, with limit orders, and suffer as a result is clearly supported by the findings. We see that there is a general effect of the 52WH ratio that leads to disposition-effect-style selling. In addition, we find that sell limit orders executed immediately prior to and on the 52WH day cause significant decreases in the trade imbalance ratio. This causes the AR to be relatively weak on the 52WH day. The implication is that investors miss out on significant short-term post-event abnormal returns, which supports the finding of Barber et al. (2008) that prices move against household trading. Individuals, however, do not face lost AR when reacting to the new 52 WH, which is a novel finding. The existence of a new 52WH is much more rare than of an old 52WH, which suggests that despite this finding, households are, on average, losing out on economic returns.

Table 7: Abnormal Stock Returns and Investor behavior at New Vs Old 52WH.

This table reports the statistics for the event study $t_{-5} - T_{+5}$ days around the 52WH day event. Panel A of the Table presents the 5 day day lead and lag abnormal return (stock return less market return), household trade imbalance and the taking rate sells of the respective stocks sorted based on whether they are at the new or old 52WH at time T. Panel B reports the cumulative lead and lag abnormal return of stocks of the new and old 52WH as well as the pre, during and post event window. The t statistics are presented in parenthesis, ***, **, *, indicate significance at the 1%, 5% and the 10% level, respectively.

Panel A: Descriptive Statistics

Time	Abnormal Returns (%)		Trade Imbalance Ratio HH		Taking Rate Sells HH	
	Old 52WH	New 52WH	Old52WH	New 52WH	Old 52WH	New 52WH
t_{-5}	0.987	0.220	-0.184	-0.135	0.521	0.544
t_{-4}	1.025	0.201	-0.184	-0.124	0.520	0.526
t_{-3}	1.228	0.207	-0.186	-0.159	0.519	0.530
t_{-2}	1.280	0.603	-0.185	-0.184	0.517	0.523
t_{-1}	1.341	2.048	-0.187	-0.267	0.513	0.512
t_0	**0.582**	**0.031**	**-0.166**	**-0.363**	**0.507**	**0.460**
t_{+1}	0.650	-0.045	-0.144	-0.224	0.519	0.535
t_{+2}	0.650	0.067	-0.137	-0.191	0.523	0.543
t_{+3}	0.006	-0.135	-0.135	-0.175	0.527	0.540
t_{+4}	0.641	-0.066	-0.133	-0.163	0.528	0.541
t_{+5}	0.645	-0.032	-0.131	-0.186	0.532	0.532

Panel B: Cumulative Lead and Lag Abnormal Returns

	Old 52WH	New 52WH	New - Old
CAR Pre Event Window $_{(t-5,t-1)}$	5.917	3.277	-2.639
			(-0.832)
AR Event $_{(t)}$	0.582	-0.031	0.613
			(-0.236)
CAR Post Event Window $_{(t+1,t+5)}$	1.940	-0.275	-2.215*
			(-1.154)
Pre - Post Event	3.976***	3.552***	
	(5.175)	(20.722)	

We next continue the analysis of post-52WH abnormal returns during the [t+5] event day window using the following OLS regression specifications.

$$\begin{aligned} CAR_{i,t,n} = b_{0,} &+ b_1 52WHIndicator_{i,t} + b_2 New52WHIndicator_{i,t} \\ &+ b_3 52WHRatio_{i,t} + InvestorBehavior + Interactions \\ &+ Controls + \epsilon_{i,t} \end{aligned} \tag{10}$$

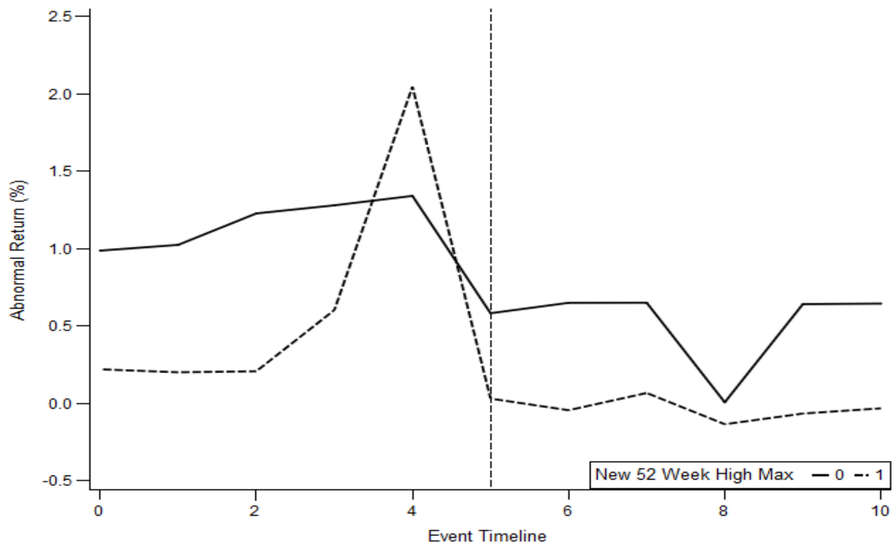
$CAR_{i,n,t}$ is the CAR from time t to time n, which is equal to $t+5$, for stock i. The cumulative trade imbalance is the sum of the trade imbalance divided by shares outstanding of stock i over the specified period.

$TradeImbalanceRatioLowQuartile_{i,t}$ is an indicator variable that takes value one if the stocks are currently in the lowest quartile of daily trade imbalance by day, zero otherwise. All other interactions and controls are as defined above.

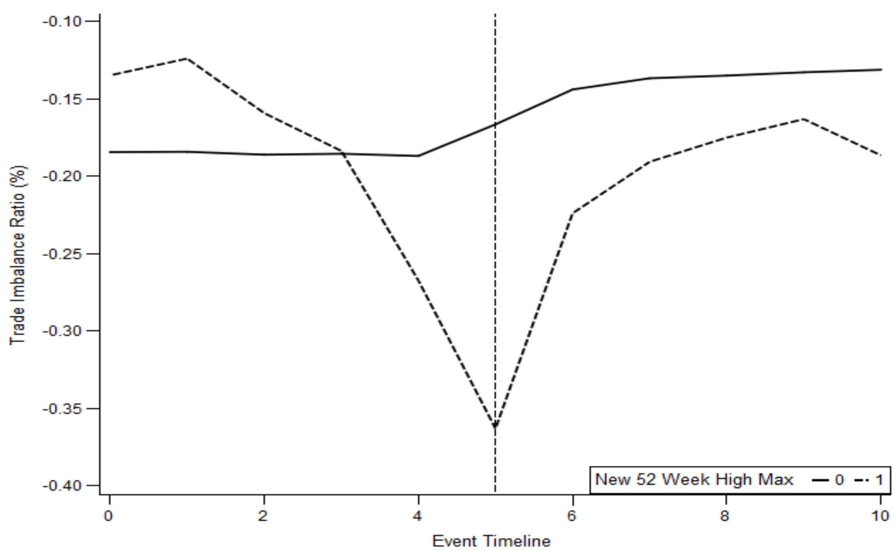
The results of regression 10 are presented in table 8. We find that the effect of the 52WH price results in clear post-event alpha. Furthermore, the new 52WH coefficient is not significant and, thus, does not lead to any additional returns when controlling for the 52WH. We obtain a similar non-significant coefficient for the 52WH ratio. Thus, the 52WH max price is the sole cause of the post-event 5-day abnormal returns.

We now introduce investor behavior in the form of cumulative trade imbalance [4] and find that much of the positive returns following the 52WH are driven by household selling, but this is not the case prior to the 52WH. This supports the expectation offered by Kelley and Tetlock (2013) that prices move against household trading. We next observe the effect of sell limit orders on 5-day-lead abnormal returns and,

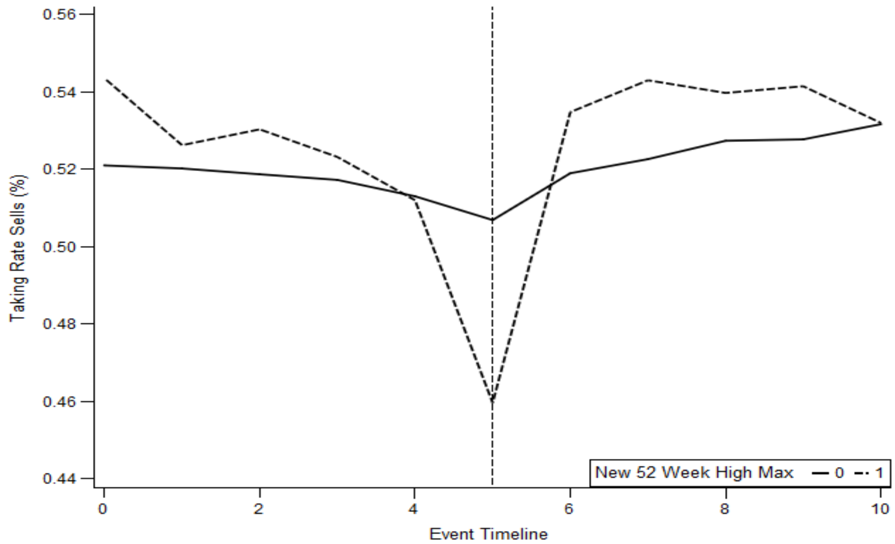
[4]Cumulative trade imbalance is the sum of the household buys - household sells over the given period.



(a) Household Abnormal Return around New and Old 52 Week High Day



(b) Household Trade Imbalance Ratio around New and Old 52 Week High Day



(c) Household Taking Rate Sells around New and Old 52 Week High Day by VIX Rank

Figure 2: Investor behavior around new and old 52 week high by VIX rank

The plots identify stocks by day if they are within 3% of the 52WH price and have been at the 52WH within the last 14 trading days (Old 52WH) and those that are within 3% of the 52WH and the stock price has not surpassed the 52WH in the past 14 trading days (New 52WH). Panel A plots the daily average abnormal return for all stocks from the t_{-5} to t_{+5} centering at the 52 week high.Panel B plots the daily average Panel B plots the daily average household trade imbalance with institutions for the same period. Panel C plots the daily average household taking rate for sells within the same period.

interestingly, find that the taking rate for sells is inversely related to future returns, that is, sell limit orders drive positive returns, while the interaction variable $Takingratesellslowquartile * 52WHindicator$ shows that very high limit order usage at the 52WH is very strongly related to post-event drift, to the extent that the 52WH indicator is no longer significant. This suggests that the underlying cause of the observed 52WH and post-event returns is in large part due to household limit orders: when we control for them, the 52WH effect disappears. This implication may very well explain the underlying cause of the 52WH post-event returns being household limit order selling allowing for the liquidity for post-event drift. Having observed the short-term effect of this anchoring behavior, a longer term exploration of AR drift is required to determine the full economic effect of this behavior on household returns and the role of sell limit orders in causing the longer term 52WH drift found by George and Hwang (2004), Bhootra and Hur (2013).

Table 8: 5 Day Lead Cumulative Abnormal Returns following the 52 Week High

This table presents results from the OLS regression 10, with 5 day lead cumulative abnormal returns as the dependent variable. The 52WH Indicator is an indicator variable with a value of one, if the stock i price opens within 3% of the 52WH price, zero otherwise. The New 52WH Indicator is an indicator variable with a value of 1, if stock i price opens within 3% of the 52WH price and has not been at the 52WH in the 14 calendar days prior, zero otherwise. The $52WHratio$ is the ratio of stock i price at time t relative to the 52WH price. $TradeImbalance$ is the ratio of household buying behavior as a percentage of total household trading in stock i at time t as a percentage of shares outstanding. $CumulativeTradeImbalance$ $[t_{-5}, t_{-1}]$ is the cumulative household trade imbalance in stock i as a percentage of shares outstanding for the 5 days prior. $CumulativeTradeImbalance$ $[t_{+1}, t_{+5}]$ is the cumulative household trade imbalance in stock i as a percentage of shares outstanding for the 5 days forward. $Takingratesells$ is the rate of market order usage by households to sell stock i at time t. $TakingRateSellsLowQuartile$ * $52WHIndicator$ is in indicator variable that has a value of one, if the taking rate sells in stock i are in the lowest quartile on day t and the stock is at the 52WH, zero otherwise. $MktCap$ is the log Market capitalization of stock i at time t. VIX $[t_{-20}, t]$ is the average value for the EuroVIX index for the prior 20 trading days. The t statistics are reported in brackets below the coefficients , ***, **, *, indicate significance at the 1%, 5% and the 10% level, respectively.

Table 8: Continued

	Cumulative Abnnormal Return [t_{+1},t_{+5}]				
	I	II	III	IV	V
Intercept	0.190***	0.190***	0.188***	0.161***	0.199***
	(7.18)	(7.18)	(6.85)	(6.53)	(6.31)
52WH Indicator	0.018***	0.019***	0.017***	0.011**	-0.001
	(3.16)	(3.28)	(2.78)	(2.08)	(-0.17)
New 52WH Indicator		-0.025			
		(-0.95)			
52 Week High Ratio			0.004		
			(0.37)		
Cumulative Trade Imbalance [t_{-5}, t_{-1}]				0.002	
				(0.72)	
Trade Imbalance [t]				0.007	
				(0.93)	
Cumulative Trade Imbalance [t_{+1}, t_{+5}]				-0.014***	
				(-5.82)	
Taking Rate Sells					-0.021**
					(-2.05)
Taking Rate Sells Low Quartile					-0.015*
					(-1.78)
Taking Rate Sells Low Quartile * 52 WH Indicator					0.058***
					(4.45)
Log Market Capitalization	-0.009***	-0.009***	-0.009***	-0.008***	-0.009***
	(-7.10)	(-7.11)	(-7.11)	(-6.47)	(-6.36)
Average Lag VIX [t_{-20}, t]	-0.000	-0.000	-0.000	-0.000	-0.000
	(-1.11)	(-1.11)	(-0.89)	(-0.82)	(-1.00)
Obs	92,093	92,093	92,093	92,093	92,093
R-Square	0.0006	0.0006	0.0006	0.0009	0.0009
Adj R-Sq	0.0006	0.0006	0.0006	0.0008	0.0008

4.5. Drift

Birru (2015) finds that the 52WH acts as a psychological barrier for investors. The result is expectational errors [5] and under-reaction to news at the 52WH. Therefore, for our hypothesis to hold, post-event drift should occur following the 52WH; this will reflect the cost to households in lost returns as a result of anchoring to the 52WH. We have identified the cost at the 5-day-lead period, and we next need to determine the cost of the 52WH anchor to individuals in the form of longer term post-52WH drift. To measure post-event drift, we follow the method of Garfinkel and Sokobin (2006). Following each 52WH event, we cumulate the firm's AR over a 30- and 60-calendar-day window. We use the 30- and 60-day CAR as the dependent variable in OLS regressions to explore the effect of the 52WH ratio, the 52WH price and the new 52WH on future returns. We include additional interactions at the 52WH and controls for investor behavior, firm size and market volatility

To test the hypothesis that households suffer from return continuation as a result of anchoring to the 52WH, we use the following OLS regression specification:

$$\begin{aligned} CAR_{i,t,n} = b_{0,} &+ b_1 52WHIndicator_{i,t} + b_2 New52WHIndicator_{i,t} \\ &+ b_3 52WHRatio_{i,t} + InvestorBehavior + Interactions \\ &+ Controls + \epsilon_{i,t} \end{aligned} \tag{11}$$

$Car_{i,t,n}$ is the CAR for stock i over the forward period from t to n. Table 10 presents the results from regressions for the 30 and 60 days following the 52WH day.

Consistent with the expectations from prior literature (George and Hwang,

[5] Expectational errors are the difference between the expectation and actual event; Birru (2015) finds that investors' expectational errors regarding future returns are particularly high at the 52WH.

2004), we find that the 52WH max price and the 52WH ratio (George and Hwang, 2004) are strongly associated with positive future abnormal returns. The effect of the new 52WH on AR is not present for the 30-day window, but the coefficient becomes negative and significant for the 60-day window. However, it is not large enough to distort the 52WH drift, and it is relatively infrequent and, thus, would not result in any large changes in economic terms.

We introduce cumulative trade imbalance and obtain negative and significant coefficients for the days $t_{+1} - -t_{+5}$ period. This supports our hypothesis that household investor behavior is costly, to the extent that prices move against it, and influences post-trade movements. This finding supports the prediction of Birru (2015) that households suffer as a result of their expectational errors at the 52WH.

Finally, in model V and model X, we find that high limit order usage by households is strongly related to post-event drift for both the 30- and 60-day windows. Similarly to the 5-day CAR, when we include the indicator variable $Takingratesells-lowquartile * 52WH$, which indicates the highest quartile for limit order usage at the 52WH, we observe strong and positive post-event returns, for both the 30-day and 60-day windows. The addition of this interaction causes the 52WH max price to no longer predict future returns. This finding suggests that the underlying cause of the 52WH anomaly (George and Hwang, 2004) is a result of household limit order selling at the 52WH.

Our findings are robust to our controls; we find that post event returns are strongly related to market capitalization, that is, small firms experience larger positive post-event drift, while market-wide VIX is also significantly related to negative returns. Of key interest is the role of the new 52WH: the results show that it is negatively related to post-event drift, which suggests that these stocks experience less post-event drift. Overall, the new 52WH lessens the extent of the post-event drift. Nevertheless, individuals still suffer as a result of their anchoring behavior over longer periods. Overall, these results explain the large post-event drift found by George and Hwang (2004) as naively being a result of the 52WH; however, upon further investigation, the rationale offered by Shefrin and Statman (1985), Kahneman (1992), Kelley and Tetlock (2013), namely the disposition effect, anchoring and unsupervised limit orders, is clarified: it is in fact households selling, for non-informational reasons, and providing liquidity that allows prices to continue to rise following the 52WH.

Table 10: 30 and 60 day lead cumulative abnormal returns following the 52 week high

This table presents results from the OLS regression 10, with 5 day lead cumulative abnormal returns as the dependent variable. The 52WH Indicator is an indicator variable with a value of one, if the stock i price opens within 3% of the 52WH price, zero otherwise. The New 52WH Indicator is an indicator variable with a value of 1, if stock i price opens within 3% of the 52WH price and has not been at the 52WH in the 14 calendar days prior, zero otherwise. The $52WHratio$ is the ratio of stock i price at time t relative to the 52WH price. $TradeImbalance$ is the ratio of household buying behavior as a percentage of total household trading in stock i at time t as a percentage of shares outstanding. $CumulativeTradeImbalance$ $[t_{-5}, t{-}_1]$ is the cumulative household trade imbalance in stock i as a percentage of shares outstanding for the 5 days prior. $CumulativeTradeImbalance$ $[t_{+1}, t_{+5}]$ is the cumulative household trade imbalance in stock i as a percentage of shares outstanding for the 5 days forward. $Takingratesells$ is the rate of market order usage by households to sell stock i at time t. $TakingRateSellsLowQuartile$ * $52WHIndicator$ is in indicator variable that has a value of one, if the taking rate sells in stock i are in the lowest quartile on day t and the stock is at the 52WH, zero otherwise. $MktCap$ is the log Market capitalization of stock i at time t. VIX $[t_{-20}, t]$ is the average value for the EuroVIX index for the prior 20 trading days. The t statistics are reported in brackets below the coefficients , ***, **, *, indicate significance at the 1%, 5% and the 10% level, respectively.

Table 10: Continued

	Cumulative Abnormal Return [t_{+1},t_{+30}]					Cumulative Abnormal Return [t_{+1},t_{+60}]				
	I	II	III	IV	V	VI	VII	VIII	IX	X
Intercept	0.924***	0.924***	0.892***	0.957***	1.055***	1.879***	1.880***	1.814***	1.560***	1.712***
	(15.75)	(15.75)	(14.71)	(15.68)	(14.52)	(22.39)	(22.40)	(20.91)	(20.14)	(18.62)
52WH Indicator	0.068***	0.071***	0.057***	0.062***	-0.001	0.158***	0.165***	0.136***	0.122***	-0.005
	(5.34)	(5.50)	(4.16)	(4.77)	(-0.04)	(8.70)	(8.93)	(6.92)	(7.42)	(-0.30)
New 52WH Indicator		-0.079					-0.170**			
		(-1.37)					(-2.07)			
52 Week High Ratio			0.048**					0.098***		
			(2.05)					(2.94)		
Cumulative Trade Imbalance [t_{-5},t_{-1}]				0.004					0.001	
				(0.63)					(0.13)	
Trade Imbalance				0.010					0.007	
				(0.50)					(0.28)	
Cumulative Trade Imbalance [t_{+1},t_{+5}]				-0.013**					-0.014*	
				(-2.09)					(-1.82)	
Taking Rate Sells					-0.120***					-0.185***
					(-5.18)					(-6.30)
Taking Rate Sells Low Quartile					-0.064***					-0.116***
					(-3.36)					(-4.84)
Taking Rate Sells Low Quartile * 52 WH Indicator					0.257***					0.489***
					(8.56)					(12.84)
Log Market Capitalization	-0.045***	-0.045***	-0.045***	-0.046***	-0.047***	-0.092***	-0.092***	-0.092***	-0.076***	-0.077***
	(-15.57)	(-15.58)	(-15.69)	(-15.51)	(-14.56)	(-22.31)	(-22.32)	(-22.47)	(-20.16)	(-18.87)
Average Lag VIX [t_{-20}, t]	-0.001**	-0.001**	-0.000	-0.001**	-0.001**	-0.001**	-0.001**	-0.000	-0.001	-0.001
	(-2.07)	(-2.06)	(-1.13)	(-2.22)	(-2.18)	(-2.03)	(-2.02)	(-0.76)	(-1.28)	(-1.54)
Obs	92,737	92,737	92,737	92,737	92,737	92,737	92,737	92,737	92,737	92,737
R-Square	0.0028	0.0028	0.0028	0.0029	0.0044	0.0058	0.0059	0.0059	0.0050	0.0078
Adj R-Sq	0.0028	0.0028	0.0028	0.0028	0.0043	0.0058	0.0058	0.0059	0.0049	0.0077

The R^2 values for the models are low, between 0.28% and 0.77%. There are several potential reasons for this. First, we are explaining market-adjusted abnormal returns in a cross-sectional regression. Second, we are explaining individual stock rather than portfolio returns, as is done in Fama and French (1992)-style regression; in the context of this study, portfolios would be inappropriate. Finally, these R^2 values are comparable to those found in previous studies of post-event drift on stock returns (Garfinkel and Sokobin, 2006).

5. Conclusion

This study exploits a rich data set from the Nordic Central Securities Depository to examine how individual investors anchor to the 52WH price, their trade direction, their order submission type and the subsequent cost of this anchoring behavior. Our findings are consistent with the literature on the 52WH, anchoring and the disposition effect. We find that individual investors undertake disposition style investing – selling winners and anchoring behavior around the 52WH price. They do so with latent limit order selling, which is intensified if the 52WH becomes more salient, either due to newness or volatility. We show through an event study that the 52WH day is in fact the unique point of interest, investor behavior prior to and following the day is otherwise as expected. This anchoring behavior is not costless: we show that there is strong post-event return continuation at the 5-, 30- and 60-day time horizons – consistent with momentum-style returns. This behavior directly benefits institutional investors, which are the counterparties to the observed trades, and we show that through this bias, households provide liquidity for institutions to open up momentum positions and generate post-52WH event returns. Finally, we contribute to the literature by showing that the underlying cause of the 52WH post-event drift may be that households sell limit orders placed at the 52 week high. When controlling for the 52WH, it is clear that it no longer explains future returns; rather, it is the limit order selling by households that provides the liquidity to drive future positive returns. Overall, our evidence contributes to the growing literature on the 52WH, the poor performance of individual investors, and how their behavior affects returns. This study has many implications for future research regarding the role of individual investors as liquidity providers, particularly around anchors and attention-grabbing events.

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