Does Information Reduce the Disposition Effect? Attention, Mobile Push, and Selling at a Loss*

Minxia Chen† Liqiang Huang‡ Massimo Massa§

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Abstract

Does information access reduce the disposition effect? We use data on Chinese retail investors' holdings, sales, stock-page visits, and push notifications on a large online trading platform to document that the answer depends on who collected the information. *Goal-driven* information collection – i.e., when information is deliberately collected by the investors – has emotional implications. The deliberate action of seeking information intensifies emotional attachment and, especially after losses, the investor's regret, reducing the incentive to further acquire information and to properly process it. This implies that in the presence of losses *goal-driven* information further amplifies the disposition bias. However, if a selling action is taken, the information content is so high as to generate a good sale selection. In contrast, in the case of *stimulus-driven* information, when information is exogenously provided, there is less emotional attachment to the information and the associated regret. The loss may still be painful, even without responsibility for seeking the information. The pain of the loss could still reinforce the disposition effect. However, the weaker attachment to information the investor did not seek may not alter the selection of stocks for sale.

Keywords: Disposition effect; Selective attention; Stock-page clicks; Unsolicited information; Push notifications; Selling decisions; Subsequent returns; Retail investors.

JEL: G41, G11, G14, D83, D91.

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†INSEAD, 1 Ayer Rajah Avenue, Singapore 138676, Singapore; Email: minxia.chen@insead.edu.

‡School of Management, Zhejiang University, Hangzhou, China; Email: huanglq@zju.edu.cn.

§INSEAD, 1 Ayer Rajah Avenue, Singapore 138676, Singapore; Email: massimo.massa@insead.edu.

1. Introduction

The disposition effect – the well-documented tendency of retail investors to sell winning positions too early and to hold on to losing ones too long (Shefrin and Statman, 1985; Odean, 1998) – is costly, persistent, and apparently information-resistant.[1] The loss-side drag is economically significant: *held losers* earn a CRSP value-weighted adjusted return of −1.06% annually in the U.S. market (Odean, 1998) and, a factor-adjusted return of −1.48% in the Chinese market. The pattern persists in modern data-rich environments – where recent prices, analyst reports, earnings announcements, and order flows are a click away – with evidence from online brokerage platforms (Quispe-Torreblanca et al., 2025), online equity mutual-fund accounts observed monthly (Jin et al., 2023), and mobile-phone mutual-fund apps updating unrealized profits daily (Liu, Liu, and Shi, 2024).

A natural question arises: if investors have abundant access to diagnostic information, why does the disposition effect persist? One might expect that clearly seeing a losing stock's deteriorating fundamentals would push investors past the psychological threshold of holding. Yet, field evidence suggests that the display of information can exacerbate the very bias it ought to cure: a natural experiment in Chinese brokerage data that increases the visibility of the purchase prices without changing the investor's information set raises the disposition effect by 17% relative to the control group (Frydman and Wang, 2020), while removing gain/loss displays from financial-advisor screens reduces it among highly advised clients and improves their raw portfolio returns by 20 basis points per month relative to lightly advised clients, with no change in factor-adjusted returns (Andries, Bonelli, and Sraer, 2025). This raises the question of whether more information reduces the disposition bias or, in fact, makes it worse.

In this paper, we argue that access to information often depends on the same gain/loss states that shape the disposition effect. Indeed, investors often choose which information to consult, and their willingness to collect and use such information will also vary with gains and losses (Karlsson, Loewenstein, and Seppi, 2009; Sicherman et al., 2016). A losing investment may discourage both information collection and information processing. Gains may make information pleasurable, reinforcing favorable beliefs and attracting attention. Losses may instead make information painful by challenging expectations and exposing mistakes, discouraging further search and processing. Understanding the role of information therefore requires looking at the linkage between information collection and the gains and losses underlying the disposition effect.[2]

[1] We use the term disposition effect to refer to the empirical regularity of selling winners and holding losers (Shefrin and Statman, 1985). This pattern admits both rational frameworks – portfolio rebalancing under incomplete information and transaction costs (Dai et al., 2023) and strategic responses to information asymmetry (Dorn and Strobl, 2023) – and behavioral ones rooted in prospect theory (Kahneman and Tversky, 1979), realization utility (Barberis and Xiong, 2012), and regret aversion (Bell, 1982), alongside the empirical association with mean-reversion beliefs (Andersen et al., 2025) and belief-revision trading in Ben-David and Hirshleifer (2012), who reject the mean-reversion explanation and allow belief revision to be irrational. Since Odean (1998) demonstrates that the pattern is costly – *sold winners* outperform *held losers* – we examine this behavioral interpretation while retaining the term disposition effect for the observed selling pattern.

[2] Attention to the loser may be lower because reviewing a loss is unpleasant or because the investor is less inclined to sell it. The ostrich-effect and information-avoidance literatures predict fewer clicks when the discomfort of reviewing a loss outweighs the expected informational benefit (Karlsson, Loewenstein, and Seppi, 2009; Golman, Hagmann, and

Let us see how. Behavioral economics treats inattention as a unifying theme in Gabaix (2019), while Enke (2026) decomposes decision making into three stages: the acquisition of information through attention, its interpretation, and its aggregation into action. Deliberately collecting information, as through a stock-page visit, reflects *goal-driven* attention. More specifically, *goal-driven* attention directs investors toward a stock's information page, which displays real-time prices, intraday charts, order book depth, firm announcements, analyst reports, and related disclosures. Seeking this information implicates the investor's own agency, with the prospect of pain over a loss or relief over a gain.

In contrast, information that reaches investors through salient events in their environment may draw *stimulus-driven* attention, which Enke (2026) distinguishes from *goal-driven* attention by its response to changes, surprises, and variability. We apply this distinction to a push notification delivered by a trading app, which arrives unbidden. When beliefs about one's positions are themselves carriers of utility, investors trade off the decision value of information against the anticipated pain of confronting it, and may prefer to avoid it altogether (Golman, Hagmann, and Loewenstein, 2017), even though higher decision stakes would otherwise encourage *goal-driven* attention (Enke, 2026). This implies that *goal-driven* information will therefore depend on the same preferences that generate the disposition bias, while *stimulus-driven* information can arrive without passing through the investor's choice to seek it.

Both *goal-driven* and *stimulus-driven* attention can bring information to investors and could therefore discipline sell decisions, reducing the disposition effect. However, the deliberate action of seeking information (i.e., *goal-driven* information) may intensify emotional attachment and, especially after losses, the investor's regret. One candidate mechanism is an "ostrich effect" in acquisition: investors may avoid information about losing positions because reviewing it is psychologically painful. This would be the case when information comes from investors clicking on losing positions. In this case, information would be higher in gain states and lower in loss states, potentially hampering information usage relevant to selling decisions. A second candidate mechanism is "cognitive inertia" in processing: even when investors collect information about a losing position, having "dug out" bad news may make them feel responsible for what they have uncovered and reluctant to update their beliefs and act – i.e., selling when they should do it. Moreover, inertia could discourage further search as well as processing. This could further amplify inaction and the disposition effect. Deliberate information collection may therefore fail along two dimensions – avoidance of acquisition (ostrich) and inaction conditional on acquisition (inertia). Under this interpretation, investors will act only when the collected information is sufficiently compelling. The higher hurdle to act suggests both lower willingness to act – i.e., whether and when to realize a loss – and, in the case of action, sharper selection – i.e., the quality of the decision of the stock to sell within a gain/loss state. This allows us to formulate our first set of hypotheses linking *goal-driven* actions (i.e., information collection and stock trade) and their quality to gains/losses

H1a. Goal-driven information seeking is lower for losing positions than for winning positions.

H1b. Goal-driven information seeking is associated with a stronger disposition effect on trades.

Loewenstein, 2017). News utility provides a related account of attention that depends on anticipated gains and losses (Pagel, 2018).

H1c. Goal-driven information seeking is associated with sharper selection of stocks for sale.

For *stimulus-driven* information, by contrast, information is exogenously provided, so the investor does not participate in the act of collecting it. This will reduce the emotional attachment to the information and the associated regret. The loss may still be painful, even without responsibility for seeking the information. The pain of the loss could still reinforce the disposition effect. However, the weaker attachment to information the investor did not seek may not alter the selection of stocks for sale. This allows us to formulate our second hypothesis linking *stimulus-driven* actions (i.e., stock trade) and their quality to gains/losses.

H2a. Unsolicited information delivered through the stimulus-driven channel is associated with a stronger disposition effect.

H2b. Unsolicited information delivered through the stimulus-driven channel is not associated with an improvement in selection measured by held-minus-sold subsequent returns within each gain/loss state.

To test these hypotheses, we use holdings, stock-page clicks, executed trades, watchlists, and push-delivery records from a large Chinese online trading platform (hereafter, the Platform). The records identify which held stock an investor views and whether the investor sells or holds that position; held denotes no net position change on the decision day. We organize the records into position-days.[3]

Our measures link *goal-driven* attention to sought information, recorded by stock-page clicks, and the *stimulus-driven* channel to unsolicited information, recorded by push notifications that measure delivery rather than attention. Clicks are recorded visits to the focal stock's page, which shows its quotes, chart, order book, news, and announcements; our daily indicator records whether the investor visits that page during the trading day. Pushes are messages about a held stock delivered by the Platform on the previous trading day, observed within the period covered by the delivery logs. Clicks proxy attention to a particular holding and may also follow a notification, while push notifications record delivery without requiring a contemporaneous stock-page visit. Investor-day and stock fixed effects compare holdings within an investor's day, absorbing circumstances shared across that investor's positions and persistent differences across stocks. Using both stock-day and investor fixed effects we can absorb news and price movements common to a stock's holders that day and persistent differences across investors.

We document that the disposition effect in selling is accompanied by an asymmetry in clicks: within the same investor's day, losing positions are both clicked and sold less often than winning positions. In particular, within the same day, investors are approximately 10 percent less likely to click on a losing position than on a winning one, a statistically significant gap.[4] This is the click asymmetry predicted by the ostrich account: losing holdings receive less recorded attention.

[3] A position is one investor's holding of one stock. A position-day is that holding on one trading day, with a positive reconstructed holding at the previous close.

[4] The percentage effects on click and sale probabilities reported here are measured relative to the corresponding estimation sample's average click or sale rate. In the full-panel estimation samples, the average click rate is 52.52 percent and the average sale rate is 7.71 percent. The average sale rate is 7.71 percent in the prior-click estimation sample and 8.38 percent in the delivery-window estimation sample. The break-even comparison scales each jump by the corresponding average click or sale rate within its estimation window.

Moreover, investors are also affected by the gain/loss states of their other stocks in the portfolio and the ones not held but in the watchlist. When their other holdings are at a loss, the tendency to reduce the selling of the losing stocks compared to the winning ones is raised from 56 percent to 67 percent of the unconditional mean. Similarly, when the stocks in the watchlist are at a loss, the tendency is reduced from 56 percent to 44 percent of the unconditional mean.[5]

Around the break-even point (the purchase price, where the position's unrealized return at the previous close is zero), the click and sale patterns diverge, even though both vary with the size of unrealized losses and gains. Both probabilities fall as losses deepen, and selling is highest just above the break-even point, a selling pattern consistent with the reverse V-shaped selling schedule with elevated activity near zero that An et al. (2024) report for Chinese investors. Therefore, following the selling-discontinuity design of Ben-David and Hirshleifer (2012), we fit separate cubic return polynomials on either side of the break-even point; we extend the design to estimate the click and sale jumps jointly, incorporating their covariance. Investors are approximately 6.82 percent more likely to sell and 1.31 percent more likely to click just above break-even than just below it. The difference between these proportional increases is 5.51 percentage points and is statistically significant. This joint difference weighs against the explanation that losing positions are sold less simply because they receive fewer clicks. If clicks merely foreshadowed sales in a fixed proportion, the higher sale probability just above break-even would imply an equally large proportional increase in clicks. The click findings support H1a's prediction of less information seeking for losing positions; the prior-click comparison below tests H1b's prediction about selling.

Next, we focus on the key question: the role of information. We start with *goal-driven* information seeking through clicks and ask how they relate to the tendency to sell more winners than losers. We therefore compare the same investor's losing and winning positions on the same day, separately among positions clicked and not clicked on the previous trading day, holding fixed the investor's circumstances that day and persistent differences across stocks (investor-day and stock fixed effects). A click can precede a planned sale, so the break-even comparison addresses whether clicks simply foreshadow selling in a fixed proportion. We find that investors sell losing positions less often than winning positions both with and without a click on the previous trading day. For positions not clicked on the previous trading day, investors are

[5] An et al. (2024) find that the disposition effect for a stock is larger when the investor's portfolio is at a loss and interpret this as mental accounting at the stock and portfolio levels, both encompassing the investor's own holdings. In their account, a portfolio gain may allow the investor to book the sale of a losing stock against that gain; when the portfolio is at a loss, both frames indicate a bad decision, making loss realization harder to reconcile with the investor's self-image as a good decision-maker. This interpretation draws on Chang, Solomon, and Westerfield (2016), who argue that realized losses cause greater discomfort than unrealized losses. Watchlist stocks belong to neither account because they are not held: their price declines cost the investor no money and entail no pain of realization. Losses on other holdings and on watchlist stocks may nevertheless convey the same information about a market-wide or sector decline. If that information explained the interactions, the disposition effect would change in the same direction; the opposite signs are instead consistent with discomfort from realizing a loss on the investor's own holdings. The weaker disposition effect when watchlist stocks have fallen may reflect regret about the choice of stock: Bell (1982) measures regret relative to the outcomes of alternatives not chosen, which include stocks watched but not bought. When those alternatives have also fallen, the held loss may seem less attributable to a mistaken choice, consistent with Chang, Solomon, and Westerfield (2016), who argue that investors avoid admitting a mistake when they can attribute the loss to someone else.

approximately 9 percent less likely to sell a losing position than a winning one. The tendency to retain losers is therefore present even without a recorded prior click. For clicked positions, investors are approximately 70 percent less likely to sell a losing position than a winning one. The gap is approximately 8 times as large among positions clicked on the previous trading day as among unclicked positions. If we focus on the winning positions, we document that investors are also more likely to sell winning positions overall after a click. Investors are 147 percent more likely to sell a winning position after a click, a statistically significant increase.

Overall, information access amplifies the disposition effect. This supports H1b's prediction of a stronger disposition effect among positions for which investors seek information, consistent with cognitive inertia as a candidate interpretation.

Push notifications likewise induce a stronger disposition effect, providing the corresponding test of the *stimulus-driven* channel. Here, we examine exogenous information shocks in the form of pushes, which investors do not choose to receive at the time of delivery. We document that the tendency to sell winners as opposed to losers is amplified after a notification. Comparing the same investor's positions on the same day and positions in the same stock, we find that investors are approximately 51 percent less likely to sell a loser than a winner without a push on the previous trading day, compared with 77 percent after a push. In other words, notifications do not bring loss realizations closer to gain realizations. We also find a stronger tendency to sell winners rather than losers after a push notification in the within-investor-day comparison. Investors are 78 percent more likely to sell winning positions with a prior push notification than those without one. Exogenously delivered information (without a contemporaneous search) is therefore also associated with readier selling of winners. A push notification about any stock other than the position being evaluated – the nonfocal push – is also followed by a stronger disposition effect, holding fixed the push about the position and its interaction with the loss state. This supports H2a's prediction of a stronger disposition effect after a push notification.

More selling need not mean better selection, so we investigate the quality of the stock selection and ask whether more information helps the selection of the stocks to sell. H1c predicts sharper selection after a prior click, while H2b posits no corresponding improvement after a push notification. We therefore compare positions sold with positions held on the same decision day, separately within each gain/loss state. We start with the classical return comparison for the disposition effect: the subsequent return on losing stocks held minus that on winning stocks sold (the "Odean wedge"). While this wedge is negative in the US because both *held losers* and *sold winners* underperform the market index, it is positive in the Chinese market, which is characterized by more reversal. This is driven mostly by the poorer subsequent performance of *sold winners*, while losers kept also earn negative factor-adjusted returns.[6] In other words, in the Chinese market, the trading cost of the disposition effect appears mainly among losing stocks rather than winning stocks. Over the following year, *losers held* earn −1.48 percent and *sold winners* earn −4.43 percent. The positive wedge thus reflects the still poorer subsequent returns of *sold winners*.

[6]Factor-adjusted returns are stock returns less the risk-free rate and the contribution of exposure to market, size, value, and turnover factors in the Chinese factor model of Liu, Stambaugh, and Yuan (2019), using loadings estimated before the return period. Returns are compounded from the trading day after the decision.

Within each gain/loss state, the return comparisons reveal two key stylized facts. The first is that *held-minus-sold* differences are positive and *sold winners* are the worst-performing group. Over the following year, *held winners* outperform *sold winners* by 3.43 percent, and *held losers* outperform *sold losers* by 1.92 percent. In other words, investors sell the stocks that go on to do worse than those they keep in both states. The second stylized fact is that the *sold loser–winner difference* is always positive and, over the same horizon, is 1.04 percent. Stocks sold at a loss subsequently outperform stocks sold at a gain, even though each sold group trails its held counterpart. These two facts help to explain the Odean wedge, which is driven by the difference between *held winners* and *sold winners*.

These within-state differences provide the benchmark for our tests: whether prior clicks are associated with sharper selection and whether push notifications show a corresponding improvement.

We find that prior clicks are associated with sharper selection: the stocks sold subsequently underperform the held alternatives by more, suggesting that the choice of what to sell differs after a click. Over the following year, *held winners* outperform *sold winners* by 4.20 percent in factor-adjusted returns among clicked positions, compared with 0.07 percent among unclicked positions. Thus, a prior click is associated with sharper selection of the stocks that subsequently underperform, among both winners and losers at short horizons and among winners over the year. Over the following year, *sold losers* outperform *sold winners* by 3.32 percent more in factor-adjusted returns among clicked positions than among unclicked positions. The stronger disposition effect among clicked positions does therefore coexist with sharper selection among the winners that the investors sell.

Overall, these results support H1b and H1c: prior clicks are associated with a stronger disposition effect and sharper selection of stocks for sale. What about the *stimulus-driven* channel? We consider both the "focal" push – i.e., the push about the position being evaluated – and the "nonfocal" push – i.e., a push notification delivered to the investor on the previous trading day about any stock other than the position being evaluated, including the investor's other portfolio holdings, stocks on the investor's watchlist, and stocks in neither set. For both focal and nonfocal pushes, there is no statistically detectable change in the *held-minus-sold* return differences for winners or losers. This is consistent with the predictions in H1c and H2b: sharper selection after a click and no statistically detectable improvement after a push notification.

2. Related Literature and Contribution

Our paper connects information exposure to the decision to sell a losing investment.[7] We measure attention to a held stock through stock-page clicks and link those clicks to the sale

[7] Shefrin and Statman (1985) relate loss realization to mental accounting, and Odean (1998) and Grinblatt and Keloharju (2001) document reluctance to realize losses. Theoretical work studies disposition and realization utility (Barberis and Xiong, 2009, 2012; Ingersoll and Jin, 2013). Ben-David and Hirshleifer (2012) distinguish broad trading schedules from break-even discontinuities, and Kaustia (2010) finds a selling propensity approximately flat over a wide range of losses but jumping at break-even. Hartzmark (2015) shows that position rank matters, while An et al. (2024) find that portfolio gains weaken disposition and portfolio losses strengthen it. In Chinese investor data, Feng and Seasholes

of the same holding, comparing positions within the same investor's day. On the one hand, information-avoidance theories explain why investors may decline useful, freely available information when attending is unpleasant (Karlsson, Loewenstein, and Seppi, 2009; Golman, Hagmann, and Loewenstein, 2017; Golman et al., 2022). Pagel (2018) models portfolio inattention through news utility, while Quispe-Torreblanca et al. (2026) distinguish utility from attending to already-known outcomes from utility associated with changes in beliefs.[8] We find that investors click less often on their losing holdings than on their winning holdings on the same day.

On the other hand, greater attention to information can facilitate selling while making the purchase price more salient.[9] Display experiments show that reducing purchase-price salience by removing its display weakens disposition (Frydman and Rangel, 2014) and increasing it strengthens disposition without changing available information (Frydman and Wang, 2020). We compare clicks and sales around the break-even point on the same positions to ask whether lower attention alone explains lower loss realization. We find that selling rises sharply just above break-even while clicking changes little, and the larger proportional response of selling weighs against that explanation.

We distinguish sought information, recorded by stock-page clicks, from unsolicited information, recorded by push notifications, and compare the subsequent returns of sold and held stocks within each gain/loss state. We find that prior clicks are associated with both a stronger disposition effect and sharper selection: the stocks sold subsequently underperform those kept by more, among both winners and losers at short horizons and among winners over the following year under factor adjustment.

We contribute by showing that the quality of the decision to act (sell) is related to sought information but shows no statistically detectable relation to unsolicited information. This distinction helps reconcile conflicting findings on the role of information by separating the willingness to realize losses from the choice of stocks to sell.

The distinction between accessing information and acting on it also connects our paper to information delivered without a request. Andries and Haddad (2020) model information aversion and state-dependent alerts, while evidence on app features and standardized push messages

(2005) link sophistication and experience to reduced reluctance to realize losses, while Chen et al. (2007) document strong disposition and underperformance of stocks bought relative to stocks sold.

[8] Account evidence shows both withdrawal after market declines (Sicherman et al., 2016) and increased monitoring after positive and negative daily market returns (Gherzi et al., 2014), while Olafsson and Pagel (2025) find lower attention as bank balances become negative and overdraft debt increases. Stock-level measures range from aggregate searches in Da, Engelberg, and Gao (2011) to browsing linked to performance in Gargano and Rossi (2018). Barber and Odean (2008) show why the decision matters: individuals are net buyers of attention-grabbing stocks, whereas selling draws from stocks already owned.

[9] For example, Dierick et al. (2019) find less disposition among frequent account users, and Quispe-Torreblanca et al. (2025) show that selling depends on returns since the last login as well as since purchase. Liu, Liu, and Shi (2024) find realization preference among mutual fund investors after accounting for inattentive days and motivate attention as preparation for anticipated trading. Andries, Bonelli, and Sraer (2025) find less disposition among highly advised clients after removing acquisition-price and gain/loss information from advisors' displays, while the clients' own displays do not change. Cognitive dissonance provides a related account of gain/loss-dependent evaluation (Chang, Solomon, and Westerfield, 2016), while ownership-related overreaction to signals concerns stronger reactions to good and bad news about assets owned (Hartzmark, Hirshman, and Imas, 2021).

shows changes in attention-induced trading and leverage (Barber et al., 2022; Arnold, Pelster, and Subrahmanyam, 2022). We compare selling after a push with selling without one and assess selection through subsequent returns on sold stocks relative to held stocks in the same gain/loss state. We show that a push notification on the previous trading day is associated with more selling of winners and a stronger disposition effect when comparing positions within the same investor's day. We find no statistically detectable change in the *held-minus-sold* return differences, so greater selling activity brings no demonstrated improvement in selection.

Our contribution to the literature on attention and the disposition effect is to distinguish how information relates to realization – whether a loss is sold – from selection – which stocks are sold within a gain/loss state.

3. Empirical Design

3.1. The Main Specification

To examine our hypotheses, we begin in Section 4 by comparing investors' clicks and sales across losing and winning positions in Table 2 and Table 3. Both tables use the same linear-probability specification, with *Sale (t)* as the outcome in Table 3 and *Click (t)* in Table 2:

$$\begin{aligned} Sale_{ijt} \times 100 = {} & \beta_L Unrealized\ Loss_{ijt} + \beta_P Portfolio\ Loss_{ijt} + \beta_W Watchlist\ Loss_{ijt} \\ & + \beta_{LP} Unrealized\ Loss_{ijt} \times Portfolio\ Loss_{ijt} \\ & + \beta_{LW} Unrealized\ Loss_{ijt} \times Watchlist\ Loss_{ijt} + \gamma' X_{ijt} + \mu_i + \delta_j + \tau_t + \varepsilon_{ijt} \end{aligned} \quad (1)$$

The indices identify investor i, stock j, and trading day t, and ε is the error. The vector X contains the controls, and γ contains their coefficients; μ denotes investor effects indexed by i, δ stock effects indexed by j, and τ date effects indexed by t. In both Table 2 and Table 3, columns (1)–(3) include an intercept but no fixed effects, column (4) includes the displayed investor, stock, and date effects, column (5) replaces the stock and date effects with stock × day effects while retaining investor effects, and column (6) replaces the investor and date effects with investor × day effects while retaining stock effects. The controls include the logarithm of calendar days held and the negative and positive parts of lagged unrealized return. In Table 3, we ask whether investors have a greater propensity to sell a winning position than a losing one – i.e., the disposition effect – while in Table 2, we ask whether investors have a greater propensity to click on a winning position than on a losing one. The *Unrealized Loss* coefficient measures how much less likely investors are to sell a losing position in Table 3, or click on it in Table 2, when *Portfolio Loss* and *Watchlist Loss* both record gains.

Following An et al. (2024), the *Unrealized Loss* × *Portfolio Loss* interaction asks whether investors show a stronger or weaker disposition effect when *Portfolio Loss* records a loss rather than a gain. The *Unrealized Loss* × *Watchlist Loss* interaction asks the same question for *Watchlist Loss*. The *Unrealized Loss* coefficients in Table 2 and Table 3 compare losing and winning positions across

the full range of unrealized returns, controlling for the size of those returns. Section 4.3 asks a different question: whether clicks and sales change abruptly between positions just below and just above the purchase price.

Section 5 asks whether information access is associated with a weaker disposition effect. We compare investors' selling of losing and winning positions between groups with and without a click on the previous trading day in Table 5. The *Unrealized Loss* × *Click (t−1)* interaction measures how the disposition effect differs between these groups. The corresponding comparison for positions with and without a push notification on the previous trading day uses *Unrealized Loss* × *Push (t−1)* in Table 6. These interactions distinguish a change in the disposition effect from an increase in selling that applies equally to winning and losing positions.

The fixed effects determine which investors and positions are compared. Following Hartzmark (2015), we use stock-day effects to compare investors holding the same stock on the same day, absorbing the news and price movements they share while retaining investor effects. Investor-day effects instead compare losing and winning positions held by the same investor on the same day, absorbing circumstances such as liquidity needs and application use while retaining stock effects. These complementary specifications allow us to investigate whether the results persist when we hold constant either the stock's circumstances or the investor's circumstances. The tables introduce return controls, *Portfolio Loss*, *Watchlist Loss*, and fixed effects in stages; the Internet Appendix reports the full sequence. Each column uses position-days with observations on all variables in that specification and reports its own sample size and average click or sale rate. We express the estimated click and sale differences relative to those average rates; interactions on the absolute probability scale are reported in percentage points.

We have information on which of their existing holdings the investors click on or sell on a given day. We organize these observations into position-days and link each stock to its subsequent as well as previous returns ("gains and losses"). This allows us to compare the same investor's decisions across winning and losing positions, as well as different investors' decisions about the same stock.

3.2. The Online Trading Platform

We obtain our data from a large Chinese financial-information and trading app linked to licensed brokers (hereafter, "the Platform"). The Platform provides investors with access to stock prices, corporate announcements, analysts' research, market news, and various trading tools. It distributes real-time market quotes, firm fundamentals, analyst forecasts, fund data, and macroeconomic indicators through mobile and desktop applications. Investors can use these applications to review company information and follow market developments. In parallel, the Platform connects retail investors to licensed brokerage firms, allowing investors to place and monitor orders through its interface while the linked brokerages execute their trades.

Brokerage accounts are linked directly to the Platform, so all transaction records correspond to verified executed trades rather than simulated or survey-based activity. The Platform's data infrastructure records fine-grained traces of investor interaction – page views, searches, watchlist updates, and trading actions – within a unified environment. This design enables observation

of how retail investors allocate stock-page clicks across holdings and how those visits relate to trading decisions. Individual investors' A-share capital gains are not taxed, removing a capital-gains-tax incentive to realize losses.

3.3. Sample Construction

The position-day data cover January 1, 2022, to May 26, 2023. Executed trades record direction, quantities, and values in CNY; monthly snapshots provide an additional record of holdings; watchlist records identify stocks followed and observed addition dates; and daily clicks record visits associated with a stock. The push-delivery log records stock-specific news messages sent and delivered to investors' mobile phones. That log ends on March 31, 2023, so push regressions use only the overlapping coverage window. Anonymized investor identifiers and stock codes link these records to market and firm data.

We reconstruct holdings from trade histories and cumulative net share quantities. A position-day enters the sample when the investor's cumulative share purchases exceed cumulative share sales through the previous close. This requires an existing holding with a known cost basis and excludes positions first bought that day, which cannot yet be resold. We call the position-days that enter the sample under this rule, including days without a sale, the "full panel". Table IA-1 first reports the restriction to A-share boards, the requirement that shares sold do not exceed shares held at the previous close, and the match to each stock's daily price record and trading calendar.

We consider four sample filters. First, we exclude investor-stock pairs with a daily purchase or sale quantity not divisible by 100 shares. Second, we only include observations for which the investor's earliest recorded account application must predate the sample start. Third, we only include observations for which the pair's first recorded purchase must fall on or after the start and strictly before the end. Fourth, we retain only investor-stock pairs with a recorded watchlist addition on or after the sample start, January 1, 2022; pairs without a watchlist record are excluded.

The sample remaining after the four filters have been applied, reported in Table IA-1's Investors and N columns, comprises 10,223 investors and 4,426,154 position-days. The table also reports the investor-stock pairs remaining at each step. Its final block reports the exclusions needed to define gain/loss indicators and the separate restriction to the sale-day sample, which keeps investor-days with at least two positions in the full panel and a net sale of at least one of those positions. Each position-day statistic in Table 1 uses the observations for which that row's variable is available, so the observation count can differ across rows. Each regression column then applies its own variable requirements and reports its estimation-sample size and average click or sale rate.

3.4. Variable Definitions and Timing

The main focus variables are the previous gains/losses. *Unrealized Loss* is a dummy that equals one for negative returns and zero for positive returns, with exact zeros set to missing. It classifies the position using its return at the close of day $t-1$, before the outcome day. The lag avoids classifying the position using the current day's execution price. The return is 100 times

Table 1: Summary Statistics

	N	Mean	SD	P25	P50	P75
Investor characteristics						
Male (%)	9,727	69.40	46.10	0	100	100
Age (years)	9,727	36.17	7.93	31	35	40
Account Tenure (years)	9,727	4.85	3.14	2.16	4.35	7.39
Account Size (CNY, in thousands)	9,727	186.95	1,628.49	17.61	52.72	146.74
Equity Holdings (CNY, in thousands)	9,727	150.97	1,387.65	13.01	39.86	118.46
Portfolio Size (# of stocks)	9,342	3.63	4.93	1.44	2.31	4.08
Watchlist Size (# of stocks)	9,725	145.12	245.44	24	61	154
Average Buy Size (CNY, in thousands)	9,727	27.20	83.77	5.03	11.45	26.73
Average Sale Size (CNY, in thousands)	9,617	30.94	74.25	5.90	13.65	31.58
Position-Days per Investor (#)	9,727	451.86	584.89	103	286	572
Days with a Click (%)	9,727	64.20	31.80	37.90	71.10	95.10
Days with a Sale (%)	9,727	14.50	17.10	2.60	8.10	20.00
Dependent variables						
Click (%)	4,416,616	55.70	49.70	0	100	100
Clicks (#)	4,416,616	53.88	161.42	0	4	37
Sale (%)	4,416,616	11.60	32.00	0	0	0
Position states and controls						
Time Owned (days)	4,416,616	115.70	122.82	16	69	182
Unrealized Loss (%)	4,387,148	71.40	45.20	0	100	100
Unrealized Return (%)	4,387,148	-7.45	15.47	-12.40	-3.62	0.52
Realized Loss (% of sale days)	511,790	51.40	50.00	0	100	100
Watchlist Loss (%)	3,943,255	77.00	42.10	100	100	100
Watchlist Return (%)	3,944,861	-8.75	13.62	-15.65	-7.38	-0.57
Portfolio Loss (%)	3,631,459	77.50	41.80	100	100	100
Portfolio Return (%)	3,633,065	-5.53	10.20	-8.71	-3.34	-0.30

Note: The table summarizes investors, the two dependent variables, *Click (t)* and *Sale (t)*, and the count behind the click indicator. Definitions follow Tables 2 and 3. Investor rows require observations in both gain/loss states. *Account Size* averages total assets, including cash; *Equity Holdings* averages stock market value. *Portfolio Size* averages daily holdings counts; missing holding-list records reduce its investor count. *Days with a Click*/Sale measure each investor's share of position-days carrying that outcome. N varies with availability; each row states its unit, and time-varying investor characteristics are averages over the observation window. *Unrealized Return* is the previous-close cumulative log return on cost, in percent; *Unrealized Loss* indicates a negative return. *Realized Loss* uses execution prices on sale days rather than the previous close. Exact-zero returns are unclassified, reducing loss-indicator counts relative to their returns. *Portfolio Loss* value-weights the investor's other holdings, excluding the focal position; *Watchlist Loss* equal-weights eligible watchlist stocks, excluding held stocks. Indented rows report continuous measures behind indicators. The sample includes approximately 10,000 retail investors of a large Chinese online trading platform between January 2022 and May 2023.

the logarithm of the ratio of cumulative sale proceeds plus the market value of remaining shares to cumulative purchase cost, all measured at that close. For a simple non rebalanced position, it reduces to the log return from purchase price.

Portfolio Loss is the loss indicator for the lagged value-weighted return on the investor's *other* holdings, excluding the focal stock. *Watchlist Loss* is the loss indicator for the lagged equal-weighted return since addition on the top-100 watchlist set – *stocks not yet traded* by the investor at the monthly snapshot and among the first 100 in the Platform's watchlist order – excluding held stocks. The weighting conventions remain fixed across specifications. These variables describe reference states for the owned-position analysis. The activity outcomes are *Click (t)* and *Sale (t)*. *Click (t)* equals one if the investor makes any click on the focal stock's page on day t and zero otherwise. *Click (t−1)* records the same indicator for the previous trading day.

Sale (t) is a dummy taking a value of one when the position's net share change from executed purchases and sales on day t is negative and zero otherwise, including net-purchase days and days with no net position change. *Held(t)* denotes no net position change on the day.[10] A zero net change can conceal offsetting purchases and sales. Section 6 examines subsequent returns separately from these activity outcomes.

Clicks are aggregated by trading day, defined by exchange hours, with days without a recorded click coded as zero. *Click (t)* is the click outcome; *Click (t−1)* records a stock-page visit on the previous trading day in the trading regressions. Clicking on a held stock opens a page with its prices, charts, and order book (Figure 1, Panel A), alongside its news, announcements, and analyst reports (Panel B).

A push notification names a stock and a news item and can arrive without a contemporaneous stock-page visit. For outcomes on day *t*, *Push (t−1)* records whether an investor receives a push notification about the held stock on the previous trading day within the delivery-log coverage window. It includes all message types and measures delivery, rather than opening or reading; the absence of a recorded notification is coded only inside that window. *Nonfocal Push (t−1)* records whether the investor receives a push notification on the previous trading day about any stock other than the position being evaluated, including the investor's other portfolio holdings, stocks on the investor's watchlist, and stocks in neither set, under the same message-type, delivery, and coverage-window conventions as *Push (t−1)*. Messages are not investor-targeted. Delivery precedes the outcome day.

The main linear specifications control for the negative and positive parts of the lagged unrealized return and the logarithm of calendar days held. The local break-even design instead uses return polynomials and square-root time owned, as described in Section 4.3. Section 1 of the Internet Appendix provides complete definitions of every variable printed in the tables and figures.

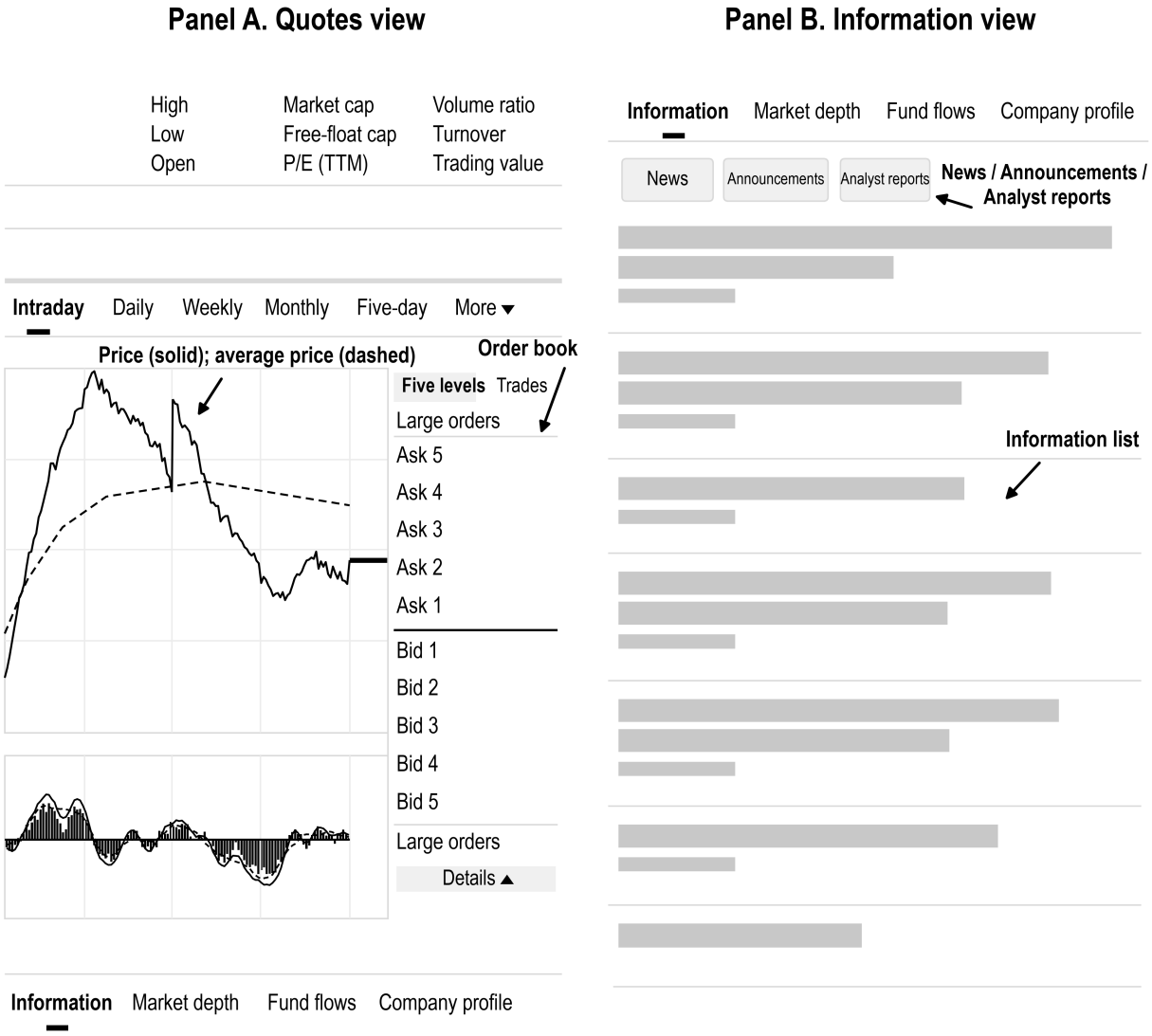
3.5. Summary Statistics

The descriptive statistics in Table 1 establish who the investors are and how often they click on, sell, or hold losing positions. The investor summaries cover investors observed in both gain/loss states. The investors are predominantly male and have established accounts: in Table 1's Mean column, 69 percent are male, while in Table 1's P50 column, their median age is 35 years, and median account tenure is 4.35 years. Investors hold relatively few stocks while following a broader watchlist: in Table 1's P50 column, their median account size is 52.72 thousand CNY, the median number of holdings is 2.31 stocks, and their median watchlist size is 61 stocks.

Investors hold positions whose unrealized returns are centered on losses: in Table 1's Mean column, the average return at the previous close is −7.45 percent, while in Table 1's P50 column, the median is −3.62 percent. Losses extend farther into the lower tail than gains into the upper tail: in Table 1's P25 column, the unrealized return is −12.40 percent, while in Table 1's P75 column,

[10] Position-days with a net purchase form separate groups that the paper does not report.

Figure 1: The Stock Page



Note: The figure presents edited illustrations adapted from the stock page of the Platform. Panel A depicts stock quotes, a price chart, and an order book. Panel B depicts access to news, corporate announcements, and analyst reports. Functional labels are translated into English, and the interface is rendered in monochrome. Stock identifiers, numerical values, and news content are removed; gray bars mark removed headlines and source and time fields. The illustrations are redrawn schematics of the interface rather than screenshots and retain its broad arrangement. Stock-page clicks in the analysis record visits associated with a particular stock; a visit does not establish which content an investor reads. The page illustrates the information available during a visit, rather than a trading outcome or a push notification.

it is 0.52 percent. This asymmetry motivates controlling separately for the negative and positive parts of the return when comparing losing and winning positions.

Investors realize losses less often than the presence of losing positions in their holdings would suggest: in Table 1's Mean column, *Unrealized Loss* accounts for 71 percent of position-days with an observed, nonzero holding-stage return, whereas *Realized Loss* accounts for 51 percent of sale days. The gain/loss state is measured at the previous close for position-days and at the execution price for sales. Ben-David and Hirshleifer (2012) likewise distinguish transaction prices from closing prices when classifying gains and losses. The difference between these shares therefore combines which positions investors sell with price movements before execution; it motivates the within-investor-day comparisons rather than estimating the disposition effect.

Investors click on their positions much more often than they sell them: in Table 1's Mean column, we see that investors click on 55.7 percent of position-days in the full panel but sell just on 11.6 percent of position-days. Giving each investor equal weight preserves this contrast: Table 1's Mean column shows that the averages of investors' own position-day activity shares are 64.2 percent for clicks and 14.5 percent for sales. These results suggest that clicking is a routine activity, whereas selling is comparatively infrequent. This is why, in the interpretation of the results in the paper, we express their magnitudes relative to the average click rate or average sale rate, as applicable.

The comparisons also account for how long investors have held a position and how their other holdings and watchlist stocks have performed. Investors often hold positions well beyond the day of purchase: in Table 1's P50 column, the median time owned is 69 calendar days. Losses also occur outside the focal position: in Table 1's Mean column, *Portfolio Loss* applies to 78 percent of position-days with that state defined and *Watchlist Loss* to 77 percent of position-days with that state defined. Including *Portfolio Loss* and *Watchlist Loss* alongside *Unrealized Loss* distinguishes the focal position's gain/loss state from the gain/loss states of the investor's other holdings and watchlist stocks not yet traded. Together, the descriptive contrasts set up the comparisons of clicks and sales, the tests of selling after prior clicks and push notifications, and the subsequent-return comparisons of stocks sold and held.

4. Unrealized Losses, Clicks, and Sales

In this section, we investigate whether investors treat their losing positions differently from their winning positions in what they click on and what they sell, comparing positions within the same investor's day. We first examine clicks and then sales using the same econometric specifications and samples. We then compare clicks and sales around the break-even point to ask whether they respond in the same proportion.

4.1. Clicks on Losing and Winning Positions

Using stock-page clicks, we first examine H1a's prediction that *goal-driven* information seeking is lower for losing positions than for winning positions. We therefore ask whether

investors are less likely to click on a losing position than on a winning position on the same day. The ostrich-effect and information-avoidance literature motivates this question: investors may avoid negative information even when it could inform a decision (Karlsson, Loewenstein, and Seppi, 2009; Golman, Hagmann, and Loewenstein, 2017). We estimate equation (1) with *Click (t)* as the outcome variable and compare losing positions with winning positions, holding fixed the investor's activity and the other circumstances that day as well as persistent differences across stocks (i.e., using investor-day and stock fixed effects). We also control for the time the stock has been owned, the signed lagged return, and the gain/loss states of other holdings and watchlist stocks. Because *Unrealized Loss* is interacted with *Portfolio Loss* and *Watchlist Loss*, the baseline comparison refers to holdings for which neither other-position indicator records a loss.

It is worth noticing that in our specification we are able to observe clicks on individual holdings, whereas Quispe-Torreblanca et al. (2025) relate stock sales to the price reference established by an account login. The complementary stock-day comparison retains a negative *Unrealized Loss* association after absorbing news and price movements common to holders of the stock that day.

We document that investors click less often on their losing positions than on their winning positions on that day. Table 2's column (6) shows that investors are less likely to click on the stocks investors already own, by approximately 10 percent (= 5.08 / 52.52) than the average click rate in the estimation sample of 52.52 percent, a statistically significant gap.[11]

The main analysis uses the full panel. In the Appendix, we also examine alternative samples and functional forms. We use the sale-day sample in Table IA-3 and estimate conditional-logit models with stock-day or investor-day strata in Table IA-4, while the proportional-hazards estimates in Table IA-5 show a lower click hazard for losing positions in every reported specification except the control-only specification. The *Unrealized Loss* coefficient is negative and statistically significant throughout Table IA-3's sale-day specifications and remains negative throughout Table IA-4's conditional-logit specifications. For models with only stock-day or investor-day strata, the *Unrealized Loss* coefficient is statistically significant in Table IA-4's stock-day column (1) and investor-day columns (6)–(9), but not stock-day columns (2)–(4). Overall, we document that investors click less often on their losing positions than on their winning positions even within the same day. This pattern supports H1a's prediction of fewer clicks on losing positions than on winning positions.

4.2. Sales of Losing and Winning Positions

We now zoom on the disposition effect in investors' sales. We therefore compare losing positions and winning positions on the same position-days controlling for the same controls as in the specification for the clicks. This allows us to keep fixed the investor's circumstances on the

[11] The full control and fixed-effect sequence behind Table 2, including the intermediate specifications omitted from the main table, appears in Table IA-2. Investors also click less often on losing positions when we hold fixed persistent investor differences and circumstances common to holders of the stock that day (stock-day and investor fixed effects): at Table 2's column (5), they are less likely to click than on winning positions by approximately 7 percent (= 3.45 / 52.52) relative to the average click rate in the estimation sample of 52.52 percent, a statistically significant *Unrealized Loss* association.

Table 2: Clicks on Losing and Winning Positions

	(1)	(2)	(3)	(4)	(5)	(6)
			Click (t) × 100			
Unrealized Loss	-14.54***	-4.17***	-7.18***	-4.35***	-3.45***	-5.08***
	(0.64)	(0.47)	(0.78)	(0.44)	(0.60)	(0.69)
Watchlist Loss			-0.49	-0.33	-0.07	
			(0.69)	(0.33)	(0.40)	
Portfolio Loss			-2.86***	-1.59***	-1.55***	-0.02
			(0.71)	(0.32)	(0.39)	(0.60)
Unrealized Loss × Watchlist Loss			1.44**	0.47	0.33	1.44***
			(0.65)	(0.36)	(0.47)	(0.54)
Unrealized Loss × Portfolio Loss			2.39***	-0.24	0.18	0.00
			(0.71)	(0.36)	(0.46)	(0.64)
Controls Included:						
Position (Time Owned, Ret±)		✓	✓	✓	✓	✓
Fixed Effects Included:						
Investor				✓	✓	
Date				✓		
Stock				✓		✓
Stock × Day					✓	
Investor × Day						✓
Base rate of click	55.48	55.48	52.52	52.52	52.52	52.52
R-squared (%)	1.75	22.52	20.28	47.62	7.21	11.21
N	4,387,148	4,387,148	3,218,675	3,218,675	3,218,675	3,218,675

Note: The table estimates *Click (t)*, indicating a stock-page visit, by linear probability models on the full position-day panel. *Unrealized Loss* indicates a negative previous-close reconstructed return. *Portfolio Loss* value-weights other holdings; *Watchlist Loss* equal-weights eligible watchlist stocks, excluding held stocks. Columns (1)–(3) successively include no controls, log time owned and the negative and positive parts of the lagged unrealized return (Ret±), and other-position loss states and interactions. Fixed effects vary as shown in columns (4)–(6). The level of *Watchlist Loss* is not identified in column (6). Table IA-2 reports full specifications. Each column reports its own complete-case N. Coefficients are multiplied by 100. Standard errors, clustered by investor and by stock, are in parentheses. The sample includes approximately 10,000 retail investors of a large Chinese online trading platform between January 2022 and May 2023. *, **, and *** denote significance at the 10%, 5%, and 1% levels.

day and differences across stocks (investor-day and stock fixed effects). Investors are less likely to sell losing positions than winning ones in the presence of Unrealized Losses. In particular, if we focus on Table 3, column (6), we see that investors are approximately 56 percent (= 4.33 / 7.71) less likely to sell a losing position than a winning one, if compared to the sample's average sale rate.

If we focus on the gain/loss states of other stocks in the portfolio and the stocks not held but in the watchlist, we see that investors are even less likely to realize losses than gains when the rest of their portfolio is also at a loss. When *Portfolio Loss* records a loss, the natural tendency to sell more winners than losers is increased from 56 percent (= 4.33 / 7.71) to 67 percent of the average sale rate. The negative *Unrealized Loss* × *Portfolio Loss* interaction is consistent with the portfolio-driven disposition effect documented by An et al. (2024).

In contrast, if we focus on the gain/loss of the stocks not held but in the watchlist, we see that investors are still less likely to realize losses than gains, but less so when those stocks are at a loss. When *Watchlist Loss* records a loss, the natural tendency to sell more winners than losers is reduced from 56 percent (= 4.33 / 7.71) to 44 percent of the average sale rate.

Table 3: Sales of Losing and Winning Positions

	(1)	(2)	(3)	(4)	(5)	(6)
			Sale (t) × 100			
Unrealized Loss	-9.56***	-6.54***	-4.90***	-4.60***	-3.50***	-4.33***
	(0.24)	(0.17)	(0.24)	(0.22)	(0.25)	(0.32)
Watchlist Loss			-2.29***	-0.66***	-0.44**	
			(0.23)	(0.16)	(0.18)	
Portfolio Loss			0.44**	-0.35**	-0.09	0.71***
			(0.22)	(0.15)	(0.17)	(0.26)
Unrealized Loss × Watchlist Loss			0.76***	0.61***	0.40**	0.91***
			(0.18)	(0.17)	(0.20)	(0.25)
Unrealized Loss × Portfolio Loss			-1.23***	-0.58***	-0.55***	-0.84***
			(0.18)	(0.16)	(0.18)	(0.27)
Controls Included:						
Position (Time Owned, Ret±)		✓	✓	✓	✓	✓
Fixed Effects Included:						
Investor				✓	✓	
Date				✓		
Stock				✓		✓
Stock × Day					✓	
Investor × Day						✓
Base rate of sale	11.39	11.39	7.71	7.71	7.71	7.71
R-squared (%)	1.85	14.46	8.53	15.77	2.38	4.03
N	4,387,148	4,387,148	3,218,675	3,218,675	3,218,675	3,218,675

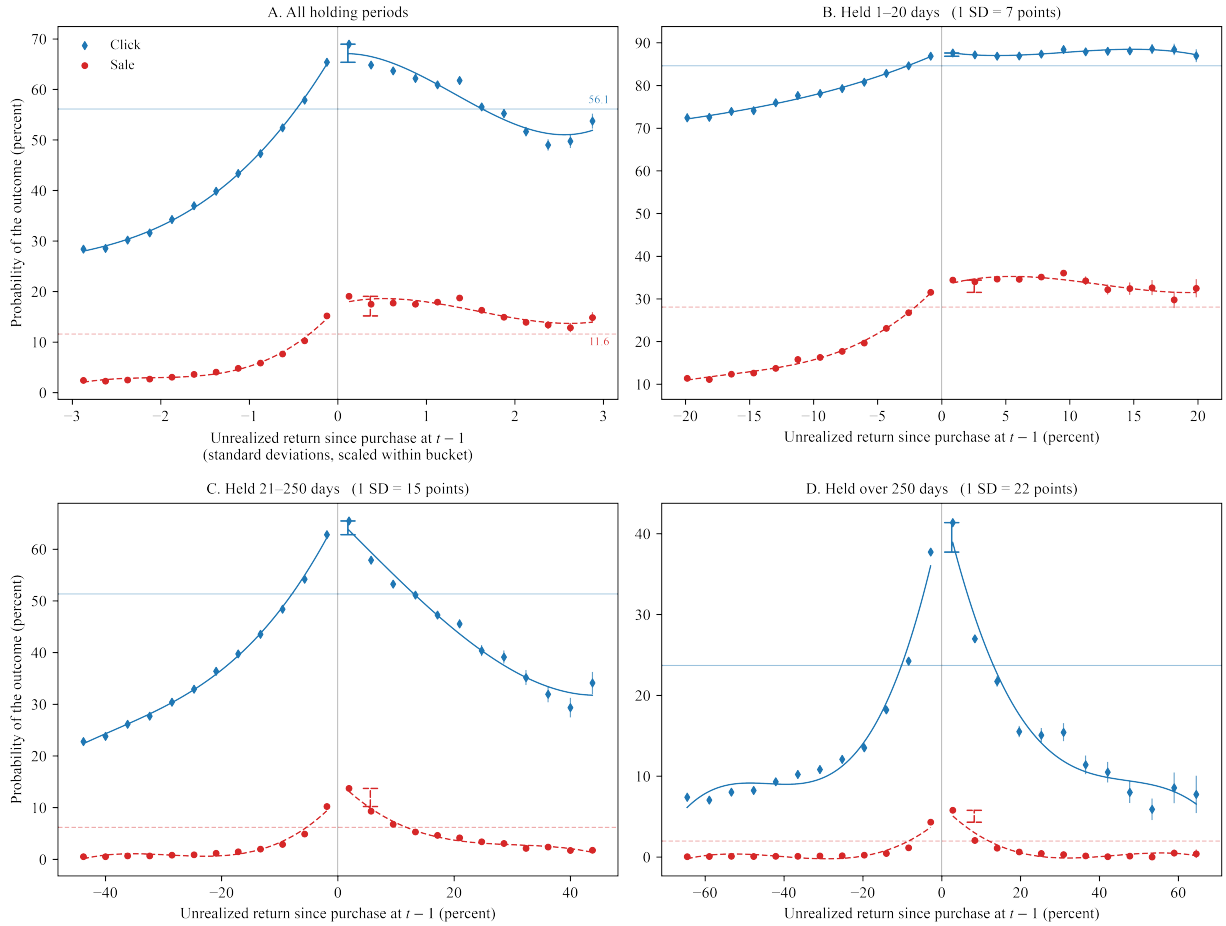
Note: The table estimates *Sale (t)*, indicating negative net share change from trading, by linear probability models on the full position-day panel. *Unrealized Loss*, *Watchlist Loss*, and *Portfolio Loss* follow Table 2. Columns (1)–(3) successively include no controls, log time owned and the negative and positive parts of the lagged unrealized return (Ret±), and other-position loss states and interactions. Fixed effects vary as shown in columns (4)–(6). The level of *Watchlist Loss* is not identified in column (6). Table IA-6 reports full specifications. Each column reports its own complete-case N. Coefficients are multiplied by 100. Standard errors, clustered by investor and by stock, are in parentheses. The sample includes approximately 10,000 retail investors of a large Chinese online trading platform between January 2022 and May 2023. *, **, and *** denote significance at the 10%, 5%, and 1% levels.

Robustness checks based on the sale-day sample show that investors continue to sell losing positions less often than winning positions. Even on days when investors sell, Table IA-7's column (12) shows that they are approximately 24 percent (= 6.52 / 27.25) less likely to sell a losing position than a winning one, relative to the sale-day sample's average sale rate. Also, the conditional-logit estimates in Table IA-8, which use the full panel, remain negative, and the proportional-hazards estimates in Table IA-9 show a lower sale hazard for losing positions in every reported specification.

4.3. Clicks and Sales Around the Break-Even Point

We now examine whether click and sale probabilities vary across positions as a function of the size of the unrealized losses or gains. We divide each position's previous-close unrealized return by the return standard deviation within its holding-period group, group positions into bins on this standardized return axis, and plot the click and sale probabilities within each bin in Figure 2. If either outcome simply mirrors the other, their schedules should have the same shape after allowing for their different frequencies. Panel A pools the holding-period groups on the

Figure 2: Clicks and Sales by *Unrealized Return*

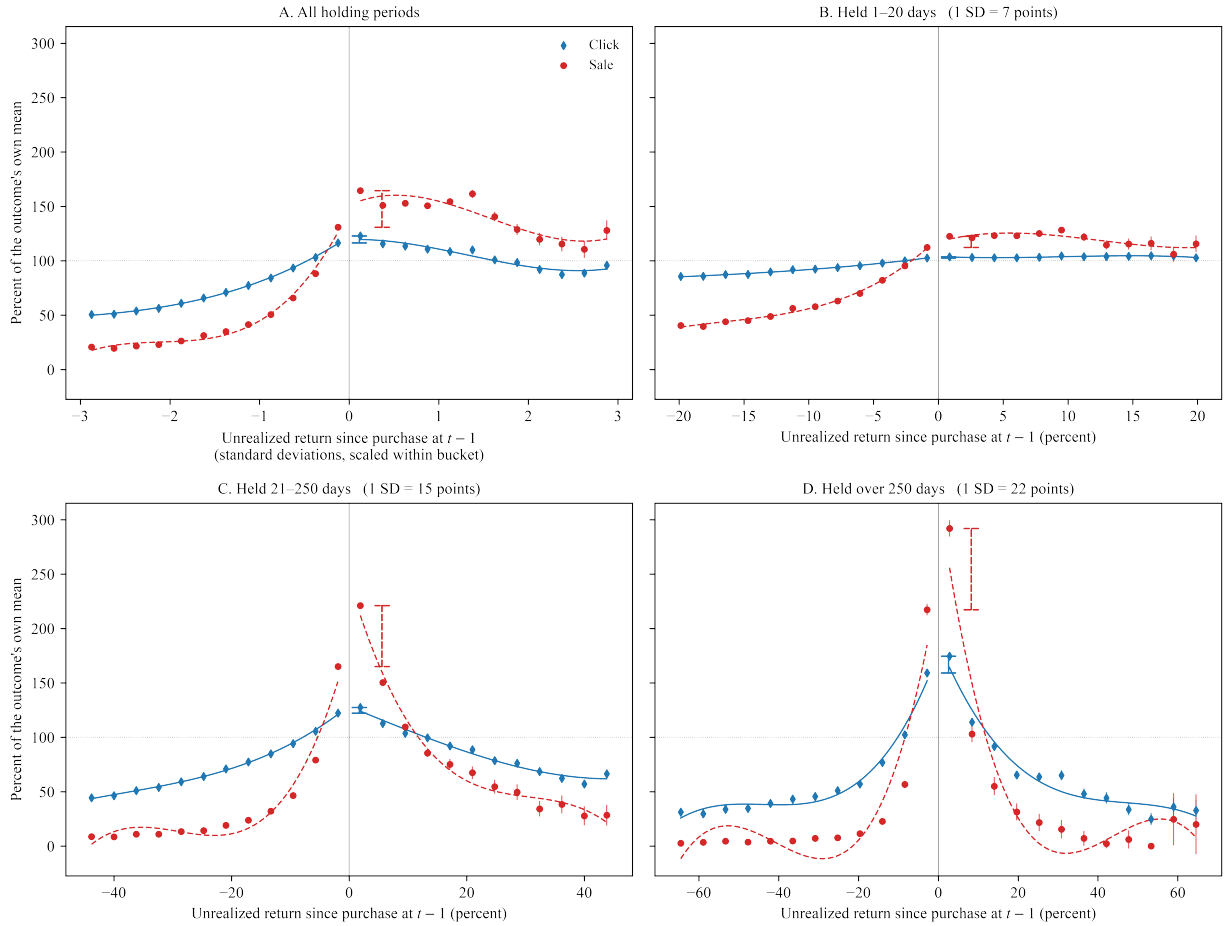


Note: The figure plots click and sale probabilities in percent against previous-close unrealized returns. *Click (t)* records whether an investor clicks on a position the investor holds; *Sale (t)* records negative net share change. Panel A pools holding periods; Panels B–D cover 1–20, 21–250, and over 250 holding days. Returns are standardized within holding-period groups for quarter-standard-deviation bins; returns beyond three standard deviations and bins with fewer than 30 observations are omitted, following □ Ben-David and Hirshleifer (2012)□ . Bars are 95% binomial confidence intervals; curves are cubics fitted separately on either side of zero. Panel A's axis is standardized; B–D use percent. Faint lines mark each series' mean over plotted bins; brackets compare adjacent bins, not fitted discontinuities. Panel scales differ. Figure 3 shows normalized schedules. The sample includes approximately 10,000 retail investors of a large Chinese online trading platform between January 2022 and May 2023.

standardized return axis: both probabilities fall as losses deepen, and selling is highest just above the break-even point, a selling pattern consistent with the reverse V-shaped selling schedule with elevated activity near zero that An et al. (2024) report for Chinese investors. The holding-period panels also show that slopes and behavior near the break-even point vary with time owned.

Next, we see whether the schedules move together relative to how often each outcome occurs. We therefore divide each schedule by the corresponding average click rate or average sale rate in Figure 3, so proportional movements can be compared despite the different frequencies of clicks and sales; schedules that mirror each other would overlap on this scale. We find that sales have a steeper loss-side gradient than clicks in the pooled panel. The difference in shape motivates a

Figure 3: Mean-Normalized Clicks and Sales by *Unrealized Return*



Note: The figure plots Figure 2's click and sale probabilities as percentages of their means against previous-close unrealized returns. Panel A pools holding periods; Panels B–D cover 1–20, 21–250, and over 250 holding days. Returns are standardized within holding-period groups for quarter-standard-deviation bins; returns beyond three standard deviations and bins with fewer than 30 observations are omitted, following □ Ben-David and Hirshleifer (2012)□ . Bars are 95% binomial confidence intervals; curves are cubics fitted separately on either side of zero. Panel A's axis is standardized; B–D use percent. The mean is 100; brackets compare adjacent bins, not Table 4's jumps. The sample includes approximately 10,000 retail investors of a large Chinese online trading platform between January 2022 and May 2023.

formal comparison at the break-even point, where selling ceases to realize a loss and begins to realize a gain.

To test whether clicks and sales respond in the same proportion at the break-even point, we compare their fitted jumps (the fitted increase in the click or sale probability from just below to just above the break-even point) on identical position-days within a narrow window on either side of the break-even point.[12] Following the selling-discontinuity design of Ben-David and Hirshleifer

[12]Comparing the full-sample *Unrealized Loss* coefficients for clicks and sales is distinct from comparing their fitted jumps when examining behavior around the break-even point. Investors also sell their own losing positions less often than their own winning positions, holding fixed investor differences and circumstances common to holders of the stock that day: at Table 3's column (5), they are less likely to sell their losing positions by approximately 45 percent (= 3.50 / 7.71) relative to the average sale rate in the estimation sample. The sale association remains negative, but

(2012), we fit separate cubic return polynomials on either side of the break-even point; we extend the design to estimate the click and sale jumps jointly, incorporating their covariance. We express each jump as a percent of its own average click or sale rate within the estimation window, so the difference between these percentages is measured in percentage points.[13]

We report the results in Table 4. Investors are more likely to sell or click just above break-even than just below it: at Table 4's column (1), the increases are approximately 6.82 percent for selling and 1.31 percent for clicking. The difference between these proportional increases at Table 4's column (1) is 5.51 percentage points and is statistically significant.[14] For the selling pattern, this joint difference (the sale jump minus the click jump, estimated together) weighs against the explanation that losing positions are sold less simply because they receive fewer clicks. If clicks merely foreshadowed sales in a fixed proportion, the higher sale probability just above break-even would imply an equally large proportional increase in clicks. The different jumps therefore weigh against this simple explanation for fewer clicks on losing positions.

Across polynomial-degree and bandwidth variants, the proportional increase in selling exceeds that in clicking, with each jump again expressed as a percent of its own average rate, as above: at Table IA-11's Panels A and C, All Holding Periods columns, the differences span 4.38–7.62 percentage points and are statistically significant in every variant. The residual-based comparison in Table IA-11's Panel B provides weaker evidence. The schedules in Figures IA-1 and IA-2 revisit the level and mean-normalized comparisons at fixed prior holding days, while Figures IA-3 and IA-4 separate the probability of a position change from the share of changes that are sales, retaining clicks and the respective scales. All the results provide the same consistent picture that investors are less likely to click on and to sell their losing positions than their winning positions within the same day. Yet clicks and sales do not respond in the same proportion at the break-even point, so neither pattern simply mirrors the other.

5. Prior Clicks, Push Notifications, and Sales

We now examine the link between the disposition effect and information. H1b predicts a stronger disposition effect among previously clicked positions, and H2a predicts a stronger disposition effect after a push notification. Specifically, we examine whether prior clicks and push notifications, each measured on the previous trading day, are associated with a stronger

its relative magnitude changes with the comparison. We compare probability-point coefficients directly in Table IA-10, estimating clicks and sales jointly on identical position-days and with the same fixed effects, using *Click (t)* as the reference outcome. Investors are less likely both to click on and to sell losing positions within the same day: at Table IA-10's column (12), their sale-minus-click difference in the *Unrealized Loss* coefficients is 0.75 percentage points and is statistically insignificant.

[13] Returns are standardized within holding-period groups, and the baseline uses a symmetric bandwidth, the square root of calendar days held, and its interactions with the return polynomials; standard errors are clustered by investor. The full-sample regressions instead control for the logarithm of calendar days held.

[14] The proportional increase in selling also exceeds that in clicking within each holding-period group: at Table 4's columns (2) to (4), the differences are 2.47, 7.30, and 9.29 percentage points, respectively, as time owned increases. The pooled sale jump and the contrasts in Table 4's columns (2) and (3) are statistically significant, with the contrast in column (2) significant only at the 10 percent level, whereas the pooled click jump and the contrast in column (4) are statistically insignificant.

Table 4: Responses at the Break-Even Point

	All Holding Periods (1)	Held 1–20 Days (2)	Held 21–250 Days (3)	Held Over 250 Days (4)
		Click and Sale, jumps in percent of base rate		
Click Jump	1.31	0.31	0.80	9.87*
	(0.92)	(0.33)	(1.28)	(5.96)
Sale Jump	6.82***	2.78**	8.10***	19.16
	(1.49)	(1.29)	(3.01)	(13.29)
Sale vs. Click:				
Difference (Δ)	5.51***	2.47*	7.30***	9.29
	(1.41)	(1.29)	(2.70)	(11.57)
Base rate, click (%)	64.42	86.62	60.73	34.22
Base rate, sale (%)	15.27	31.63	9.67	3.67
N	2,323,237	687,440	1,287,591	348,206

Note: The table reports gain-side minus loss-side jumps at break-even. *Click (t)* indicates a stock-page visit; *Sale (t)* indicates negative net share change. Previous-close unrealized returns are standardized within holding-period groups. The bandwidth spans half a standard deviation on either side of zero. Following □ Ben-David and Hirshleifer (2012)□ , separate cubic return polynomials include square-root time owned and its interactions. Jumps are percentages of the printed click and sale base rates within the bandwidth. The sale-minus-click contrast uses this scale and incorporates covariance from joint estimation. N counts position-days within the bandwidth. Investor clustering allows dependence across an investor's positions and days. Table IA-11 reports sensitivity specifications. Standard errors, clustered by investor, are in parentheses. The sample includes approximately 10,000 retail investors of a large Chinese online trading platform between January 2022 and May 2023. *, **, and *** denote significance at the 10%, 5%, and 1% levels.

disposition effect. We examine this question separately for a stock-page click and a push notification on the previous trading day. For each information channel, the central comparison is whether its association with selling differs between winning and losing positions, rather than whether it is associated with more sales overall.

5.1. Sales of Losing and Winning Positions After a Prior Click

We first ask whether clicks impact the tendency to sell more winners than losers. We therefore compare the same investor's losing and winning positions on the same day, separately for positions clicked and positions not clicked on the previous trading day, holding fixed the investor's circumstances that day and persistent differences across stocks (investor-day and stock fixed effects). We extend the Table 3 sale specifications with *Click (t−1)* and *Unrealized Loss* × *Click (t−1)* in Table 5. The interaction tests whether the disposition effect differs between these groups, with a positive sign indicating a weaker effect and a negative sign a stronger one.

We find that investors sell losing positions less often than winning positions both with and without a click on the previous trading day. For positions not clicked on the previous trading day, Table 5's column (6) shows that investors are approximately 9 percent (= 0.69 / 7.71) less likely to sell a losing position than a winning one, relative to the estimation sample's average sale rate of 7.71 percent. For clicked positions, Table 5's column (6) shows that investors are approximately 70 percent less likely to sell a losing position than a winning one, relative to the same average sale rate, making the gap approximately 8 times as large as for unclicked positions. The *Unrealized Loss* × *Click (t−1)* interaction is statistically significant. In particular, at Table 5's column (6), the

Table 5: Prior Clicks and Sales of Losing and Winning Positions

	(1)	(2)	(3)	(4)	(5)	(6)
			Sale (t) × 100			
Unrealized Loss	-2.24***	-1.29***	-0.06	-0.75***	-0.68***	-0.69**
	(0.12)	(0.15)	(0.21)	(0.21)	(0.26)	(0.31)
Click ($t-1$)	21.84***	12.30***	10.84***	10.53***	9.07***	11.36***
	(0.39)	(0.28)	(0.23)	(0.22)	(0.24)	(0.34)
Unrealized Loss × Click ($t-1$)	-7.79***	-6.91***	-6.20***	-4.92***	-3.70***	-4.71***
	(0.23)	(0.20)	(0.18)	(0.17)	(0.19)	(0.25)
Controls Included:						
Position (Time Owned, Ret±)		✓	✓	✓	✓	✓
Other-position loss states and their interactions			✓	✓	✓	✓
Fixed Effects Included:						
Investor				✓	✓	
Date				✓		
Stock				✓		✓
Stock × Day					✓	
Investor × Day						✓
Base rate of sale	11.39	11.39	7.71	7.71	7.71	7.71
R-squared (%)	8.33	15.64	9.85	16.76	3.33	5.44
N	4,387,148	4,387,148	3,218,675	3,218,675	3,218,675	3,218,675

Note: The table estimates *Sale (t)*, indicating negative net share change from trading, on the full position-day panel. *Click (t−1)* indicates a stock-page visit on the previous trading day. *Unrealized Loss* and specifications follow Table 2, including log time owned and the negative and positive parts of the lagged unrealized return (Ret±). Other-position loss states and their interactions enter where marked; their coefficients are not reported. Fixed effects follow Table 2; in column (6), the level of *Watchlist Loss* is not identified. Table IA-12 reports full specifications. Each column reports its own complete-case N. Coefficients are multiplied by 100. Standard errors, clustered by investor and by stock, are in parentheses. The sample includes approximately 10,000 retail investors of a large Chinese online trading platform between January 2022 and May 2023. *, **, and *** denote significance at the 10%, 5%, and 1% levels.

Unrealized Loss × *Click (t−1)* interaction is −4.71 percentage points, indicating a stronger disposition effect among clicked positions. Thus, the larger tendency to realize gains rather than losses occurs among positions the investor recently clicked on.

Investors are also more likely to sell winning positions overall after a click. Investors who clicked on a winning position on the previous trading day are, at Table 5's column (6), 147 percent (= 11.36 / 7.71) more likely to sell it than a winning position not clicked on, relative to the estimation sample's average sale rate, a statistically significant increase. We report the full specification sequence in Table IA-12.

Investors sell winning positions more readily after a click, but the disposition effect is stronger among the positions they clicked. We interpret these findings as suggesting that information access amplifies the disposition effect. Clicking on a losing position and realizing its loss remain distinct decisions: the investor can click and continue holding the position.

5.2. Sales of Losing and Winning Positions After a Push Notification

Next, we focus on unsolicited information delivered through push notifications. A push message can bring a held stock to the notice of an investor who sees it, without a stock-page visit, so delivery does not require the investor to choose to examine the position. Evidence that

app features shape trading (Barber et al., 2022) motivates examining whether notifications are associated with more activity and whether that association differs between winners and losers.

We ask whether pushes impact the tendency to sell more winners than losers. We compare the same investor's losing and winning positions on the same day, separately among positions with and without a push notification on the previous trading day, holding fixed the investor's circumstances that day and persistent differences across stocks (investor-day and stock fixed effects). We use the push indicator defined in Section 3.4 and restrict the regressions to the delivery-log coverage window described in Section 3.3. Delivery therefore precedes the outcomes. The complementary stock-day specification holds fixed news and price movements common to holders of the same stock that day.

In particular, we regress *Sale (t)* and *Click (t)* on *Unrealized Loss*, *Push (t−1)*, and their interaction, using the controls and fixed-effect sequence in Section 3.1. The *Push (t−1)* coefficient describes the association among winners at the reference values of the other moderators, while *Unrealized Loss* × *Push (t−1)* measures how that association differs among losers. Their sum gives the push association among losers. A positive loss interaction would indicate a weaker disposition effect for sales or a narrower winner–loser difference in clicks. We report the full specifications behind Table 6 and the click estimates in Table IA-13.

Table 6: Push Notifications and Sales of Losing and Winning Positions

	(1)	(2)	(3)	(4)	(5)	(6)
			Sale (t) × 100			
Unrealized Loss	-10.18***	-6.69***	-4.81***	-4.40***	-3.55***	-4.28***
	(0.26)	(0.18)	(0.26)	(0.24)	(0.28)	(0.35)
Push ($t-1$)	11.99***	7.04***	7.50***	6.03***	4.78***	6.54***
	(1.24)	(0.92)	(0.84)	(0.67)	(0.81)	(0.98)
Unrealized Loss × Push ($t-1$)	-2.25**	-3.36***	-3.27***	-2.31***	-1.09	-2.18**
	(0.95)	(0.71)	(0.72)	(0.67)	(0.85)	(0.92)
Controls Included:						
Position (Time Owned, Ret±)		✓	✓	✓	✓	✓
Other-position loss states and their interactions			✓	✓	✓	✓
Fixed Effects Included:						
Investor				✓	✓	
Date				✓		
Stock				✓		✓
Stock × Day					✓	
Investor × Day						✓
Base rate of sale	12.33	12.33	8.38	8.38	8.38	8.38
R-squared (%)	2.08	14.63	8.76	16.71	2.53	4.20
N	3,731,522	3,731,522	2,707,442	2,707,442	2,707,442	2,707,442

Note: The table estimates *Sale (t)*, indicating negative net share change from trading, on Table 2's full panel restricted to the delivery-log window, which ends on March 31, 2023, before the panel does. *Push (t−1)* records delivery about the held stock on the previous trading day, not opening or reading. Messages are not investor-targeted. Other covered position-days form the comparison group. Variables and specifications follow Table 2, including log time owned and the negative and positive parts of the lagged unrealized return (Ret±). The investor-day specification omits the absorbed *Watchlist Loss* level. Table IA-13 reports full specifications. Each column reports its own complete-case N. Coefficients are multiplied by 100. Standard errors, clustered by investor and by stock, are in parentheses. The sample includes approximately 10,000 retail investors of a large Chinese online trading platform between January 2022 and May 2023. *, **, and *** denote significance at the 10%, 5%, and 1% levels.

We find that investors are more likely to sell winning positions with a prior push notification than those without one. Investors are 78 percent (= 6.54 / 8.38) more likely to sell a winning position after a push than without one, relative to the delivery-window sample's average sale rate of 8.38 percent. Moreover, the tendency to sell winners as opposed to losers is amplified after a notification. The *Unrealized Loss* × *Push (t−1)* sale interaction at Table 6's column (6) is −2.18 percentage points and statistically significant.[15] Without a push on the previous trading day, investors are approximately 51 percent less likely to sell a loser than a winner, compared with 77 percent after a push, both relative to the delivery-window sample's average sale rate. A push notification is therefore associated with more selling of winning positions without bringing loss realization closer to gain realization. We interpret this as indicating a stronger disposition effect.

Also, investors' greater activity after a notification is evident in both outcomes: the positive sale association with winners in Table 6 and the positive click association with winners in Table IA-13, Panel B, are statistically significant under both stock-day and investor-day fixed effects. More clicks and sales among winners do not by themselves imply a weaker disposition effect.

This provides further support for the previous results on clicks suggesting that more information increases the disposition effect. One possible interpretation is that information access makes losses more salient and the prospect of realizing them more painful. Under this interpretation, greater salience reduces the willingness to realize a loss.

Nonfocal pushes are also associated with a stronger disposition effect. We regress *Sale (t)* and *Click (t)* on *Unrealized Loss*, *Nonfocal Push (t−1)*, and their interaction, using Table 6's sequence of controls and fixed effects while holding fixed the focal push, *Push (t−1)*, and its interaction with *Unrealized Loss*. The sale estimates appear in Table 7.

We report the full specifications behind Table 7 and the click estimates in Table IA-14. The *Unrealized Loss* × *Nonfocal Push (t−1)* sale interaction is negative and statistically significant throughout the sequence, including with investor-day effects. The *Nonfocal Push (t−1)* level is absorbed by investor-day effects because it varies across investor-days rather than across the investor's positions within a day; its interaction with the position's loss state remains estimable.

We find that investors show little difference by gain/loss state in the click association with a nonfocal push: at Table IA-14's Panel B, column (10), with stock-day and investor fixed effects, the *Unrealized Loss* × *Nonfocal Push (t−1)* click interaction is 0.04 percentage points and statistically indistinguishable from zero. This contrasts with the positive focal-push click interaction in Table IA-13's Panel B discussed below.

Pushes could also amplify the disposition effect indirectly by prompting investors to click on their positions. We therefore examine whether notifications are followed by more clicks on losing positions relative to winning positions. After a push, investors' probability of clicking rises more for losers than winners: at Table IA-13's Panel B, column (10), the difference is 3.35 percentage

[15] The sale interaction remains negative in the complementary specifications: at Table 6's column (4), the *Unrealized Loss* × *Push (t−1)* interaction is −2.31 percentage points. Holding fixed investor differences and circumstances common to holders of the stock that day gives a smaller negative estimate: at Table 6's column (5), the interaction is −1.09 percentage points (stock-day and investor fixed effects). The interaction in column (4) is statistically significant, whereas the interaction in column (5) is statistically insignificant.

Table 7: Nonfocal Push Notifications and Sales of Losing and Winning Positions

	(1)	(2)	(3)	(4)	(5)	(6)
			Sale (t) × 100			
Unrealized Loss	-9.07***	-5.83***	-4.14***	-3.70***	-2.85***	-3.53***
	(0.33)	(0.23)	(0.29)	(0.26)	(0.30)	(0.41)
Nonfocal Push ($t-1$)	3.55***	2.02***	1.61***	1.27***	1.43***	
	(0.48)	(0.35)	(0.28)	(0.22)	(0.25)	
Unrealized Loss × Nonfocal Push ($t-1$)	-1.75***	-1.34***	-1.09***	-1.08***	-1.09***	-1.16***
	(0.34)	(0.24)	(0.22)	(0.21)	(0.23)	(0.33)
Push ($t-1$)	10.72***	6.33***	6.94***	5.74***	4.46***	6.26***
	(1.23)	(0.91)	(0.84)	(0.67)	(0.81)	(0.98)
Unrealized Loss × Push ($t-1$)	-1.62*	-2.88***	-2.88***	-1.96***	-0.73	-1.82**
	(0.95)	(0.71)	(0.72)	(0.67)	(0.85)	(0.92)
Controls Included:						
Position (Time Owned, Ret$\pm$)		✓	✓	✓	✓	✓
Other-position loss states and their interactions			✓	✓	✓	✓
Fixed Effects Included:						
Investor				✓	✓	
Date				✓		
Stock				✓		✓
Stock × Day					✓	
Investor × Day						✓
Base rate of sale	12.33	12.33	8.38	8.38	8.38	8.38
R-squared (%)	2.210	14.660	8.790	16.720	2.540	4.200
N	3,731,522	3,731,522	2,707,442	2,707,442	2,707,442	2,707,442

Note: The table reports linear probability models of *Sale (t)*, indicating a negative net share change from trading, within Table 6's delivery-log window. *Nonfocal Push (t−1)* records delivery on the previous trading day of a push notification about any stock other than the position being evaluated, including the investor's other portfolio holdings, stocks on the investor's watchlist, and stocks in neither set. Each specification includes the focal push, *Push (t−1)*, and its interaction with *Unrealized Loss*. Controls and fixed effects follow Table 6. Investor-day effects absorb the *Nonfocal Push (t−1)* level. Each column uses its own complete-case sample. Full specifications and click estimates appear in Table IA-14. Coefficients are multiplied by 100. Standard errors, clustered by investor and by stock, are in parentheses. The sample includes approximately 10,000 retail investors of a large Chinese online trading platform between January 2022 and May 2023. *, **, and *** denote significance at the 10%, 5%, and 1% levels.

points, or 6 percent (= 3.35 / 54.09) of the delivery-window average click rate, with stock-day and investor fixed effects. Comparing the same investor's positions on the same day, while accounting for persistent differences across stocks, gives a smaller extra rise for losers: at Table IA-13's Panel B, column (12), it is 1.93 percentage points, or 4 percent (= 1.93 / 54.09) of the same average click rate. The stock-day interaction is statistically significant, whereas the investor-day interaction is statistically insignificant. These estimates are consistent with notifications drawing clicks toward losing positions under the stock-day comparison, without corresponding evidence of a weaker disposition effect.

Together, the click and sale results fit the interpretation that information access amplifies the disposition effect. These findings support the predictions in H1b and H2a: both prior clicks and push notifications are associated with a stronger disposition effect in the within-investor-day comparison.

6. Quality of the Action: Subsequent Returns

The earlier sections suggest that information access does not weaken the disposition effect and in fact amplifies it. We now examine H1c and H2b: prior clicks are associated with sharper selection, whereas push notifications are not associated with a corresponding improvement. We measure the quality of the selling decision by the *held-minus-sold* subsequent return difference within each gain/loss state: a larger difference means that the stocks sold perform worse than those kept. We distinguish realization – whether and when a loss is realized – from selection – which stocks are sold within a gain/loss state. Sold-versus-held returns within each gain/loss state assess selection, while the comparison of *held losers* with *sold winners* asks whether realization – i.e., holding losers instead of selling winners – sacrifices subsequent returns.

6.1. Measuring Subsequent Returns

We measure subsequent buy-and-hold stock returns from the trading day after the decision to sell. Our main benchmark is CH-4, the Chinese four-factor model of Liu, Stambaugh, and Yuan (2019). We estimate factor loadings before each quarter using trailing returns and factor leads and lags, then compound the daily factor-adjusted returns over each subsequent horizon. We also report characteristic-adjusted returns using size, book-to-market, and momentum portfolios following Daniel, Grinblatt, Titman, and Wermers (1997; DGTW). The return tables report the gain/loss-by-action groups over 5, 20, 60, 120, and 240 trading days. All the returns are reported in percent, with their construction detailed in Section 5 of the Internet Appendix.

We give equal weight to an investor's positions with the same action on a given day, pooling gains and losses under the action definitions in Section 3. We then divide each position's weight by the investor's total number of days with a purchase or sale during the sample. The first adjustment prevents days with more positions in the same action from receiving more weight; the second prevents more active traders from dominating the comparison. Standard errors are clustered by investor and date.

6.2. Held and Sold Positions

We first ask whether the stocks investors sell subsequently underperform the stocks they keep, separately for losers and winners. We compare positions sold with positions held on the same decision day, separately within each gain/loss state. We report in Table 8 the groups of "*held losers*", "*sold losers*", "*held winners*", and "*sold winners*", denoted by R_{LH}, R_{LS}, R_{WH}, and R_{WS}. *Held losers* and *held winners* have, respectively, a negative or positive unrealized return at the previous close and no net position change on the decision day; *sold losers* and *sold winners* have the same respective return signs and a negative net share change, including partial sales. Positions with an exact zero unrealized return are excluded. These groups retain the previous-close gain/loss classification and net trading definitions established in Section 3, including partial net sales.[16]

[16]Held positions include all the position-days in the full panel with no net position change, not only those on the investor's sale days.

Table 8: Subsequent Returns of Held and Sold Positions

Panel A: The four position groups

	CH-4					DGTW				
	5d	20d	60d	120d	240d	5d	20d	60d	120d	240d
	Return after the decision day, percent									
Losers:										
Losers Held (R_{LH})	-0.06	-0.20**	-0.63***	-1.08***	-1.48**	-0.06	-0.16*	-0.64***	-1.38***	-2.06***
	(0.04)	(0.10)	(0.22)	(0.38)	(0.70)	(0.04)	(0.09)	(0.20)	(0.33)	(0.59)
Losers Sold (R_{LS})	-0.73***	-1.94***	-2.97***	-3.83***	-3.39***	-0.71***	-1.97***	-3.29***	-4.49***	-5.40***
	(0.09)	(0.16)	(0.23)	(0.27)	(0.44)	(0.08)	(0.15)	(0.21)	(0.25)	(0.26)
Winners:										
Winners Held (R_{WH})	-0.33***	-0.92***	-1.70***	-2.08***	-1.00	-0.35***	-1.10***	-2.19***	-2.65***	-2.86***
	(0.05)	(0.15)	(0.32)	(0.54)	(1.00)	(0.04)	(0.13)	(0.31)	(0.55)	(0.97)
Winners Sold (R_{WS})	-1.16***	-2.92***	-4.07***	-5.40***	-4.43***	-1.09***	-2.90***	-4.45***	-6.12***	-7.34***
	(0.11)	(0.19)	(0.27)	(0.35)	(0.61)	(0.10)	(0.17)	(0.26)	(0.31)	(0.32)
N, Losers Held	2,602,394	2,590,056	2,557,669	2,520,809	2,462,619	2,482,422	2,470,593	2,438,792	2,402,904	2,347,564
N, Losers Sold	254,731	253,466	250,247	246,154	239,770	244,424	243,228	240,242	236,242	230,175
N, Winners Held	899,636	895,247	885,592	874,040	856,779	869,367	865,122	855,682	844,510	828,043
N, Winners Sold	215,716	214,470	211,879	208,591	203,947	207,654	206,462	203,994	200,804	196,355
Investors	9,771	9,768	9,761	9,754	9,724	9,720	9,717	9,709	9,702	9,674
Trading days	336	336	336	336	336	336	336	336	336	336

Note: The table reports group returns, group-specific N, investors, and trading days in Panel A. Panel B prints the Odean wedge (*held losers* minus *sold winners*) once and steps of the two accounting routes. L/W denote previous-close losses/gains; H/S denote no net change/net sale, including partial sales. Buy-and-hold returns begin the trading day after the decision, in percent: CH-4 factor-adjusted (Liu, Stambaugh, and Yuan, 2019) and Daniel–Grinblatt–Titman–Wermers (DGTW) characteristic-adjusted (Daniel et al., 1997) . Weights invert the product of the investor's positions with the same action that day (pooling gains and losses) and number of days with a purchase or sale over the sample. Weights do not equalize total weight per investor. No controls or fixed effects enter. Standard errors, clustered by investor and date, are in parentheses. The sample includes approximately 10,000 retail investors of a large Chinese online trading platform between January 2022 and May 2023. *, **, and *** denote significance at the 10%, 5%, and 1% levels.

(Continued)

Table 8—Continued

Panel B: The Odean wedge and its two accounting routes

	CH-4					DGTW				
	5d	20d	60d	120d	240d	5d	20d	60d	120d	240d
	Return after the decision day, percent									
The Odean wedge:										
$R_{LH} - R_{WS}$	1.10***	2.72***	3.44***	4.32***	2.96***	1.03***	2.73***	3.81***	4.73***	5.27***
	(0.11)	(0.21)	(0.35)	(0.49)	(0.93)	(0.10)	(0.20)	(0.33)	(0.45)	(0.64)
Via the loser sold:										
$R_{LH} - R_{LS}$	0.68***	1.74***	2.34***	2.75***	1.92**	0.65***	1.81***	2.65***	3.10***	3.33***
	(0.09)	(0.16)	(0.29)	(0.42)	(0.81)	(0.08)	(0.16)	(0.27)	(0.39)	(0.61)
$R_{LS} - R_{WS}$	0.43***	0.97***	1.10***	1.57***	1.04**	0.39***	0.92***	1.16***	1.63***	1.94***
	(0.10)	(0.19)	(0.28)	(0.35)	(0.52)	(0.10)	(0.18)	(0.26)	(0.33)	(0.37)
Via the winner held:										
$R_{LH} - R_{WH}$	0.27***	0.72***	1.07***	0.99*	-0.47	0.29***	0.94***	1.55***	1.26**	0.79
	(0.06)	(0.17)	(0.37)	(0.59)	(1.05)	(0.05)	(0.16)	(0.35)	(0.58)	(0.97)
$R_{WH} - R_{WS}$	0.83***	1.99***	2.37***	3.33***	3.43***	0.74***	1.79***	2.25***	3.47***	4.48***
	(0.10)	(0.19)	(0.37)	(0.57)	(1.00)	(0.09)	(0.18)	(0.35)	(0.55)	(0.93)

We start with the classical test of disposition return: the Odean wedge, $R_{LH} - R_{WS}$. In the US sample of Odean (1998), Table VI shows a negative wedge over the following year because R_{LH} is negative and R_{WS} is positive, with both returns measured relative to the market index. That is, investors hold on to losing positions and sell winning positions too early. In a market like the US, characterized by momentum, this is consistent with a bias; Odean (1998) relates this finding to the price momentum documented by Jegadeesh and Titman (1993).

However, in our case, the Odean wedge is positive at every reported horizon under both benchmarks in our sample.[17] If we look at the components, we see that R_{LH} is negative and R_{WS} is also very negative. Subtracting the more negative return on *sold winners* more than offsets the negative return on *held losers*, leaving a positive wedge. This suggests that the key differentiating factor is the behavior in the area of gain. In other words, the positive Odean wedge reflects the poorer subsequent performance of *sold winners*, while losers kept also earning negative factor-adjusted returns. The group levels make this distinction explicit: at Table 8, Panel A's CH-4 240-trading-day column, *losers held* earn −1.48 percent and *sold winners* earn −4.43 percent. The *sold winners* thus do worse still over the following year. In contrast, Odean (1998) finds that *sold winners* subsequently outperform losers left unrealized on portfolio sale days.

More specifically, we find that *held-minus-sold* differences are positive at every reported horizon under both benchmarks, and *sold winners* are the worst-performing group. The year-end comparison illustrates the selection pattern. If we focus on Table 8, Panel B's CH-4 240-trading-day column, we see that *held winners* outperform *sold winners* by 3.43 percent, and *held losers* outperform *sold losers* by 1.92 percent.

In other words, investors sell the stocks that go on to do worse than those they keep in both states. Investors continue to sell stocks that subsequently underperform their held alternatives within every band around break-even in Table IA-16. It is worth noticing that we control for the stock's own returns over the days before the decision, adjusted for size, book-to-market, and momentum using DGTW portfolios. These controls reduce the magnitude of the winners' sold-minus-held return difference by approximately half: at Table IA-17's Panel A, in the CH-4 column at 240 trading days without fixed effects, it moves from −3.43 percent to −1.89 percent. The remaining difference is statistically significant only at the ten percent level. Across the reported horizons and benchmarks, the stocks investors sell subsequently underperform the stocks they keep on the same decision day, whether the positions are at a loss or a gain.

[17] The *sold winners* earn lower subsequent returns than the losers kept: at Table 8, Panel B's CH-4 240-trading-day column, the Odean wedge is 2.96 percent. The held groups finish the year about level: at Table 8, Panel B's CH-4 240-trading-day column, the *held loser–winner difference*, $R_{LH} - R_{WH}$, is −0.47 percent, not statistically distinguishable from zero. The within-state selection comparisons are also positive under DGTW: at Table 8, Panel B's DGTW 240-trading-day column, the *held-minus-sold* differences are 4.48 percent for winners and 3.33 percent for losers. *Sold losers* also outperform *sold winners*: at Table 8, Panel B's DGTW 240-trading-day column, the *sold loser–winner difference* is 1.94 percent. The *sold winners* also do worse than the losers kept under characteristic adjustment: at Table 8, Panel B's DGTW 240-trading-day column, the Odean wedge is 5.27 percent. All these differences are statistically significant. The shorter horizons differ from the year-end comparison: in Table 8, Panel B's columns from 5 through 120 trading days, the *held loser–winner difference* is positive and of similar size to the *sold loser–winner difference* under both benchmarks. The *held loser–winner difference* at the year-end horizon is not statistically distinguishable from zero under DGTW either.

Also, we can look at the *sold loser–winner difference* ($R_{LS} - R_{WS}$), which compares subsequent returns across the stocks sold in each gain/loss state. The *sold loser–winner difference* at Table 8, Panel B's CH-4 240-trading-day column, is 1.04 percent.

These patterns also survive the price-limit exclusions in Table IA-15, which separately removes decision-day upper-limit closes, lower-limit closes, or either, retaining the original weights on surviving observations. *Held-minus-sold* differences remain positive under both benchmarks at the reported horizons, and the Odean wedge remains positive and statistically significant after each exclusion. Loss sales concentrate near the purchase price: at Table IA-16's Panel C, 74 percent (= 176,262 / 239,770) of loss sales fall within 5 log points of break-even, against 34 percent (= 841,105 / 2,462,619) of held losing position-days.

Armed with these two sets of findings, we can decompose the Odean wedge as:

$$R_{LH} - R_{WS} = (R_{LH} - R_{LS}) + (R_{LS} - R_{WS}) = (R_{LH} - R_{WH}) + (R_{WH} - R_{WS}) \tag{2}$$

These identities distinguish the within-state selection comparisons from the comparison of *held losers* with *sold winners*. Using the decomposition in equation (2), we see that $R_{LH} - R_{LS}$ measures selection among losers: the subsequent return on losers kept minus that on *losers sold*; $R_{LS} - R_{WS}$ compares *sold losers* with *sold winners*. The winner-selection component drives the positive Odean wedge: at Table 8, Panel B's CH-4 240-trading-day column, *held winners* outperform *sold winners* by 3.43 percent.

6.3. Information and Performance

We now investigate the role of information on the quality of the choice. We ask whether information access is associated with sharper selection of stocks for sale, measured by the *held-minus-sold* subsequent return differences within each gain/loss state. We examine sought information through the investor's prior clicks and unsolicited information through push notifications. We first compare these return differences between clicked and unclicked positions on the same decision day, then between positions with and without a push, considering the focal push and the nonfocal push separately. A click is chosen by the investor and may reflect information already known, whereas a push notification arrives without being sought.

6.3.1. Prior Clicks and Subsequent Returns

We start by asking whether investors who click on a stock before deciding the action are better able to select stocks for sale. We compare the *held-minus-sold* differences for positions clicked on the previous trading day with those for positions not clicked in Table 9. In particular, within each gain/loss state, a clicked sale is compared with a clicked held position on the same decision day; the corresponding comparison among unclicked positions provides the benchmark.

Overall, the short-horizon comparisons favor clicked positions: in Table 9, Panel C's 5- and 20-trading-day columns under both benchmarks, sold stocks trail held stocks by more among clicked positions in both states. For winners, each contrast subtracts the *held-minus-sold* return

Table 9: Prior Clicks and Subsequent Returns

Panel A: The eight position groups

	CH-4					DGTW				
	5d	20d	60d	120d	240d	5d	20d	60d	120d	240d
	Return after the decision day, percent									
Losers:										
Losers Held, Not Clicked	0.03	-0.01	-0.25	-0.52	-1.31	0.02	0.02	-0.28	-0.86**	-1.63**
	(0.04)	(0.11)	(0.28)	(0.47)	(0.84)	(0.04)	(0.11)	(0.25)	(0.42)	(0.69)
Losers Held, Clicked	-0.20***	-0.52***	-1.27***	-2.03***	-1.76**	-0.20***	-0.47***	-1.26***	-2.27***	-2.80***
	(0.05)	(0.12)	(0.24)	(0.40)	(0.85)	(0.04)	(0.11)	(0.22)	(0.35)	(0.72)
Losers Sold, Not Clicked	-0.23	-0.70**	-1.71***	-2.45***	-3.22***	-0.27*	-0.70**	-1.58***	-2.78***	-4.02***
	(0.15)	(0.29)	(0.46)	(0.51)	(0.73)	(0.15)	(0.28)	(0.46)	(0.53)	(0.71)
Losers Sold, Clicked	-0.82***	-2.16***	-3.19***	-4.07***	-3.42***	-0.78***	-2.19***	-3.58***	-4.78***	-5.63***
	(0.10)	(0.17)	(0.24)	(0.29)	(0.48)	(0.09)	(0.16)	(0.22)	(0.27)	(0.27)
Winners:										
Winners Held, Not Clicked	-0.22***	-0.70***	-1.40***	-1.97***	-1.29	-0.25***	-0.92***	-1.86***	-2.23***	-2.20*
	(0.06)	(0.19)	(0.47)	(0.74)	(1.30)	(0.05)	(0.18)	(0.46)	(0.77)	(1.33)
Winners Held, Clicked	-0.45***	-1.17***	-2.02***	-2.20***	-0.69	-0.46***	-1.31***	-2.55***	-3.09***	-3.56***
	(0.07)	(0.18)	(0.32)	(0.58)	(1.08)	(0.06)	(0.15)	(0.29)	(0.53)	(0.92)
Winners Sold, Not Clicked	-0.56**	-1.52***	-1.79***	-2.56***	-1.37	-0.50**	-1.65***	-2.48***	-3.57***	-4.64***
	(0.22)	(0.35)	(0.55)	(0.83)	(1.29)	(0.21)	(0.34)	(0.54)	(0.79)	(0.95)
Winners Sold, Clicked	-1.25***	-3.12***	-4.40***	-5.82***	-4.89***	-1.18***	-3.08***	-4.74***	-6.49***	-7.74***
	(0.11)	(0.20)	(0.28)	(0.35)	(0.61)	(0.10)	(0.19)	(0.27)	(0.31)	(0.32)
N, Losers Held, Not Clicked	1,399,491	1,392,738	1,375,009	1,355,338	1,323,387	1,331,441	1,324,893	1,307,147	1,287,935	1,257,474
N, Losers Held, Clicked	1,202,903	1,197,318	1,182,660	1,165,471	1,139,232	1,150,981	1,145,700	1,131,645	1,114,969	1,090,090
N, Losers Sold, Not Clicked	20,819	20,712	20,467	20,134	19,724	19,974	19,870	19,633	19,307	18,913
N, Losers Sold, Clicked	233,912	232,754	229,780	226,020	220,046	224,450	223,358	220,609	216,935	211,262
N, Winners Held, Not Clicked	374,175	372,336	367,965	363,586	356,051	362,091	360,313	355,995	351,705	344,553
N, Winners Held, Clicked	525,461	522,911	517,627	510,454	500,728	507,276	504,809	499,687	492,805	483,490
N, Winners Sold, Not Clicked	14,749	14,692	14,550	14,352	14,085	14,257	14,202	14,064	13,868	13,604
N, Winners Sold, Clicked	200,967	199,778	197,329	194,239	189,862	193,397	192,260	189,930	186,936	182,751

Note: The table splits Table 8's groups by *Click (t−1)*, a stock-page visit on the previous trading day. Panel A reports group returns and N; investor and trading-day counts are as in Table 8. Panel B prints the Odean wedge once per click group and the two accounting routes' steps. Panel C reports clicked-minus-unclicked contrasts. Group definitions, horizons, and CH-4 factor and Daniel–Grinblatt–Titman–Wermers (DGTW) characteristic adjustments follow Table 8. Returns begin the trading day after the decision, in percent. Weights invert the product of the investor's positions with the same action that day (pooling gains and losses) and number of days with a purchase or sale over the sample. No controls or fixed effects enter. Standard errors, clustered by investor and date, are in parentheses. The sample includes approximately 10,000 retail investors of a large Chinese online trading platform between January 2022 and May 2023. *, **, and *** denote significance at the 10%, 5%, and 1% levels.

(Continued)

Table 9—Continued

Panel B: The Odean wedge and its two accounting routes

	CH-4					DGTW				
	5d	20d	60d	120d	240d	5d	20d	60d	120d	240d
	Return after the decision day, percent									
The Odean wedge:										
$R_{LH} - R_{WS}$, Not Clicked	0.59***	1.51***	1.54**	2.03**	0.06	0.52**	1.66***	2.20***	2.71***	3.01***
	(0.23)	(0.37)	(0.60)	(0.93)	(1.43)	(0.21)	(0.36)	(0.57)	(0.87)	(1.08)
$R_{LH} - R_{WS}$, Clicked	1.05***	2.59***	3.13***	3.79***	3.12***	0.99***	2.61***	3.48***	4.22***	4.94***
	(0.11)	(0.22)	(0.37)	(0.50)	(1.03)	(0.11)	(0.21)	(0.34)	(0.45)	(0.77)
Via the loser sold:										
$R_{LH} - R_{LS}$, Not Clicked	0.26*	0.69**	1.45***	1.93***	1.92*	0.29*	0.72**	1.30***	1.93***	2.39**
	(0.15)	(0.30)	(0.50)	(0.63)	(1.04)	(0.15)	(0.28)	(0.50)	(0.63)	(0.93)
$R_{LH} - R_{LS}$, Clicked	0.62***	1.63***	1.92***	2.03***	1.66*	0.59***	1.72***	2.32***	2.51***	2.84***
	(0.09)	(0.17)	(0.30)	(0.44)	(0.91)	(0.08)	(0.16)	(0.28)	(0.40)	(0.71)
$R_{LS} - R_{WS}$, Not Clicked	0.33	0.81*	0.08	0.11	-1.86	0.23	0.94**	0.90	0.78	0.62
	(0.26)	(0.45)	(0.70)	(0.93)	(1.40)	(0.25)	(0.43)	(0.67)	(0.93)	(1.15)
$R_{LS} - R_{WS}$, Clicked	0.43***	0.96***	1.21***	1.75***	1.46***	0.40***	0.89***	1.16***	1.71***	2.11***
	(0.11)	(0.20)	(0.29)	(0.35)	(0.51)	(0.10)	(0.19)	(0.27)	(0.32)	(0.36)
Via the winner held:										
$R_{LH} - R_{WH}$, Not Clicked	0.24***	0.69***	1.15**	1.44*	-0.01	0.27***	0.94***	1.59***	1.38*	0.57
	(0.07)	(0.22)	(0.52)	(0.81)	(1.42)	(0.06)	(0.20)	(0.50)	(0.82)	(1.40)
$R_{LH} - R_{WH}$, Clicked	0.25***	0.64***	0.75**	0.16	-1.07	0.26***	0.83***	1.29***	0.82	0.76
	(0.07)	(0.20)	(0.36)	(0.60)	(1.04)	(0.06)	(0.17)	(0.33)	(0.55)	(0.87)
$R_{WH} - R_{WS}$, Not Clicked	0.34	0.82**	0.38	0.59	0.07	0.26	0.73**	0.61	1.33	2.43*
	(0.23)	(0.38)	(0.68)	(1.01)	(1.57)	(0.21)	(0.36)	(0.66)	(0.99)	(1.42)
$R_{WH} - R_{WS}$, Clicked	0.79***	1.95***	2.38***	3.62***	4.20***	0.72***	1.77***	2.19***	3.40***	4.18***
	(0.10)	(0.19)	(0.35)	(0.59)	(1.08)	(0.10)	(0.17)	(0.31)	(0.54)	(0.90)

(Continued)

Table 9—Continued

Panel C: The clicked-minus-unclicked difference

	CH-4					DGTW				
	5d	20d	60d	120d	240d	5d	20d	60d	120d	240d
	Return after the decision day, percent									
The Odean wedge and the steps of its two accounting routes:										
$R_{LH} - R_{WS}$, Clicked − Not Clicked	0.46**	1.09***	1.60***	1.75*	3.06**	0.46**	0.94**	1.28**	1.51*	1.94
	(0.23)	(0.39)	(0.62)	(0.94)	(1.55)	(0.22)	(0.38)	(0.59)	(0.90)	(1.26)
$R_{LH} - R_{LS}$, Clicked − Not Clicked	0.36**	0.94***	0.47	0.11	-0.26	0.29*	1.00***	1.02*	0.58	0.45
	(0.16)	(0.31)	(0.53)	(0.69)	(1.13)	(0.16)	(0.30)	(0.53)	(0.68)	(1.01)
$R_{LS} - R_{WS}$, Clicked − Not Clicked	0.10	0.15	1.13	1.65*	3.32**	0.17	-0.06	0.26	0.93	1.49
	(0.28)	(0.46)	(0.73)	(0.91)	(1.36)	(0.27)	(0.45)	(0.69)	(0.93)	(1.17)
$R_{LH} - R_{WH}$, Clicked − Not Clicked	0.01	-0.04	-0.40	-1.28	-1.06	-0.01	-0.10	-0.30	-0.55	0.19
	(0.07)	(0.23)	(0.53)	(0.85)	(1.42)	(0.07)	(0.21)	(0.50)	(0.82)	(1.37)
$R_{WH} - R_{WS}$, Clicked − Not Clicked	0.45*	1.13***	2.00***	3.03***	4.12**	0.47**	1.05***	1.58**	2.07*	1.75
	(0.24)	(0.41)	(0.73)	(1.11)	(1.83)	(0.22)	(0.39)	(0.69)	(1.09)	(1.55)

difference among unclicked positions from the same difference among clicked positions, so a positive contrast means that sold stocks underperform held stocks by more among clicked positions. The winner contrasts in Table 9, Panel C's CH-4 120- and 240-trading-day columns are also positive, and all the contrasts just described are statistically significant, including the DGTW loser and CH-4 winner contrasts at 5 trading days only at the 10 percent level. The year-end winner result is representative: at Table 9, Panel C's CH-4 240-trading-day column, the directly fitted clicked-minus-unclicked contrast in the *held-minus-sold* difference is 4.12 percent.[18] Thus, after a prior click, the stocks investors sell fall further behind those they keep, among both winners and losers at short horizons and among winners over the following year under factor adjustment.

The *sold loser–winner difference* also varies with prior clicks. We compare this difference among clicked positions with the same difference among unclicked positions on the same decision day. *Sold losers* outperform *sold winners* by more among clicked positions than among unclicked positions: at Table 9, Panel C's CH-4 240-trading-day column, the additional return difference is 3.32 percent.

Returning to the decomposition of the Odean wedge, we examine how its components are related to clicks. The winner *held-minus-sold* difference ($R_{WH} - R_{WS}$) is larger after a prior click, while the *held loser–winner difference* ($R_{LH} - R_{WH}$) shows no statistically detectable change. This pattern associates prior clicks with better selection among winners, while the held loser–winner comparison concerns the positions investors keep; selection among losers is sharper only at short horizons. Specifically, the year-ahead clicked-minus-unclicked difference in winner selection at Table 9, Panel C's CH-4 240-trading-day column, is 4.12 percent, exceeding the full-sample winner *held-minus-sold* difference at Table 8, Panel B's CH-4 240-trading-day column, of 3.43 percent.

The group comparisons show the economic size directly: at Table 9, Panel B's CH-4 240-trading-day column, *held winners* outperform *sold winners* by 4.20 percent among clicked positions, compared with 0.07 percent among unclicked positions. These results support H1c's click prediction: prior clicks are associated with sharper selection among winners under the main factor adjustment. The last step is to examine whether push notifications are also associated with sharper selection.

6.3.2. Push Notifications and Subsequent Returns

The previous results suggest that prior clicks are associated with sharper selection among both winners and losers at short horizons; over the following year, the winner contrast is

[18] The DGTW clicked-minus-unclicked contrasts are statistically insignificant at the headline horizon: at Table 9, Panel C's DGTW 240-trading-day column, the winner *held-minus-sold* contrast is 1.75 percent and the sold loser–winner contrast is 1.49 percent, with the latter statistically insignificant at every reported DGTW horizon. The DGTW winner contrasts in Table 9, Panel C, are positive but smaller than their CH-4 counterparts from 20 trading days on. The winner contrast in Table 9, Panel C's DGTW 120-trading-day column and the loser contrast in its DGTW 60-trading-day column are statistically significant at the 10 percent level, whereas the loser contrast in the CH-4 60-trading-day column and at the 120- and 240-trading-day horizons under both benchmarks are statistically insignificant.

distinguishable from zero under CH-4 factor adjustment but not under DGTW characteristic adjustment.[19] We now ask whether the same pattern holds after unsolicited push notifications.

We consider the focal push, *Push (t−1)*, in Table 10 and the nonfocal push, *Nonfocal Push (t−1)*, in Table 11. *Push (t−1)* records a notification about the position being evaluated; *Nonfocal Push (t−1)* records a push notification delivered to the investor on the previous trading day about any stock other than the position being evaluated, including the investor's other portfolio holdings, stocks on the investor's watchlist, and stocks in neither set. Table 11 excludes position-days with a recorded *Push (t−1)* and compares held and sold positions on the same decision day, within each gain/loss state and the delivery-log coverage window. Its panels follow Table 10: group returns, the Odean wedge and its accounting components, and the nonfocal push minus no nonfocal push contrasts. The *held-minus-sold* differences show no statistically detectable change at any horizon under CH-4, while the Odean wedge is wider at intermediate horizons but not statistically distinguishable from the comparison without a nonfocal push over the following year, as reported in Table 11's contrast panel. Under DGTW, loser selection is sharper at short horizons, and the wedge is wider at long horizons at the ten percent significance level. These comparisons show no consistent improvement in selection and do not hold investor-specific circumstances fixed.

The results show that both held and sold stocks tend to earn lower subsequent returns after a push notification (Table 10, Panel A), but there is *no statistically detectable change* in the *held-minus-sold* differences between winners or losers (Table 10, Panel C).[20] Table 10's Panel B reports the Odean wedge and its components along the accounting routes defined above. Investors sell more winners after a push, as Table 6 shows, but the return comparisons do not indicate that they choose better or worse stocks to sell relative to those they keep.

Overall, these results suggest that investors sell stocks that subsequently underperform those they keep in both gain/loss states. Loss sales concentrate near the purchase price in Table IA-16, Panel C, and selling jumps at break-even in Section 4.3, consistent with waiting to get even. *Sold winners* earn lower subsequent returns than *sold losers*.

Prior clicks are associated with sharper selection, whereas the greater selling of winners after push notifications suggests that pushes amplify the disposition effect without a statistically detectable change in selection. Push notifications instead relate to realization – whether investors sell – even though the return comparisons do not show selection benefits.

In line with H2b, one possible interpretation is that such "no collection-regret" information contains too little incremental information to be associated with sharper selection; the insignificant contrasts do not establish this mechanism. This intuition is consistent with Kelly (2018), who finds that, among insiders' actively purchased shares, stocks sold at a loss subsequently underperform stocks sold at a gain, consistent with a higher hurdle for realizing losses. In our case, the intuition differs because we consider regret from collecting information and focus on ordinary retail investors rather than insiders.

[19] Both benchmarks adjust subsequent returns: CH-4 uses a factor model, whereas DGTW compares stocks with portfolios matched on characteristics. We do not report unadjusted returns.

[20] The separate Odean-wedge contrast is statistically significant only in the CH-4 60-trading-day column of Table 10, Panel C.

Table 10: Push Notifications and Subsequent Returns

Panel A: The eight position groups

	CH-4					DGTW				
	5d	20d	60d	120d	240d	5d	20d	60d	120d	240d
	Return after the decision day, percent									
Losers:										
Losers Held, No Push	0.01	-0.04	-0.51**	-0.99**	-1.43**	-0.01	-0.07	-0.49**	-1.21***	-2.04***
	(0.04)	(0.11)	(0.24)	(0.40)	(0.69)	(0.04)	(0.10)	(0.23)	(0.37)	(0.62)
Losers Held, Push	-1.00*	-1.80**	-0.36	-4.31**	-3.67	-1.14**	-2.05***	-1.72	-4.21**	-3.69*
	(0.52)	(0.70)	(0.99)	(1.80)	(2.55)	(0.53)	(0.71)	(1.09)	(1.83)	(2.13)
Losers Sold, No Push	-0.72***	-1.92***	-3.13***	-3.98***	-4.23***	-0.68***	-1.94***	-3.42***	-4.66***	-5.35***
	(0.09)	(0.17)	(0.23)	(0.28)	(0.39)	(0.09)	(0.16)	(0.22)	(0.26)	(0.26)
Losers Sold, Push	-0.67	-2.90**	-1.50	-7.70***	-5.22**	-1.03	-3.75***	-3.42**	-8.28***	-7.47***
	(0.81)	(1.17)	(1.83)	(1.13)	(2.24)	(0.78)	(1.16)	(1.39)	(1.24)	(1.97)
Winners:										
Winners Held, No Push	-0.29***	-0.75***	-1.27***	-1.54**	-1.19	-0.34***	-1.00***	-1.89***	-2.26***	-2.45**
	(0.06)	(0.17)	(0.40)	(0.67)	(1.18)	(0.05)	(0.15)	(0.41)	(0.71)	(1.18)
Winners Held, Push	-1.11	-3.15***	-6.01***	-9.83***	-6.95	-1.53**	-3.13***	-4.33***	-8.82***	-3.80
	(0.70)	(1.17)	(2.04)	(2.46)	(4.36)	(0.68)	(1.17)	(1.51)	(2.14)	(3.87)
Winners Sold, No Push	-1.09***	-2.83***	-4.05***	-5.17***	-5.45***	-1.05***	-2.84***	-4.47***	-6.03***	-7.20***
	(0.11)	(0.20)	(0.29)	(0.38)	(0.61)	(0.10)	(0.18)	(0.28)	(0.34)	(0.35)
Winners Sold, Push	-2.24***	-4.95***	-7.72***	-10.55***	-5.44**	-2.15***	-5.11***	-7.43***	-11.24***	-7.27***
	(0.80)	(1.52)	(1.57)	(1.63)	(2.16)	(0.75)	(1.32)	(1.47)	(1.52)	(2.02)
N, Losers Held, No Push	2,169,528	2,160,309	2,131,754	2,097,457	2,047,994	2,074,334	2,065,573	2,038,094	2,004,458	1,956,902
N, Losers Held, Push	14,954	14,887	14,610	14,384	14,174	14,427	14,362	14,093	13,882	13,689
N, Losers Sold, No Push	231,436	230,330	227,261	223,250	217,205	222,341	221,303	218,471	214,549	208,788
N, Losers Sold, Push	3,744	3,728	3,675	3,627	3,525	3,602	3,587	3,536	3,492	3,400
N, Winners Held, No Push	736,137	732,567	723,723	712,767	698,206	712,870	709,426	700,914	690,307	676,309
N, Winners Held, Push	7,764	7,727	7,638	7,484	7,291	7,420	7,385	7,296	7,144	6,953
N, Winners Sold, No Push	193,521	192,389	189,945	186,754	182,362	186,508	185,427	183,105	180,007	175,794
N, Winners Sold, Push	4,125	4,102	4,055	3,984	3,871	3,963	3,941	3,896	3,830	3,718
Investors	9,582	9,579	9,571	9,561	9,532	9,526	9,523	9,515	9,505	9,477

Note: The table splits Table 8's groups by previous-trading-day push delivery (*Push (t−1)*), not opening or reading. Messages are not investor-targeted. Delivery-log coverage ends March 31, 2023, before panel coverage. Panel A: group returns, position-day and investor counts; B: each push group's Odean wedge once and the two accounting routes' steps; C: push-minus-no-push contrasts. Definitions and CH-4/DGTW (Daniel–Grinblatt–Titman–Wermers) adjustments follow Table 8. Weights invert each investor's daily same-action position count (pooling gains/losses) times purchase-or-sale-day count over the sample. Standard errors, clustered by investor and date, are in parentheses. The sample includes approximately 10,000 retail investors of a large Chinese online trading platform between January 2022 and May 2023. *, **, and *** denote significance at the 10%, 5%, and 1% levels.

(Continued)

Table 10—Continued

Panel B: The Odean wedge and its two accounting routes

	CH-4					DGTW				
	5d	20d	60d	120d	240d	5d	20d	60d	120d	240d
	Return after the decision day, percent									
The Odean wedge:										
$R_{LH} - R_{WS}$, No Push	1.10***	2.79***	3.54***	4.18***	4.02***	1.04***	2.78***	3.98***	4.82***	5.15***
	(0.11)	(0.22)	(0.38)	(0.53)	(0.91)	(0.11)	(0.21)	(0.36)	(0.50)	(0.68)
$R_{LH} - R_{WS}$, Push	1.23	3.15**	7.35***	6.24***	1.77	1.01	3.05**	5.71***	7.04***	3.58
	(0.80)	(1.56)	(1.79)	(2.21)	(3.10)	(0.78)	(1.40)	(1.74)	(2.13)	(2.72)
Via the loser sold:										
$R_{LH} - R_{LS}$, No Push	0.73***	1.88***	2.62***	2.98***	2.80***	0.67***	1.87***	2.93***	3.45***	3.31***
	(0.09)	(0.17)	(0.31)	(0.45)	(0.78)	(0.08)	(0.17)	(0.29)	(0.42)	(0.65)
$R_{LH} - R_{LS}$, Push	-0.34	1.10	1.14	3.39*	1.54	-0.11	1.70	1.70	4.08**	3.79
	(0.87)	(1.22)	(1.85)	(1.98)	(3.14)	(0.80)	(1.24)	(1.59)	(1.95)	(2.63)
$R_{LS} - R_{WS}$, No Push	0.37***	0.91***	0.92***	1.19***	1.22**	0.36***	0.90***	1.05***	1.37***	1.85***
	(0.11)	(0.20)	(0.29)	(0.37)	(0.52)	(0.10)	(0.19)	(0.27)	(0.35)	(0.38)
$R_{LS} - R_{WS}$, Push	1.57*	2.05	6.21***	2.85	0.22	1.11	1.36	4.01**	2.96*	-0.20
	(0.92)	(1.92)	(2.35)	(1.89)	(2.69)	(0.83)	(1.72)	(2.02)	(1.75)	(2.46)
Via the winner held:										
$R_{LH} - R_{WH}$, No Push	0.30***	0.71***	0.76*	0.55	-0.24	0.33***	0.94***	1.40***	1.05	0.40
	(0.06)	(0.18)	(0.44)	(0.71)	(1.22)	(0.05)	(0.18)	(0.44)	(0.73)	(1.18)
$R_{LH} - R_{WH}$, Push	0.11	1.35	5.65**	5.52**	3.28	0.39	1.08	2.61	4.62*	0.11
	(0.73)	(1.25)	(2.19)	(2.79)	(4.88)	(0.71)	(1.28)	(1.71)	(2.56)	(4.00)
$R_{WH} - R_{WS}$, No Push	0.79***	2.08***	2.78***	3.62***	4.26***	0.70***	1.84***	2.58***	3.77***	4.75***
	(0.10)	(0.19)	(0.43)	(0.69)	(1.16)	(0.09)	(0.19)	(0.43)	(0.71)	(1.15)
$R_{WH} - R_{WS}$, Push	1.13	1.79	1.71	0.71	-1.51	0.62	1.97	3.10	2.42	3.47
	(1.05)	(1.99)	(2.73)	(2.83)	(4.75)	(1.01)	(1.63)	(2.04)	(2.29)	(3.55)

(Continued)

Table 10—Continued

Panel C: The push-minus-no-push difference

	CH-4					DGTW				
	5d	20d	60d	120d	240d	5d	20d	60d	120d	240d
	Return after the decision day, percent									
The Odean wedge and the steps of its two accounting routes:										
$R_{LH} - R_{WS}$, Push − No Push	0.14	0.36	3.81**	2.06	-2.26	-0.03	0.28	1.73	2.22	-1.57
	(0.79)	(1.56)	(1.79)	(2.23)	(3.14)	(0.78)	(1.40)	(1.75)	(2.17)	(2.80)
$R_{LH} - R_{LS}$, Push − No Push	-1.06	-0.78	-1.48	0.40	-1.26	-0.78	-0.18	-1.23	0.63	0.48
	(0.86)	(1.22)	(1.82)	(1.99)	(3.17)	(0.80)	(1.24)	(1.59)	(1.98)	(2.68)
$R_{LS} - R_{WS}$, Push − No Push	1.20	1.14	5.29**	1.66	-1.00	0.75	0.46	2.96	1.59	-2.05
	(0.92)	(1.92)	(2.31)	(1.91)	(2.71)	(0.83)	(1.72)	(2.00)	(1.75)	(2.48)
$R_{LH} - R_{WH}$, Push − No Push	-0.19	0.65	4.89**	4.97*	3.52	0.05	0.15	1.21	3.57	-0.29
	(0.73)	(1.25)	(2.22)	(2.87)	(4.78)	(0.71)	(1.30)	(1.78)	(2.63)	(3.81)
$R_{WH} - R_{WS}$, Push − No Push	0.33	-0.29	-1.08	-2.91	-5.77	-0.09	0.13	0.52	-1.36	-1.28
	(1.05)	(1.99)	(2.74)	(2.88)	(4.81)	(1.00)	(1.63)	(2.10)	(2.37)	(3.60)

Table 11: Nonfocal Push Notifications and Subsequent Returns

Panel A: The eight position groups

	CH-4					DGTW				
	5d	20d	60d	120d	240d	5d	20d	60d	120d	240d
	Return after the decision day, percent									
Losers:										
Losers Held, No Nonfocal Push	-0.03	-0.12	-0.66**	-1.10**	-1.57*	-0.04	-0.10	-0.61**	-1.50***	-2.59***
	(0.05)	(0.13)	(0.32)	(0.55)	(0.91)	(0.04)	(0.12)	(0.30)	(0.52)	(0.80)
Losers Held, Nonfocal Push	0.04	0.02	-0.27	-0.69	-1.13	0.02	-0.03	-0.34	-0.90*	-1.56*
	(0.04)	(0.12)	(0.30)	(0.53)	(0.95)	(0.04)	(0.12)	(0.27)	(0.47)	(0.86)
Losers Sold, No Nonfocal Push	-0.73***	-1.82***	-2.96***	-3.98***	-4.19***	-0.68***	-1.74***	-3.15***	-4.73***	-5.58***
	(0.12)	(0.22)	(0.29)	(0.36)	(0.47)	(0.11)	(0.20)	(0.27)	(0.31)	(0.35)
Losers Sold, Nonfocal Push	-0.71***	-1.99***	-3.25***	-4.02***	-4.22***	-0.70***	-2.10***	-3.61***	-4.65***	-5.19***
	(0.10)	(0.19)	(0.26)	(0.34)	(0.47)	(0.10)	(0.17)	(0.25)	(0.32)	(0.33)
Winners:										
Winners Held, No Nonfocal Push	-0.27***	-0.71***	-1.26**	-1.84**	-1.74	-0.33***	-0.99***	-2.07***	-3.02***	-3.66***
	(0.07)	(0.21)	(0.54)	(0.80)	(1.19)	(0.06)	(0.20)	(0.53)	(0.80)	(1.20)
Winners Held, Nonfocal Push	-0.34***	-0.88***	-1.62***	-1.96***	-1.86	-0.38***	-1.15***	-2.19***	-2.37***	-2.70**
	(0.07)	(0.19)	(0.39)	(0.68)	(1.31)	(0.06)	(0.18)	(0.38)	(0.75)	(1.26)
Winners Sold, No Nonfocal Push	-0.98***	-2.49***	-3.65***	-4.67***	-4.82***	-0.98***	-2.54***	-3.99***	-5.59***	-6.62***
	(0.14)	(0.26)	(0.38)	(0.55)	(0.78)	(0.14)	(0.25)	(0.37)	(0.49)	(0.53)
Winners Sold, Nonfocal Push	-1.14***	-3.02***	-4.30***	-5.51***	-5.84***	-1.08***	-3.03***	-4.77***	-6.31***	-7.55***
	(0.12)	(0.21)	(0.32)	(0.39)	(0.64)	(0.11)	(0.19)	(0.30)	(0.36)	(0.41)
N, Losers Held, No Nonfocal Push	803,206	799,745	788,802	775,579	757,206	768,325	764,987	754,386	741,402	723,792
N, Losers Held, Nonfocal Push	1,364,549	1,358,806	1,341,234	1,320,199	1,289,109	1,304,843	1,299,435	1,282,597	1,261,984	1,232,038
N, Losers Sold, No Nonfocal Push	74,190	73,818	72,844	71,577	69,718	71,534	71,184	70,301	69,060	67,275
N, Losers Sold, Nonfocal Push	157,200	156,466	154,371	151,627	147,441	150,807	150,119	148,170	145,489	141,513
N, Winners Held, No Nonfocal Push	278,766	277,442	274,076	269,901	264,192	270,287	269,031	265,844	261,866	256,327
N, Winners Held, Nonfocal Push	456,950	454,704	449,226	442,446	433,594	442,295	440,107	434,782	428,154	419,695
N, Winners Sold, No Nonfocal Push	62,962	62,615	61,892	60,873	59,478	60,862	60,530	59,844	58,849	57,499
N, Winners Sold, Nonfocal Push	130,529	129,744	128,023	125,851	122,854	125,646	124,897	123,261	121,158	118,295
Investors	9,568	9,565	9,557	9,547	9,518	9,512	9,509	9,501	9,491	9,463

Note: The table reports Table 10's return comparisons by *Nonfocal Push (t−1)*, recording delivery on the previous trading day of a push notification about any stock other than the position being evaluated, including the investor's other portfolio holdings, stocks on the investor's watchlist, and stocks in neither set. Position-days with the focal push, *Push (t−1)*, are excluded. Panel A reports group returns; Panel B, the Odean wedge and its accounting components; and Panel C, nonfocal push minus no nonfocal push contrasts. Group definitions, return adjustments, horizons, weights, and delivery-log coverage follow Table 10. Standard errors, clustered by investor and date, are in parentheses. The sample includes approximately 10,000 retail investors of a large Chinese online trading platform between January 2022 and May 2023. *, **, and *** denote significance at the 10%, 5%, and 1% levels.

(Continued)

Table 11—Continued

Panel B: The Odean wedge and its two accounting routes

	CH-4					DGTW				
	5d	20d	60d	120d	240d	5d	20d	60d	120d	240d
	Return after the decision day, percent									
The Odean wedge:										
$R_{LH} - R_{WS}$, No Nonfocal Push	0.95***	2.37***	2.99***	3.57***	3.26***	0.94***	2.44***	3.38***	4.10***	4.03***
	(0.15)	(0.29)	(0.51)	(0.76)	(1.17)	(0.14)	(0.28)	(0.48)	(0.71)	(0.92)
$R_{LH} - R_{WS}$, Nonfocal Push	1.18***	3.04***	4.02***	4.82***	4.71***	1.10***	3.01***	4.43***	5.41***	6.00***
	(0.12)	(0.24)	(0.43)	(0.62)	(1.08)	(0.12)	(0.23)	(0.40)	(0.57)	(0.89)
Via the loser sold:										
$R_{LH} - R_{LS}$, No Nonfocal Push	0.70***	1.71***	2.30***	2.88***	2.62***	0.64***	1.64***	2.54***	3.24***	2.99***
	(0.12)	(0.22)	(0.39)	(0.60)	(0.98)	(0.11)	(0.21)	(0.37)	(0.56)	(0.82)
$R_{LH} - R_{LS}$, Nonfocal Push	0.75***	2.01***	2.98***	3.33***	3.09***	0.72***	2.07***	3.27***	3.75***	3.63***
	(0.10)	(0.20)	(0.37)	(0.58)	(1.04)	(0.09)	(0.19)	(0.35)	(0.54)	(0.91)
$R_{LS} - R_{WS}$, No Nonfocal Push	0.24	0.67**	0.69	0.69	0.63	0.30**	0.81***	0.84**	0.86	1.05*
	(0.16)	(0.29)	(0.44)	(0.59)	(0.76)	(0.15)	(0.27)	(0.41)	(0.53)	(0.59)
$R_{LS} - R_{WS}$, Nonfocal Push	0.43***	1.03***	1.04***	1.49***	1.62***	0.38***	0.94***	1.16***	1.66***	2.36***
	(0.12)	(0.22)	(0.32)	(0.42)	(0.58)	(0.12)	(0.20)	(0.30)	(0.39)	(0.46)
Via the winner held:										
$R_{LH} - R_{WH}$, No Nonfocal Push	0.24***	0.59**	0.60	0.74	0.18	0.29***	0.89***	1.46***	1.52*	1.07
	(0.07)	(0.23)	(0.58)	(0.85)	(1.34)	(0.07)	(0.22)	(0.57)	(0.83)	(1.30)
$R_{LH} - R_{WH}$, Nonfocal Push	0.37***	0.90***	1.35***	1.27*	0.72	0.40***	1.12***	1.85***	1.47*	1.14
	(0.07)	(0.22)	(0.44)	(0.74)	(1.26)	(0.06)	(0.20)	(0.41)	(0.76)	(1.16)
$R_{WH} - R_{WS}$, No Nonfocal Push	0.71***	1.78***	2.38***	2.83***	3.08**	0.65***	1.56***	1.92***	2.57***	2.96**
	(0.14)	(0.28)	(0.61)	(0.87)	(1.25)	(0.14)	(0.27)	(0.59)	(0.82)	(1.19)
$R_{WH} - R_{WS}$, Nonfocal Push	0.80***	2.14***	2.68***	3.55***	3.99***	0.70***	1.88***	2.58***	3.94***	4.86***
	(0.11)	(0.22)	(0.41)	(0.65)	(1.18)	(0.11)	(0.21)	(0.39)	(0.72)	(1.18)

(Continued)

Table 11—Continued

Panel C: Nonfocal push minus no nonfocal push

	CH-4					DGTW				
	5d	20d	60d	120d	240d	5d	20d	60d	120d	240d
	Return after the decision day, percent									
The Odean wedge and the steps of its two accounting routes:										
$R_{LH} - R_{WS}$, Nonfocal Push − No Nonfocal Push	0.23	0.67**	1.04**	1.25	1.45	0.16	0.56**	1.05**	1.31*	1.96*
	(0.14)	(0.28)	(0.51)	(0.84)	(1.29)	(0.14)	(0.27)	(0.48)	(0.78)	(1.19)
$R_{LH} - R_{LS}$, Nonfocal Push − No Nonfocal Push	0.05	0.30	0.68	0.45	0.46	0.08	0.43**	0.73*	0.51	0.65
	(0.12)	(0.23)	(0.45)	(0.78)	(1.30)	(0.11)	(0.22)	(0.42)	(0.71)	(1.17)
$R_{LS} - R_{WS}$, Nonfocal Push − No Nonfocal Push	0.18	0.37	0.36	0.80	0.99	0.08	0.13	0.31	0.80	1.31*
	(0.18)	(0.31)	(0.47)	(0.67)	(0.81)	(0.17)	(0.29)	(0.44)	(0.60)	(0.70)
$R_{LH} - R_{WH}$, Nonfocal Push − No Nonfocal Push	0.14*	0.31	0.75	0.53	0.54	0.11	0.24	0.39	-0.06	0.07
	(0.08)	(0.28)	(0.69)	(1.07)	(1.66)	(0.08)	(0.26)	(0.65)	(1.06)	(1.58)
$R_{WH} - R_{WS}$, Nonfocal Push − No Nonfocal Push	0.10	0.36	0.29	0.72	0.91	0.05	0.33	0.66	1.37	1.89
	(0.15)	(0.32)	(0.68)	(1.02)	(1.57)	(0.15)	(0.31)	(0.66)	(1.02)	(1.56)

Taken together, the return comparisons support our hypotheses: prior clicks are associated with sharper selection, while focal-stock push notifications show no statistically detectable change in selection.

7. Conclusion

Does access to information make investors more willing to realize losses in a profitable way? Does information reduce the disposition effect? We argue that the answer depends on who collected the information.

We distinguish between *goal-driven* information collection, when information is deliberately collected by the investors, and *stimulus-driven* information, when information is exogenously provided. We argue that *goal-driven* information will therefore depend on the same preferences that generate the disposition bias, while *stimulus-driven* information can arrive without passing through the investor's choice to seek it.

In the case of *goal-driven* information, the deliberate action of seeking information may intensify emotional attachment and, especially after losses, the investor's regret. This would reduce incentive to further acquire information and to properly process it. This implies that in the presence of losses *goal-driven* information would further amplify the disposition bias. However, if a sale happens, the information content should be so high as to generate a good sale selection.

In contrast, *stimulus-driven* information, being exogenously provided, induces less emotional attachment to the information and the associated regret. The loss may still be painful, even without responsibility for seeking the information. The pain of the loss could still reinforce the disposition effect. However, the weaker attachment to information the investor did not seek may not alter the selection of stocks for sale.

We therefore posit that *goal-driven* information seeking is lower for losing positions than for winning positions, is associated with a stronger disposition effect on trades and with sharper selection of stocks for sale. In contrast, *stimulus-driven* information is associated with a stronger disposition effect but not associated with an improvement in selection.

To test these hypotheses, we use holdings, stock-page clicks, executed trades, watchlists, and push-delivery records from a large Chinese online trading platform (hereafter, the Platform).

We document that the disposition effect in selling is accompanied by an asymmetry in clicks: within the same investor's day, losing positions are both clicked and sold less often than winning positions.

Next, we focus on the key question: the role of information. We start by documenting that in the case of *goal-driven* collection of information, investors sell losing positions less often than winning positions in both groups, and this tendency is much *larger* among positions on which investors had clicked. Overall, information access amplifies the disposition effect. Push notifications likewise go with a stronger disposition effect, providing the corresponding test of the *stimulus-driven* channel.

However, more selling need not mean better selection, so we investigate the quality of the stock selection and ask whether more information helps the selection of the stocks to sell. As expected, clicks predict sharper selection of stocks to sell, while there is no corresponding improvement after a push notification.

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Internet Appendix for

"Does Information Reduce the Disposition Effect? Attention, Mobile Push, and Selling at a Loss"

Minxia Chen[†] Liqiang Huang[‡] Massimo Massa[§]

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[†]INSEAD, 1 Ayer Rajah Avenue, Singapore 138676, Singapore; Email: minxia.chen@insead.edu.
[‡]School of Management, Zhejiang University, Hangzhou, China; Email: huanglq@zju.edu.cn.
[§]INSEAD, 1 Ayer Rajah Avenue, Singapore 138676, Singapore; Email: massimo.massa@insead.edu.

1. Variable Definitions

This section defines the variables printed in the main-text and Internet Appendix tables and figures, expanding the definitions in Sections 3 and 3.4 of the main text. The position-day sample runs from January 1, 2022, to May 26, 2023. Unless stated otherwise, gain/loss states are measured at the close of the previous trading day, $t-1$, and click and sale outcomes on day t; the realized gain/loss state on a sale day is measured at the execution price. Linear-probability coefficients are multiplied by 100, and returns are reported in percent.

1.1. Unit and samples

The samples are constructed from investors' existing holdings and then restricted as required by each comparison.

Position-day. One investor's holding of one stock on one trading day, with a positive reconstructed holding at the previous close. A position is one investor's holding of one stock; its reconstructed holding is positive when cumulative share purchases exceed cumulative share sales through that close.

Full panel. Position-days satisfying the positive-holding requirement, including days without a sale, after the construction screens and sample filters in Section 3.3 of the main text. The construction screens retain A-share boards, require shares held at the previous close to cover shares sold, and match the stock to its daily price record and trading calendar. The sample filters require daily purchase and sale quantities divisible by 100 shares, an earliest recorded account application before the sample start, the investor-stock pair's first recorded purchase on or after the start and before the end, and a recorded watchlist addition on or after the sample start.

Sale-day sample. Position-days on investor-days with at least two positions in the full panel and a net sale of at least one of them.

Gain/loss-classifiable position-days. Position-days in the full panel excluding those with an exactly zero unrealized return, for which the gain/loss state is unclassified.

Delivery-log coverage window. The push-delivery log covers the sample from its start, January 1, 2022, through March 31, 2023. Push regressions use this window, and a day with no recorded notification is coded as zero only within it.

Break-even estimation window. A symmetric interval around zero in the previous-close unrealized return, standardized by its standard deviation within the position's holding-period group. The baseline bandwidth is half a standard deviation on either side of zero.

Held 1–20 Days. Positions held for 1–20 calendar days since the first purchase.

Held 21–250 Days. Positions held for 21–250 calendar days since the first purchase.

Held Over 250 Days. Positions held for more than 250 calendar days since the first purchase.

1.2. Outcomes

Clicks and sales are daily indicators; the break-even comparisons scale their fitted changes by the corresponding average rates.

Click (t). Equals one when the investor records at least one stock-page click on the focal stock on trading day t, defined by exchange hours, and zero otherwise. The page contains the stock's quotes, chart, order book, news, announcements, and analyst reports. The descriptive row Click (%) reports this indicator in percent.

Sale (t). Equals one when executed purchases and sales produce a negative net share change in the position on day t, and zero otherwise. A sale may be partial. Net-purchase days and days with no net position change are coded as zero; the descriptive row Sale (%) reports this indicator in percent.

Held. No net position change on the decision day. Position-days with a net purchase belong to separate groups.

Click Jump. The fitted increase in click probability from just below to just above the break-even point, divided by the average click rate within the estimation bandwidth and expressed in percent of that rate. Return polynomials are fitted separately on either side of zero.

Sale Jump. The corresponding fitted increase in sale probability, divided by the average sale rate within the same bandwidth and expressed in percent of that rate. Click and sale jumps use identical position-days.

Difference (Δ). The sale jump minus the click jump on the base-rate scale. The jumps are estimated jointly, so inference for their difference incorporates their covariance.

Probability of a position change. The probability that executed purchases and sales produce a nonzero net share change in the position on the day.

Share of position changes that are sales. Among position-days with a nonzero net share change, the share with a negative net share change. Multiplying this share by the probability of a position change gives the sale probability.

***Click (t),* log odds.** The click outcome in the stratified conditional-logit specifications. Coefficients are log odds ratios within stock-day or investor-day strata; strata without an event leave the likelihood.

***Sale (t),* log odds.** The sale outcome in the stratified conditional-logit specifications, with coefficients interpreted as log odds ratios within the stated strata.

Hazard of a Click. The hazard of the first stock-page click in a Cox proportional-hazards model with time owned as the duration. Coefficients are log hazard ratios.

Hazard of a Sale. The hazard of the first net sale in the corresponding Cox proportional-hazards model, also using time owned as the duration and reporting log hazard ratios.

Subsequent return. The buy-and-hold benchmark-adjusted stock return compounded from the trading day after the decision over the stated horizon of 5, 20, 60, 120, or 240 trading days,

reported in percent. A window containing a missing daily adjusted return has a missing horizon return. Returns are not winsorized.

1.3. Gain/loss states

The focal position, the investor's other holdings, and the watchlist have distinct return measures and weighting conventions.

Unrealized Loss. Equals one when the position's unrealized return at the previous close is negative and zero when it is positive; an exactly zero return is set to missing.

***Unrealized Return* (%).** The return is 100 times the logarithm of the ratio of cumulative sale proceeds plus the market value of remaining shares to cumulative purchase cost, all measured at the previous close. For an unrebalanced position, it reduces to the log return from the purchase price.

Portfolio Loss. The loss indicator for the lagged value-weighted return on the investor's other holdings, excluding the focal stock.

***Portfolio Return* (%).** The continuous lagged value-weighted return underlying *Portfolio Loss*.

Watchlist Loss. The loss indicator for the lagged equal-weighted return since addition on the investor's top 100 watchlist stocks: stocks not yet traded by the investor at the monthly snapshot and among the first 100 in the Platform's watchlist order, excluding held stocks.

***Watchlist Return* (%).** The continuous lagged equal-weighted return since addition underlying *Watchlist Loss*.

***Realized Loss* (% of sale days).** On a sale day, an indicator that the position's gain/loss state measured at the execution price is a loss, reported in percent of sale days.

1.4. Information measures

The lagged indicators record clicks or notification delivery on the previous trading day.

Click (t−1). The Click indicator for the previous trading day. It defines the Clicked and Not Clicked groups in the return comparisons.

Push (t−1). Equals one when a push notification about the held stock is delivered to the investor on the previous trading day within the delivery-log coverage window, and zero otherwise within that window. It includes all message types and defines the Push and No Push groups.

Nonfocal Push (t−1). Equals one when the investor receives a push notification on the previous trading day about any stock other than the position being evaluated, whether that stock is held, on the watchlist, or in neither set. It uses the same message-type, delivery, and coverage-window conventions as *Push (t−1)*.

***Unrealized Loss* × *Portfolio Loss*.** The product of the focal-position and portfolio loss indicators. Its coefficient measures how the *Unrealized Loss* association differs when *Portfolio Loss* records a loss rather than a gain.

***Unrealized Loss* × *Watchlist Loss*.** The product of the focal-position and watchlist loss indicators, measuring the corresponding difference when *Watchlist Loss* records a loss rather than a gain.

***Unrealized Loss* × *Click (t−1)*.** The product of *Unrealized Loss* and the previous trading day's Click indicator. Its coefficient measures how the *Unrealized Loss* association differs between previously clicked and unclicked positions.

***Unrealized Loss* × *Push (t−1)*.** The product of *Unrealized Loss* and *Push (t−1)*, measuring the difference in the *Unrealized Loss* association between positions with and without a prior notification about the held stock.

***Unrealized Loss* × *Nonfocal Push (t−1)*.** The product of *Unrealized Loss* and *Nonfocal Push (t−1)*, measuring the corresponding difference between positions with and without a prior nonfocal notification. In sale specifications, a negative loss interaction denotes a stronger disposition effect.

1.5. Controls

The linear-probability and break-even specifications use the following position and return controls.

***Time Owned*.** The logarithm of calendar days since the position's first purchase in the linear-probability specifications. The descriptive row *Time Owned* (days) reports calendar days directly.

***Ret*$^{-}$.** The negative part of the previous-close unrealized return, entered separately from its positive part.

***Ret*$^{+}$.** The positive part of the previous-close unrealized return, entered separately from the negative part.

Other-position loss states and their interactions. *Portfolio Loss*, *Watchlist Loss*, and their respective interactions with *Unrealized Loss*, combined into a control row in the moderator tables.

Break-even design controls. Separate cubic return polynomials on either side of zero, the square root of calendar days held, and its interactions with those polynomials. The polynomial-degree variants change the degree of the return polynomials.

Previous trading day. The stock's return on the trading day preceding the decision, used as a trailing-return control.

Raw: 1, 5, and 21 trading days. The stock's raw returns over the stated windows ending at the previous close.

Benchmark-adjusted: 1, 5, and 21 trading days. The stock's DGTW characteristic-adjusted returns over the stated windows ending at the previous close.

1.6. Fixed effects and inference

Fixed effects and strata determine the comparisons within which coefficients are estimated.

Investor. Fixed effects absorbing persistent differences across investors.

Date. Fixed effects absorbing circumstances common to observations on the same trading day.

Stock. Fixed effects absorbing persistent differences across stocks.

Stock × Day. Fixed effects comparing holders of the same stock on the same trading day, with investor effects retained in the linear-probability specifications.

Investor × Day. Fixed effects comparing positions held by the same investor on the same trading day, with stock effects retained in the linear-probability specifications.

Strata. Stock-day or investor-day groups defining the conditional-logit comparisons.

+ Investor demean. Regressors demeaned by investor in the stock-day-stratified conditional-logit specification.

+ Stock demean. Regressors demeaned by stock in the investor-day-stratified conditional-logit specification.

Standard errors. Clustered by investor and stock in the linear-probability ladders and stacked system, by investor in the break-even comparisons and conditional logits, and by investor and date in the return comparisons. The conditional-logit specifications use the Wei, Lin, and Weissfeld sandwich estimator.

1.7. Return measures and groups

Subsequent returns use the following benchmarks, weights, and gain/loss-by-action groups.

CH-4. The daily factor-adjusted return is the stock return less the risk-free rate and the sum of estimated loadings multiplied by market, size, value, and turnover factor returns. Loadings are estimated at each quarter end over the trailing 250 trading days, requiring at least 120 observations and including a lead and lag of each factor. The sum of the contemporaneous, lead, and lag coefficients gives each loading, which applies to subsequent days. No intercept is subtracted.

DGTW. The daily characteristic-adjusted return is the stock return less the return on its matched portfolio. Portfolios are formed each June from sequential 5 × 5 × 5 sorts on size, book-to-market, and momentum. Portfolio returns are value-weighted on a buy-and-hold basis, and assignments remain fixed until the next formation. Section 5 of this Internet Appendix gives the benchmark constructions.

Weights. Each position's weight is the inverse of the product of the investor's number of positions with the same action that day, pooling gains and losses, and the investor's number of days with a purchase or sale over the sample.

Losers Held. Positions with a negative unrealized return at the previous close and no net position change on the decision day; their subsequent return is denoted by R_{LH}.

Losers Sold. Positions with a negative unrealized return at the previous close and a negative net share change on the decision day, including partial sales; their subsequent return is denoted by R_{LS}.

Winners Held. Positions with a positive unrealized return at the previous close and no net position change on the decision day; their subsequent return is denoted by R_{WH}.

Winners Sold. Positions with a positive unrealized return at the previous close and a negative net share change on the decision day, including partial sales; their subsequent return is denoted by R_{WS}.

Odean wedge. $R_{LH} - R_{WS}$, the subsequent return on *held losers* minus that on *sold winners*.

***held-minus-sold* differences.** $R_{LH} - R_{LS}$ among losers and $R_{WH} - R_{WS}$ among winners, comparing subsequent returns within each gain/loss state. Each difference is fitted directly with its own standard error.

***sold loser–winner difference*.** $R_{LS} - R_{WS}$, comparing subsequent returns on *sold losers* with those on *sold winners*.

***held loser–winner difference*.** $R_{LH} - R_{WH}$, comparing subsequent returns on *held losers* with those on *held winners*.

Up-limit closes out. Excludes decision-day closes at the upper price limit across all return groups, retaining the original weights of surviving observations.

Down-limit closes out. Applies the same exclusion to decision-day closes at the lower price limit.

Either limit out. Excludes decision-day closes at either price limit across all return groups, retaining the original weights of surviving observations.

Within k points of break-even. Restricts every return group to the stated symmetric band around zero in the previous-close unrealized return, measured as 100 times the log return. Exactly zero returns remain unclassified.

1.8. Investor characteristics

The investor summaries use investors observed in both gain/loss states. Time-varying characteristics are averaged over the observation window where specified below.

***Male* (%).** The share of investors recorded as male in the Platform's account records.

***Age* (years).** Investor age in years from the Platform's account records.

***Account Tenure* (years).** The number of years since the investor's account was opened on the Platform.

***Account Size* (CNY, in thousands).** Total account assets, including cash, averaged over the observation window and reported in thousands of CNY.

***Equity Holdings* (CNY, in thousands).** The market value of stock holdings, averaged over the observation window and reported in thousands of CNY.

***Portfolio Size* (# of stocks).** The average number of stocks held per day. The investor count for this row reflects the availability of holding-list records.

***Watchlist Size* (# of stocks).** The number of stocks on the investor's watchlist, averaged over the investor's days in the observation window.

***Average Buy Size* (CNY, in thousands).** The average value per executed purchase over the observation window, reported in thousands of CNY.

***Average Sale Size* (CNY, in thousands).** The average value per executed sale over the observation window, reported in thousands of CNY.

***Position-Days per Investor* (#).** The investor's number of position-days in the full panel.

***Days with a Click* (%).** The share of the investor's own position-days with a recorded click, in percent.

***Days with a Sale* (%).** The share of the investor's own position-days with a net sale, in percent.

Clicks (#). The number of recorded stock-page clicks on the position during the trading day, underlying the Click indicator.

1.9. Reported statistics

Sample sizes and average rates correspond to the observations used in each reported specification.

Base rate of click. The average Click indicator in the column's estimation sample, reported in percent. In the break-even comparisons, the base rate uses observations within the bandwidth.

Base rate of sale. The average Sale indicator in the column's estimation sample, reported in percent, also restricted to the bandwidth in the break-even comparisons.

N. The column's complete-case observation count: position-days with no missing value on the variables used in that specification.

N (stacked). The number of observations across the equations of the stacked system, including *Click (t)*, *Sale (t)*, and the unreported additional equation.

Investors. The number of distinct investors in the reported return group.

Trading days. The number of distinct decision days in the reported return group.

R-squared (%). The linear-probability model's coefficient of determination, reported in percent.

Pseudo-R-squared (%). The reported conditional-logit fit statistic, expressed in percent.

2. Setting and Sample Construction

This section supplements Section 3 of the main text with the purchase-day resale restriction and the sample accounting behind Section 3.3. Table IA-1 records the construction steps, sample filters, and further estimation restrictions in the order used to form the full panel.

Table IA-1: Sample Construction

Filtering Steps	N	Retained (%)	Investor-stock pairs	Investors
The holding panel				
Reconstructed holdings	10,485,607	100.0	507,208	14,255
+ A-share boards only	10,074,340	96.1	490,216	14,187
+ Holding covers the sale	10,035,575	95.7	488,975	14,182
+ Matched to the trade record	10,035,575	95.7	488,975	14,182
The sample filters				
+ Quantity divisible by 100	9,838,046	93.8	484,664	14,168
+ Account opened pre-sample	9,047,449	86.3	428,212	12,353
+ First purchase in sample	5,540,457	52.8	344,463	11,103
+ Watchlist added on/after start	4,426,154	42.2	299,784	10,223
The estimation samples				
+ Gain/loss-classifiable position-days	4,416,616	42.1	298,768	10,222
+ Sale-day restriction	1,180,475	11.3	256,836	7,416

Note: The table reports position-days, investor-stock pairs, and investors remaining after each sample restriction; retained percentages use reconstructed holdings as the baseline. Restrictions apply cumulatively within the holding-panel and sample-filter sections. Reconstructed holdings require positive prior-day net quantity. The holding-panel section ends with the matched trade-record panel on which the sample filters operate. Previous-close shares must cover that day's sales. The sample filters exclude nonstandard trade quantities and apply the account-opening, purchase-date, and watchlist-date conditions described in the text. The watchlist condition requires addition on or after sample start, with no upper bound or requirement that addition precede the retained observation. Further screens report gain/loss classification and the sale-day sample: investor-days with a sale from a portfolio of at least two stocks. The sale-day screen applies before the return screen. The sample includes approximately 10,000 retail investors of a large Chinese online trading platform between January 2022 and May 2023.

Purchase-day resale. Newly purchased shares cannot be resold on the purchase day. The full panel nevertheless requires a holding at the previous close, so a first purchase without an existing holding does not automatically enter as an unsellable position. The eligibility rule therefore distinguishes the positions in the daily comparisons from newly opened positions subject to the resale restriction.

Sample accounting. We follow the construction sequence in Section 3.3 to show how the initial holdings become the full panel and the sale-day sample. Before any screen, Table IA-1's Reconstructed holdings row records 10,485,607 position-days, 507,208 investor-stock pairs, and 14,255 investors. After the construction screens, Table IA-1's Matched to the trade record row leaves 10,035,575 position-days entering the sample filters. The first-purchase requirement removes the most position-days: Table IA-1's First purchase in sample row reduces the count from 9,047,449 to 5,540,457. The full panel, at Table IA-1's Watchlist added on/after start row, contains 4,426,154 position-days, 299,784 investor-stock pairs, and 10,223 investors. The separate sale-day sample, at Table IA-1's Sale-day restriction row, contains 1,180,475 position-days and 7,416 investors. These construction counts are distinct from descriptive counts, which depend

on whether each variable is observed, and regression counts, which reflect each column's complete-case requirements.

3. Clicks and Sales

This section supplements Section 4 of the main text. For Sections 4.1 and 4.2, we report the full click and sale specification sequences, restrict each outcome to the sale-day sample, and consider conditional logit. For Section 4.3, we compare the full-sample outcome coefficients jointly, vary the break-even specification, and separate holding-period aggregation from the composition of trading activity in the schedules.

Clicks: specification sequence. Table IA-2 fills in the specifications omitted from Table 2 while retaining *Click (t)*, the underlying observations for each specification, and the control and fixed-effect sequence. The *Unrealized Loss* coefficient remains negative throughout, so its direction does not depend on which specifications appear in the main table. Introducing other-position states changes both controls and sample: at Table 2's columns (2) and (3), the sample falls from 4,387,148 to 3,218,675 position-days and the average click rate from 55.48 percent to 52.52 percent. The excluded observations have a higher click rate: at Table 2's column (3), their implied rate is 63.66 percent, calculated from the unrounded sample means. These exclusions include observations without another holding, whereas Table 2's columns (3) to (6) share observations. The other-position estimates distinguish levels from interactions: the negative *Portfolio Loss* level for focal-gain positions in the stock-day specification and the positive *Watchlist Loss* interaction in Table 2's column (6) are statistically significant, whereas the portfolio interaction and, in Table 2's column (5), both the *Watchlist Loss* level and its interaction are statistically insignificant. Investor-day fixed effects absorb the watchlist level but leave its interaction with the focal position's gain/loss state estimable. The sequence thus separates a sample change from the later fixed-effect comparisons and distinguishes the focal-loss association from other-position associations.

Clicks: sale-day sample. Table IA-3 restricts Table 2's comparison to investor-days with a sale, retaining the click outcome and specification sequence. This asks whether the click gap persists when the investor sells a position that day. Investors still click less often on losing positions than on winning positions, with a negative and statistically significant *Unrealized Loss* coefficient in every column. The click gap therefore survives conditioning on sale-day activity.

Clicks: conditional logit. Table IA-4 replaces the linear probability model with conditional logit, retaining the click outcome and comparisons within stock-day or investor-day strata. This checks whether the linear functional form determines the direction of the loss association. *Unrealized Loss* remains negative throughout. Among the single-stratum specifications, it is statistically significant in Table IA-4's stock-day column (1) and investor-day columns (6)–(9), but statistically insignificant in stock-day columns (2)–(4). The alternative estimator preserves the direction of the click gap, although its statistical support varies across specifications.

Clicks: proportional hazards. We replace the linear probability model with Cox proportional hazards in Table IA-5, using time owned as the duration and a stock-page click as the event. The

Table IA-2: Clicks on Losing and Winning Positions: Full Specifications

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
						Click (t) × 100						
Unrealized Loss	-14.54***	-4.17***	-4.38***	-7.18***	-5.25***	-6.93***	-6.36***	-4.35***	-6.63***	-3.45***	-5.99***	-5.08***
	(0.64)	(0.47)	(0.54)	(0.78)	(0.49)	(0.77)	(0.68)	(0.44)	(0.99)	(0.60)	(0.81)	(0.69)
Watchlist Loss			0.52	-0.49	-0.44	-0.68	-0.47	-0.33	-0.22	-0.07		
			(0.62)	(0.69)	(0.37)	(0.72)	(0.61)	(0.33)	(0.81)	(0.40)		
Portfolio Loss			-1.24**	-2.86***	-1.52***	-2.92***	-2.62***	-1.59***	-3.66***	-1.55***	-0.57	-0.02
			(0.54)	(0.71)	(0.36)	(0.72)	(0.59)	(0.32)	(0.75)	(0.39)	(0.73)	(0.60)
Unrealized Loss × Watchlist Loss				1.44**	0.84**	1.36**	0.95*	0.47	0.47	0.33	1.78***	1.44***
				(0.65)	(0.41)	(0.64)	(0.56)	(0.36)	(0.76)	(0.47)	(0.64)	(0.54)
Unrealized Loss × Portfolio Loss				2.39***	0.12	2.26***	1.88***	-0.24	2.80***	0.18	0.44	0.00
				(0.71)	(0.39)	(0.71)	(0.61)	(0.36)	(0.81)	(0.46)	(0.74)	(0.64)
Controls Included:												
Position (Time Owned, Ret±)		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Fixed Effects Included:												
Investor					✓			✓		✓		
Date						✓		✓				
Stock							✓	✓				✓
Stock × Day									✓	✓		
Investor × Day											✓	✓
Base rate of click	55.48	55.48	52.52	52.52	52.52	52.52	52.52	52.52	52.52	52.52	52.52	52.52
R-squared (%)	1.75	22.52	20.27	20.28	15.09	19.05	17.00	47.62	13.07	7.21	15.75	11.21
N	4,387,148	4,387,148	3,218,675	3,218,675	3,218,675	3,218,675	3,218,675	3,218,675	3,218,675	3,218,675	3,218,675	3,218,675

Note: The table reports Table 2's full specifications for *Click (t)*, indicating a stock-page visit. Variable definitions follow Table 2. Columns (1)–(4) add log time owned and the negative and positive parts of the lagged unrealized return (Ret±), then other-position loss states and interactions; columns (5)–(12) vary fixed effects. Columns (3)–(12) share observations; N is complete-case. Columns (11)–(12) omit the absorbed *Watchlist Loss* level. All columns use two-way clustering; column (8) implements the Cameron, Gelbach, and Miller covariance. Coefficients are multiplied by 100. Standard errors, clustered by investor and by stock, are in parentheses. The sample includes approximately 10,000 retail investors of a large Chinese online trading platform between January 2022 and May 2023. *, **, and *** denote significance at the 10%, 5%, and 1% levels.

Table IA-3: Clicks on Losing and Winning Positions: Sale-Day Sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
						Click (t) × 100						
Unrealized Loss	-15.58***	-3.55***	-4.69***	-7.33***	-5.55***	-6.98***	-5.92***	-4.50***	-5.75***	-3.61***	-5.86***	-4.78***
	(0.86)	(0.62)	(0.76)	(0.90)	(0.58)	(0.88)	(0.68)	(0.47)	(1.41)	(0.90)	(0.82)	(0.65)
Watchlist Loss			4.17***	3.49***	0.38	3.18***	2.89***	-0.16	3.26***	0.19		
			(0.83)	(0.80)	(0.41)	(0.85)	(0.68)	(0.35)	(1.18)	(0.59)		
Portfolio Loss			-0.37	-2.09***	1.10**	-2.22***	-1.38**	0.62*	-2.55***	0.27	0.28	0.60
			(0.71)	(0.78)	(0.46)	(0.77)	(0.58)	(0.37)	(0.93)	(0.60)	(0.81)	(0.60)
Unrealized Loss × Watchlist Loss				1.00	1.34***	0.93	0.84	1.08***	0.47	1.08	0.84	0.78
				(0.79)	(0.47)	(0.79)	(0.58)	(0.40)	(1.03)	(0.72)	(0.65)	(0.52)
Unrealized Loss × Portfolio Loss				2.71***	0.85*	2.49***	1.69***	0.34	2.59***	1.15	0.89	0.33
				(0.79)	(0.51)	(0.77)	(0.57)	(0.42)	(1.00)	(0.71)	(0.80)	(0.63)
Controls Included:												
Position (Time Owned, Ret±)		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Fixed Effects Included:												
Investor					✓			✓		✓		
Date						✓		✓				
Stock							✓	✓				✓
Stock × Day									✓	✓		
Investor × Day											✓	✓
Base rate of click	69.20	69.20	64.25	64.25	64.25	64.25	64.25	64.25	64.25	64.25	64.25	64.25
R-squared (%)	2.59	27.11	27.03	27.05	23.40	26.79	19.09	52.11	15.51	11.41	26.03	17.10
N	1,165,893	1,165,893	811,533	811,533	811,533	811,533	811,533	811,533	811,533	811,533	811,533	811,533

Note: The table repeats Table 2's click specifications on investor-days with a sale from a portfolio of at least two stocks, the sale-day sample of Odean (1998) . *Click (t)* indicates a stock-page visit. Unlike the appendix sample in An et al. (2024) , which requires at least two holdings, this sample also requires a sale. Variable definitions follow Table 2. Columns (1)–(4) add log time owned and the negative and positive parts of the lagged unrealized return (Ret±), then other-position loss states and interactions; columns (5)–(12) vary fixed effects. Columns (3)–(12) share observations; N is complete-case. Columns (11)–(12) omit the absorbed *Watchlist Loss* level. All columns use two-way clustering; column (8) implements the Cameron, Gelbach, and Miller covariance. Coefficients are multiplied by 100. Standard errors, clustered by investor and by stock, are in parentheses. The sample includes approximately 10,000 retail investors of a large Chinese online trading platform between January 2022 and May 2023. *, **, and *** denote significance at the 10%, 5%, and 1% levels.

Table IA-4: Clicks on Losing and Winning Positions: Conditional Logit

	Stock × Day					Investor × Day				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Click (t), log odds									
Unrealized Loss	-0.36***	-0.19	-0.18	-0.34	-0.19***	-0.73***	-0.30***	-0.28***	-0.36***	-0.27***
	(0.10)	(0.14)	(0.16)	(0.59)	(0.03)	(0.04)	(0.06)	(0.05)	(0.07)	(0.06)
Watchlist Loss			0.02	-0.01	0.00					
			(0.10)	(0.31)	(0.02)					
Portfolio Loss			-0.08	-0.20	-0.09***			-0.06	-0.06	0.43***
			(0.09)	(0.29)	(0.02)			(0.05)	(0.06)	(0.05)
Unrealized Loss × Watchlist Loss				0.05	0.00				0.09	0.17***
				(0.31)	(0.03)				(0.06)	(0.05)
Unrealized Loss × Portfolio Loss				0.17	0.01				0.02	-0.12**
				(0.28)	(0.02)				(0.06)	(0.05)
Controls Included:										
Position (Time Owned, Ret±)		✓	✓	✓	✓		✓	✓	✓	✓
Strata Included:										
Stock × Day	✓	✓	✓	✓	✓					
+ Investor demean					✓					
Investor × Day						✓	✓	✓	✓	✓
+ Stock demean										✓
N	4,026,639	4,026,639	2,859,009	2,859,009	2,859,009	3,306,787	3,306,787	2,667,980	2,380,711	2,380,711

Note: The table estimates *Click (t)*, indicating a stock-page visit, by stratified conditional logit. Columns (1)–(5) condition on stock-day strata; columns (6)–(10) condition on investor-day strata. Controls follow Table 2. Columns (5) and (10) additionally demean by investor and stock, respectively; their standard errors understate uncertainty from estimated means. The absorbed *Watchlist Loss* level is blank under investor-day strata; its interaction remains. Strata without an event leave the likelihood. Coefficients are log odds ratios and cannot be rescaled by an event rate. Inference uses the Wei, Lin, and Weissfeld (1989) sandwich. Standard errors, clustered by investor, are in parentheses. The sample includes approximately 10,000 retail investors of a large Chinese online trading platform between January 2022 and May 2023. *, **, and *** denote significance at the 10%, 5%, and 1% levels.

loss states and their interactions are retained; the negative and positive parts of lagged unrealized return enter as position controls, while time owned is the duration axis rather than a control. The columns introduce controls, other-position loss states, and their interactions, followed by date and stock strata. Investor, stock-day, and investor-day strata are not estimated because computation exceeded the per-specification time limit. Losing positions have lower click hazards in every reported specification except the control-only specification, where the loss coefficient is positive and statistically insignificant. Both loss interactions with *Portfolio Loss* and *Watchlist Loss* are positive and statistically significant where included. The lower click hazard thus persists under date and stock stratification.

Table IA-5: Clicks on Losing and Winning Positions: Proportional Hazards

	(1)	(2)	(3)	(4)	(5)	(6)
			Hazard of a Click			
Unrealized Loss	-0.41***	-0.08***	0.01	-0.16***	-0.22***	-0.09***
	(0.01)	(0.01)	(0.01)	(0.03)	(0.03)	(0.02)
Watchlist Loss			-0.02	-0.09***	-0.17***	-0.06***
			(0.02)	(0.02)	(0.02)	(0.02)
Portfolio Loss			-0.08***	-0.17***	-0.23***	-0.15***
			(0.02)	(0.03)	(0.02)	(0.02)
Unrealized Loss × Watchlist Loss				0.12***	0.13***	0.08***
				(0.02)	(0.02)	(0.02)
Unrealized Loss × Portfolio Loss				0.13***	0.15***	0.09***
				(0.02)	(0.02)	(0.02)
Controls Included:						
Position (Ret± only)		✓	✓	✓	✓	✓
Strata Included:						
Date					✓	
Stock						✓
Pseudo-R-squared (%)	9.580	33.930	29.560	29.500	31.410	26.300
N	4,387,148	4,387,148	3,218,675	3,218,675	3,218,675	3,218,675

Note: The table estimates the hazard of a stock-page click using Cox proportional hazards, with time owned as the duration. Successive columns introduce the negative and positive parts of lagged unrealized return, other-position loss states, and their interactions, followed by specifications stratified by date and by stock. Time owned is the duration axis rather than a regressor. Investor, stock-day, and investor-day strata are not estimated because computation exceeded the per-specification time limit. Variable definitions follow Table 2. Coefficients are log hazard ratios; the pseudo-R-squared is McFadden's. Standard errors, clustered by investor and by stock, are in parentheses. The sample includes approximately 10,000 retail investors of a large Chinese online trading platform between January 2022 and May 2023. *, **, and *** denote significance at the 10%, 5%, and 1% levels.

Sales: specification sequence. Table IA-6 fills in the specifications omitted from Table 3, retaining *Sale (t)*, the control and fixed-effect sequence, and per-column sample requirements. The *Unrealized Loss* coefficient is negative throughout, so the disposition effect is not confined to the specifications selected for the main table. Investors show a stronger disposition effect when *Portfolio Loss* records a loss: at Table 3's column (6), also printed in Table IA-6's column (12), the *Unrealized Loss* × *Portfolio Loss* interaction implies an increase equivalent to 11 percent (= 0.84 / 7.71) of the estimation sample's average sale rate and is statistically significant. Investors are also more likely to sell winning positions when the rest of the portfolio is at a loss: at Table 3's column (6), the positive *Portfolio Loss* level is equivalent to 9 percent (= 0.71 / 7.71) of the average sale

rate in the estimation sample for focal-gain positions. The level and interaction therefore describe different comparisons, while the expanded sequence preserves the baseline disposition pattern.

Sales: sale-day sample. Table IA-7 restricts Table 3's specifications to investor-days with a sale, retaining *Sale (t)* and the specification sequence while changing the opportunity set. Investors still sell losing positions less often than winning positions when they sell something that day: at Table IA-7's column (12), the magnitude of the negative *Unrealized Loss* coefficient is equivalent to 24 percent (= 6.52 / 27.25) of the average sale rate in that column's estimation sample. The *Unrealized Loss* × *Watchlist Loss* interaction also becomes negative, reversing its positive sign in the full-panel investor-day specification; both the focal-loss coefficient and the watchlist interaction are statistically significant. Conditioning on sale-day activity thus preserves the disposition pattern but changes how watchlist losses are associated with the disposition effect.

Sales: conditional logit. Table IA-8 replaces the linear probability model with conditional logit, retaining *Sale (t)* and comparisons within stock-day or investor-day strata. *Unrealized Loss* remains negative in every specification and statistically significant except in Table IA-8's column (4). The disposition effect therefore survives the alternative functional form.

Sales: proportional hazards. We repeat the sale comparison using Cox proportional hazards in Table IA-9, with time owned as the duration and a net sale as the event. The loss states and their interactions are retained; as in the click specification, the negative and positive parts of lagged unrealized return enter as position controls, while time owned is the duration axis. The columns introduce controls, other-position loss states, and their interactions, followed by date and stock strata. Investor, stock-day, and investor-day strata are not estimated because computation exceeded the per-specification time limit. Losing positions have lower sale hazards in every reported specification, and the loss coefficient is statistically significant throughout. The *Portfolio Loss* interaction strengthens the loss association, while the *Watchlist Loss* interaction weakens it, matching the directions in the linear sale specifications. The disposition pattern therefore survives the hazard specification.

Joint outcome comparison. Table IA-10 estimates *Click (t)* and *Sale (t)* jointly on common position-days, retaining the specification sequence and fixed effects while allowing equation-specific coefficients and accounting for covariance in their differences. It asks whether the full-sample loss associations differ on a common probability scale. The signed sale-minus-click difference is small relative to its uncertainty: at Table IA-10's column (12), the difference in the *Unrealized Loss* coefficient is 0.75 percentage points. In that specification, the focal-loss difference and the *Unrealized Loss* × *Watchlist Loss* difference are statistically insignificant, whereas, at Table IA-10's column (12), the *Unrealized Loss* × *Portfolio Loss* difference is statistically significant at the 10 percent level. The full-sample focal-loss coefficients therefore do not distinguish the outcomes; Section 4.3's comparison rests instead on Table 4's jumps at the break-even point, normalized by the corresponding average click rate or average sale rate.

Break-even specification. Table IA-11 varies Table 4's polynomial degree in Panel A and bandwidth in Panel C and uses a residual-based comparison in Panel B. It retains the comparison of click and sale jumps on common position-days, with each jump scaled by the corresponding average click rate or average sale rate within the bandwidth. The pooled

Table IA-6: Sales of Losing and Winning Positions: Full Specifications

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Sale (t) × 100											
Unrealized Loss	-9.56***	-6.54***	-5.24***	-4.90***	-4.85***	-4.80***	-5.11***	-4.60***	-3.91***	-3.50***	-4.49***	-4.33***
	(0.24)	(0.17)	(0.15)	(0.24)	(0.22)	(0.24)	(0.23)	(0.22)	(0.27)	(0.25)	(0.32)	(0.32)
Watchlist Loss			-1.76***	-2.29***	-0.88***	-2.37***	-2.27***	-0.66***	-1.95***	-0.44**		
			(0.15)	(0.23)	(0.17)	(0.23)	(0.21)	(0.16)	(0.23)	(0.18)		
Portfolio Loss			-0.39***	0.44**	-0.36**	0.41*	0.12	-0.35**	-0.12	-0.09	0.67**	0.71***
			(0.14)	(0.22)	(0.16)	(0.22)	(0.19)	(0.15)	(0.20)	(0.17)	(0.27)	(0.26)
Unrealized Loss × Watchlist Loss				0.76***	0.77***	0.70***	0.79***	0.61***	0.53***	0.40**	1.06***	0.91***
				(0.18)	(0.18)	(0.18)	(0.18)	(0.17)	(0.20)	(0.20)	(0.26)	(0.25)
Unrealized Loss × Portfolio Loss				-1.23***	-0.52***	-1.28***	-1.00***	-0.58***	-0.73***	-0.55***	-0.75***	-0.84***
				(0.18)	(0.16)	(0.17)	(0.16)	(0.16)	(0.18)	(0.18)	(0.27)	(0.27)
Controls Included:												
Position (Time Owned, Ret±)		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Fixed Effects Included:												
Investor					✓			✓		✓		
Date						✓		✓				
Stock							✓	✓				✓
Stock × Day									✓	✓		
Investor × Day											✓	✓
Base rate of sale	11.39	11.39	7.71	7.71	7.71	7.71	7.71	7.71	7.71	7.71	7.71	7.71
R-squared (%)	1.85	14.46	8.52	8.53	5.28	7.75	7.28	15.77	4.12	2.38	5.48	4.03
N	4,387,148	4,387,148	3,218,675	3,218,675	3,218,675	3,218,675	3,218,675	3,218,675	3,218,675	3,218,675	3,218,675	3,218,675

Note: The table reports Table 3's full specifications for *Sale (t)*, indicating negative net share change from trading. Variable definitions follow Table 2. Columns (1)–(4) add log time owned and the negative and positive parts of the lagged unrealized return (Ret±), then other-position loss states and interactions; columns (5)–(12) vary fixed effects. Columns (3)–(12) share observations; N is complete-case. Columns (11)–(12) omit the absorbed *Watchlist Loss* level. All columns use two-way clustering; column (8) implements the Cameron, Gelbach, and Miller covariance. Coefficients are multiplied by 100. Standard errors, clustered by investor and by stock, are in parentheses. The sample includes approximately 10,000 retail investors of a large Chinese online trading platform between January 2022 and May 2023. *, **, and *** denote significance at the 10%, 5%, and 1% levels.

Table IA-7: Sales of Losing and Winning Positions: Sale-Day Sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
						Sale (t) × 100						
Unrealized Loss	-16.74***	-9.14***	-10.06***	-7.27***	-6.90***	-7.03***	-6.96***	-6.21***	-4.96***	-4.09***	-6.99***	-6.52***
	(0.57)	(0.40)	(0.42)	(0.58)	(0.47)	(0.57)	(0.50)	(0.45)	(0.90)	(0.77)	(0.66)	(0.64)
Watchlist Loss			2.52***	3.50***	1.67***	2.94***	2.94***	1.27***	2.65***	1.35**		
			(0.34)	(0.46)	(0.34)	(0.47)	(0.42)	(0.32)	(0.64)	(0.53)		
Portfolio Loss			-0.83*	0.77	3.10***	0.48	0.81*	2.51***	0.24	2.56***	3.33***	3.02***
			(0.44)	(0.61)	(0.37)	(0.59)	(0.45)	(0.33)	(0.62)	(0.55)	(0.67)	(0.61)
Unrealized Loss × Watchlist Loss				-1.46***	-1.06***	-1.69***	-1.24***	-1.26***	-1.11*	-1.05*	-2.29***	-2.17***
				(0.42)	(0.37)	(0.43)	(0.40)	(0.36)	(0.66)	(0.61)	(0.53)	(0.50)
Unrealized Loss × Portfolio Loss				-2.50***	-1.11***	-2.65***	-2.34***	-1.32***	-1.88***	-1.12*	-1.48**	-1.69***
				(0.52)	(0.38)	(0.51)	(0.42)	(0.36)	(0.64)	(0.62)	(0.59)	(0.56)
Controls Included:												
Position (Time Owned, Ret±)		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Fixed Effects Included:												
Investor					✓			✓		✓		
Date						✓		✓				
Stock							✓	✓				✓
Stock × Day									✓	✓		
Investor × Day											✓	✓
Base rate of sale	35.41	35.41	27.25	27.25	27.25	27.25	27.25	27.25	27.25	27.25	27.25	27.25
R-squared (%)	2.79	18.92	14.84	14.86	11.55	14.45	10.78	22.73	7.28	5.64	13.48	9.10
N	1,165,893	1,165,893	811,533	811,533	811,533	811,533	811,533	811,533	811,533	811,533	811,533	811,533

Note: The table repeats Table 3's sale specifications on investor-days with a sale from a portfolio of at least two stocks, the sale-day sample of Odean (1998) . *Sale (t)* indicates negative net share change from trading. Unlike the appendix sample in An et al. (2024) , which requires at least two holdings, this sample also requires a sale. Variable definitions follow Table 2. Columns (1)–(4) add log time owned and the negative and positive parts of the lagged unrealized return (Ret±), then other-position loss states and interactions; columns (5)–(12) vary fixed effects. Columns (3)–(12) share observations; N is complete-case. Columns (11)–(12) omit the absorbed *Watchlist Loss* level. All columns use two-way clustering; column (8) implements the Cameron, Gelbach, and Miller covariance. Coefficients are multiplied by 100. Standard errors, clustered by investor and by stock, are in parentheses. The sample includes approximately 10,000 retail investors of a large Chinese online trading platform between January 2022 and May 2023. *, **, and *** denote significance at the 10%, 5%, and 1% levels.

Table IA-8: Sales of Losing and Winning Positions: Conditional Logit

	Panel A: Stock × Day					Panel B: Investor × Day				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Sale (t), log odds									
Unrealized Loss	-0.37***	-0.14**	-0.21***	-0.15	-0.34***	-0.73***	-0.21***	-0.32***	-0.25***	-0.34***
	(0.05)	(0.06)	(0.06)	(0.19)	(0.03)	(0.02)	(0.02)	(0.02)	(0.03)	(0.03)
Watchlist Loss			-0.22***	-0.21**	-0.04**					
			(0.05)	(0.09)	(0.02)					
Portfolio Loss			-0.09**	-0.05	-0.03			-0.03	0.04	0.43***
			(0.04)	(0.09)	(0.02)			(0.02)	(0.03)	(0.03)
Unrealized Loss × Watchlist Loss				-0.01	0.03*				0.02	0.07***
				(0.09)	(0.02)				(0.02)	(0.02)
Unrealized Loss × Portfolio Loss				-0.07	-0.05**				-0.11***	-0.21***
				(0.09)	(0.02)				(0.03)	(0.03)
Controls Included:										
Position (Time Owned, Ret±)		✓	✓	✓	✓		✓	✓	✓	✓
Strata Included:										
Stock × Day	✓	✓	✓	✓	✓					
+ Investor demean					✓					
Investor × Day						✓	✓	✓	✓	✓
+ Stock demean										✓
N	2,014,834	2,014,834	1,087,077	1,087,077	1,087,077	1,241,540	1,241,540	797,459	699,268	699,268

Note: The table estimates *Sale (t)*, indicating negative net share change from trading, by stratified conditional logit. Columns (1)–(5) condition on stock-day strata; columns (6)–(10) condition on investor-day strata. Controls follow Table 2. Columns (5) and (10) additionally demean by investor and stock, respectively; their standard errors understate uncertainty from estimated means. The absorbed *Watchlist Loss* level is blank under investor-day strata; its interaction remains. Strata without an event leave the likelihood. Coefficients are log odds ratios and cannot be rescaled by an event rate. Inference uses the Wei, Lin, and Weissfeld (1989) sandwich. Standard errors, clustered by investor, are in parentheses. The sample includes approximately 10,000 retail investors of a large Chinese online trading platform between January 2022 and May 2023. *, **, and *** denote significance at the 10%, 5%, and 1% levels.

Table IA-9: Sales on Losing and Winning Positions: Proportional Hazards

	(1)	(2)	(3)	(4)	(5)	(6)
			Hazard of a Sale			
Unrealized Loss	-0.86***	-0.12***	-0.11***	-0.09***	-0.12***	-0.08***
	(0.01)	(0.01)	(0.02)	(0.03)	(0.03)	(0.02)
Watchlist Loss			-0.24***	-0.26***	-0.37***	-0.22***
			(0.02)	(0.02)	(0.03)	(0.02)
Portfolio Loss			-0.12***	-0.08***	-0.16***	-0.11***
			(0.02)	(0.03)	(0.03)	(0.02)
Unrealized Loss × Watchlist Loss				0.05**	0.05**	0.04*
				(0.02)	(0.02)	(0.02)
Unrealized Loss × Portfolio Loss				-0.07***	-0.05**	-0.08***
				(0.02)	(0.02)	(0.02)
Controls Included:						
Position (Ret± only)		✓	✓	✓	✓	✓
Strata Included:						
Date					✓	
Stock						✓
Pseudo-R-squared (%)	19.120	47.170	43.380	43.400	45.880	40.910
N	4,387,148	4,387,148	3,218,675	3,218,675	3,218,675	3,218,675

Note: The table estimates the hazard of a net sale using Cox proportional hazards, with time owned as the duration. Successive columns introduce the negative and positive parts of lagged unrealized return, other-position loss states, and their interactions, followed by specifications stratified by date and by stock. Time owned is the duration axis rather than a regressor. Investor, stock-day, and investor-day strata are not estimated because computation exceeded the per-specification time limit. Variable definitions follow Table 3. Coefficients are log hazard ratios; the pseudo-R-squared is McFadden's. Standard errors, clustered by investor and by stock, are in parentheses. The sample includes approximately 10,000 retail investors of a large Chinese online trading platform between January 2022 and May 2023. *, **, and *** denote significance at the 10%, 5%, and 1% levels.

sale-minus-click difference remains positive across the polynomial-degree and bandwidth specifications. Statistical significance holds for those joint contrasts and for the pooled sale jump across polynomial degrees, but not for the pooled click jump or some residual-based contrasts; among the longest-held positions, the click jump is statistically significant at the 10 percent level in Table IA-11's Panel A cubic baseline and at the 5 percent level with the widest bandwidth in Panel C. Thus, the difference between the proportional click and sale responses persists across polynomial degrees and bandwidths, while the residual-based comparison provides weaker evidence.

Fixed prior holding days. Figure IA-1 and Figure IA-2 replace the holding-period groups in Figure 2 and Figure 3 with fixed prior holding days, retaining the click and sale schedules against unrealized returns. Figure IA-1 reports probabilities in percent and marks the average click rate and average sale rate; Figure IA-2 divides each schedule by the corresponding average click rate or average sale rate, preserving Figure 3's scale. These views assess whether pooling positions held for different lengths changes the displayed shape. Selling on the earliest displayed holding day differs from selling on later holding days, so aggregation over time owned matters. Ben-David and Hirshleifer (2012) also report V-shaped schedules over short holding periods. The fixed-day views motivate reading the pooled schedules alongside Table 4's holding-period comparisons, while mean normalization separates schedule shape from differences in average activity.

Table IA-10: Joint Comparison of Clicks and Sales

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Coefficient difference between two schedules × 100											
Sale minus click:												
Unrealized Loss	4.98***	-2.37***	-0.86*	2.28***	0.40	2.13***	1.25*	-0.25	2.72***	-0.04	1.50***	0.75
	(0.51)	(0.42)	(0.49)	(0.75)	(0.45)	(0.75)	(0.66)	(0.41)	(0.80)	(0.47)	(0.58)	(0.51)
Unrealized Loss × Watchlist Loss				-0.68	-0.06	-0.65	-0.16	0.14	0.06	0.07	-0.73	-0.53
				(0.64)	(0.39)	(0.64)	(0.55)	(0.34)	(0.64)	(0.38)	(0.47)	(0.40)
Unrealized Loss × Portfolio Loss				-3.62***	-0.64*	-3.54***	-2.88***	-0.34	-3.53***	-0.73*	-1.19**	-0.84*
				(0.70)	(0.38)	(0.69)	(0.59)	(0.36)	(0.68)	(0.38)	(0.55)	(0.48)
R-squared (%)	29.640	41.590	40.660	40.670	53.770	40.950	43.980	55.600	59.090	68.500	74.420	75.800
N (stacked)	13,161,444	13,161,444	9,656,025	9,656,025	9,656,025	9,656,025	9,656,025	9,656,025	9,656,025	9,656,025	9,656,025	9,656,025

Note: The table compares sale and click coefficients in a stacked linear-probability system. N (stacked) counts observations across three equations: *Click (t)*, the reference; *Sale (t)*; and a third equation for an outcome the paper does not report. *Click (t)* indicates a stock-page visit; *Sale (t)* indicates negative net share change. Rows for the third equation are not printed. All equations use identical position-days; definitions and specifications follow Tables 2 and 3. Reported sale-minus-click differences incorporate covariance between estimates. Standard errors, clustered by investor and by stock, are in parentheses. The sample includes approximately 10,000 retail investors of a large Chinese online trading platform between January 2022 and May 2023. *, **, and *** denote significance at the 10%, 5%, and 1% levels.

Table IA-11: Responses at the Break-Even Point: Polynomial Degree and Bandwidth

Panel A: Polynomial degree, ±0.5 SD bandwidth

	All Holding Periods			Held 1–20 Days			Held 21–250 Days			Held Over 250 Days		
	Cubic	Quartic	Quintic	Cubic	Quartic	Quintic	Cubic	Quartic	Quintic	Cubic	Quartic	Quintic
	Click and Sale, jumps in percent of base rate											
Click Jump	1.31	0.48	0.01	0.31	0.17	0.27	0.80	-0.23	-0.47	9.87*	6.43	1.55
	(0.92)	(1.13)	(1.28)	(0.33)	(0.41)	(0.51)	(1.28)	(1.63)	(1.83)	(5.96)	(6.61)	(7.24)
Sale Jump	6.82***	4.86***	4.39**	2.78**	3.33**	3.80*	8.10***	4.84	3.53	19.16	15.05	12.93
	(1.49)	(1.82)	(2.11)	(1.29)	(1.63)	(2.05)	(3.01)	(3.60)	(4.18)	(13.29)	(15.26)	(17.13)
Sale vs. Click:												
Difference (Δ)	5.51***	4.38***	4.38**	2.47*	3.16*	3.53*	7.30***	5.07	4.00	9.29	8.62	11.38
	(1.41)	(1.66)	(1.95)	(1.29)	(1.64)	(2.05)	(2.70)	(3.16)	(3.66)	(11.57)	(13.34)	(14.98)
Base rate, click (%)	64.42	64.42	64.42	86.62	86.62	86.62	60.73	60.73	60.73	34.22	34.22	34.22
Base rate, sale (%)	15.27	15.27	15.27	31.63	31.63	31.63	9.67	9.67	9.67	3.67	3.67	3.67
N	2,323,237	2,323,237	2,323,237	687,440	687,440	687,440	1,287,591	1,287,591	1,287,591	348,206	348,206	348,206

Note: The table extends Table 4's break-even comparison. *Click (t)* indicates a stock-page visit; *Sale (t)* indicates negative net share change. Panel A varies polynomial degree; Panel B differences mean residuals from a polynomial spanning zero; Panel C varies bandwidth. Returns are standardized within holding-period groups; separate polynomials on either side of zero include square-root time owned and its interactions as in Table 4. Jumps are percentages of the printed click and sale base rates within each bandwidth. Sale-minus-click contrasts incorporate covariance from joint estimation. N counts position-days within the bandwidth. Investor clustering allows dependence across an investor's positions and days. Standard errors, clustered by investor, are in parentheses. The sample includes approximately 10,000 retail investors of a large Chinese online trading platform between January 2022 and May 2023. *, **, and *** denote significance at the 10%, 5%, and 1% levels.

(Continued)

Table IA-11—Continued

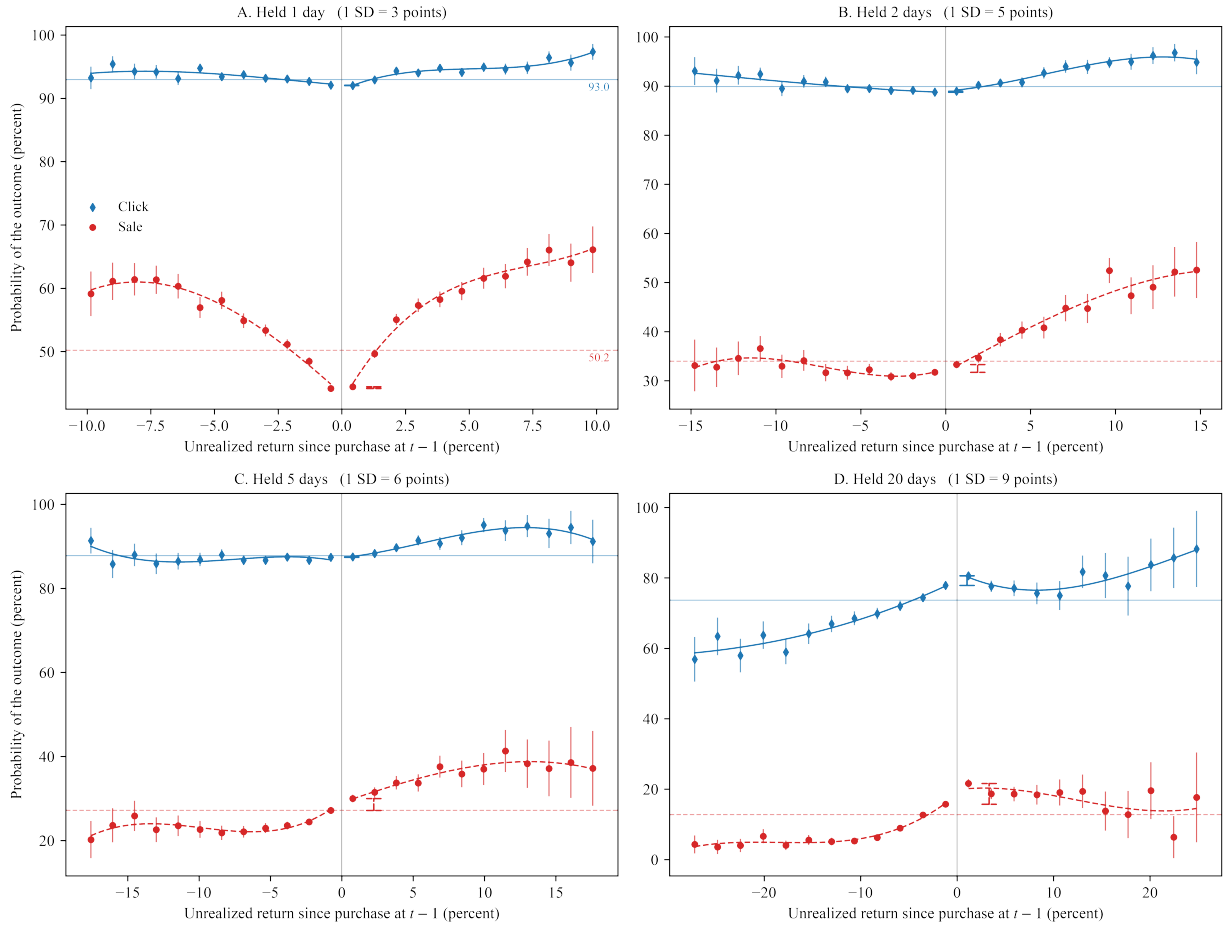
Panel B: Residual-based comparison, ±0.5 SD bandwidth

	All Holding Periods			Held 1–20 Days			Held 21–250 Days			Held Over 250 Days		
	Cubic	Quartic	Quintic	Cubic	Quartic	Quintic	Cubic	Quartic	Quintic	Cubic	Quartic	Quintic
	Click and Sale, jumps in percent of base rate											
Click Jump	0.03	0.30	0.13	-0.05	-0.04	0.01	0.04	0.33	0.12	0.34	1.89	0.81
	(0.52)	(0.52)	(0.52)	(0.16)	(0.16)	(0.16)	(0.74)	(0.74)	(0.74)	(2.73)	(2.73)	(2.72)
Sale Jump	1.07	1.77**	0.87	0.31	0.33	0.31	2.16	3.55***	1.40	1.51	6.05	1.49
	(0.75)	(0.74)	(0.74)	(0.50)	(0.50)	(0.50)	(1.32)	(1.31)	(1.30)	(4.09)	(4.04)	(4.03)
Sale vs. Click:												
Difference (Δ)	1.05	1.48*	0.74	0.36	0.37	0.30	2.12*	3.22**	1.28	1.16	4.16	0.69
	(0.79)	(0.79)	(0.79)	(0.50)	(0.50)	(0.50)	(1.26)	(1.25)	(1.24)	(3.81)	(3.77)	(3.77)
Base rate, click (%)	64.42	64.42	64.42	86.62	86.62	86.62	60.73	60.73	60.73	34.22	34.22	34.22
Base rate, sale (%)	15.27	15.27	15.27	31.63	31.63	31.63	9.67	9.67	9.67	3.67	3.67	3.67
N	2,323,237	2,323,237	2,323,237	687,440	687,440	687,440	1,287,591	1,287,591	1,287,591	348,206	348,206	348,206

Panel C: Bandwidth, cubic return polynomial

	All Holding Periods			Held 1–20 Days			Held 21–250 Days			Held Over 250 Days		
	±0.25 SD	±0.5 SD	±1 SD	±0.25 SD	±0.5 SD	±1 SD	±0.25 SD	±0.5 SD	±1 SD	±0.25 SD	±0.5 SD	±1 SD
	Click and Sale, jumps in percent of base rate											
Click Jump	0.15	1.31	1.22	0.17	0.31	-0.22	-0.57	0.80	1.27	3.45	9.87*	11.86**
	(1.18)	(0.92)	(0.80)	(0.46)	(0.33)	(0.25)	(1.64)	(1.28)	(1.11)	(6.09)	(5.96)	(5.93)
Sale Jump	4.67***	6.82***	8.84***	3.92**	2.78**	1.24	3.80	8.10***	17.57***	11.10	19.16	39.37***
	(1.80)	(1.49)	(1.33)	(1.80)	(1.29)	(0.99)	(3.24)	(3.01)	(3.01)	(12.21)	(13.29)	(13.91)
Sale vs. Click:												
Difference (Δ)	4.53***	5.51***	7.62***	3.75**	2.47*	1.46	4.36	7.30***	16.30***	7.65	9.29	27.51**
	(1.67)	(1.41)	(1.28)	(1.81)	(1.29)	(1.00)	(2.84)	(2.70)	(2.74)	(10.61)	(11.57)	(12.23)
Base rate, click (%)	66.96	64.42	61.13	87.23	86.62	85.78	63.94	60.73	56.84	39.20	34.22	29.10
Base rate, sale (%)	16.88	15.27	13.52	32.88	31.63	30.01	11.73	9.67	7.77	4.91	3.67	2.73
N	1,469,551	2,323,237	3,266,881	430,957	687,440	956,277	812,206	1,287,591	1,818,635	226,388	348,206	491,969

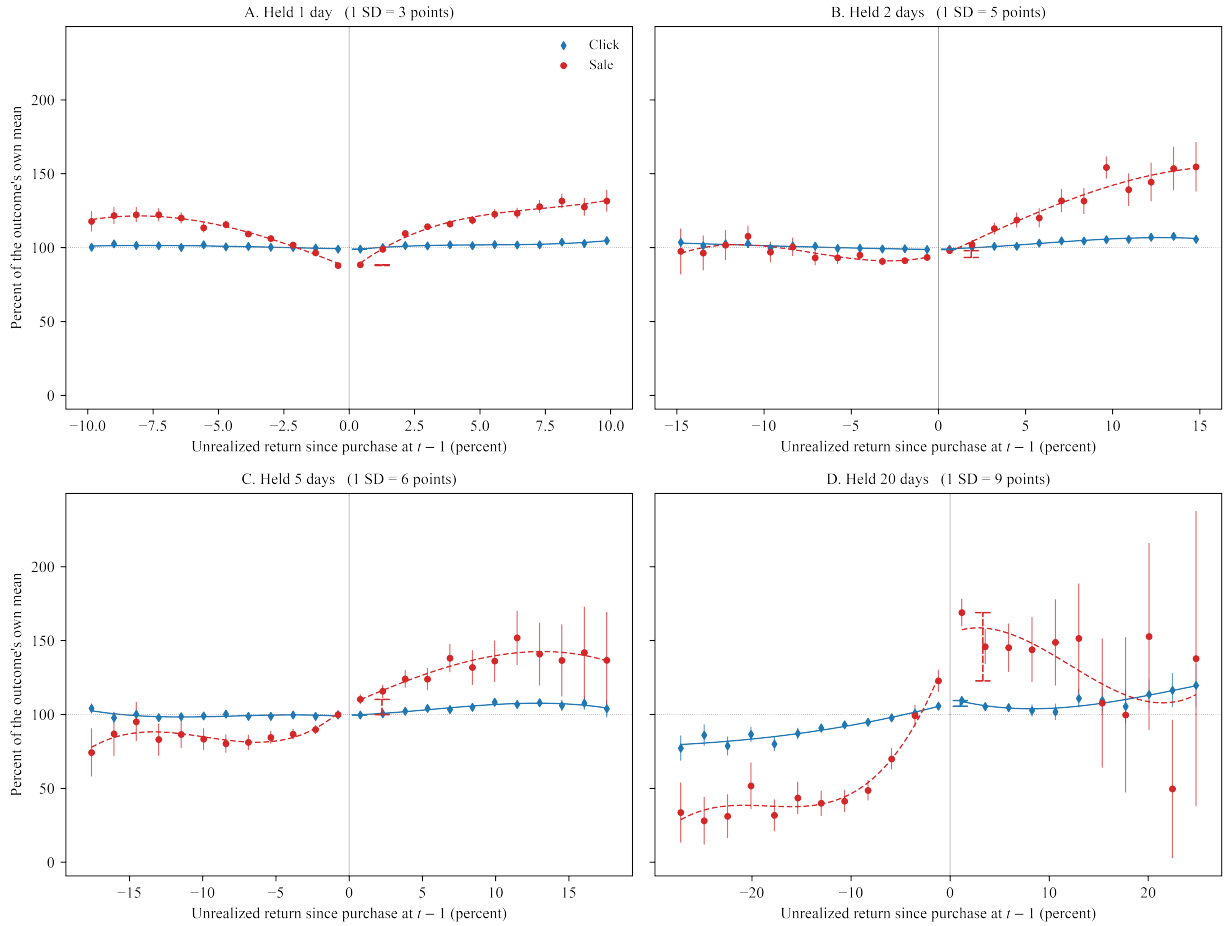
Figure IA-1: Clicks and Sales by Prior Holding Day



Note: The figure plots click and sale probabilities in percent against previous-close unrealized returns. *Click (t)* records whether an investor clicks on a position the investor holds; *Sale (t)* records negative net share change. Panels A–D fix prior holding days at 1, 2, 5, and 20, respectively. Quarter-standard-deviation bins omit returns beyond three standard deviations and bins with fewer than 30 observations. Bars are 95% binomial confidence intervals; curves are cubics fitted separately on either side of zero. Returns are standardized within holding day, following □ Ben-David and Hirshleifer (2012)□ . Faint lines mark each series' mean over plotted bins; brackets compare adjacent bins, not fitted discontinuities. Panel scales differ. Figure IA-2 shows normalized schedules. The sample includes approximately 10,000 retail investors of a large Chinese online trading platform between January 2022 and May 2023.

Position changes and sale shares. Figure IA-3 and Figure IA-4 replace the sale schedule with the probability of a position change and the share of changes that are sales, retaining the click schedule and unrealized-return axis. Figure IA-3 uses levels, while Figure IA-4 divides each schedule by its own mean, preserving Figure 3's scale; the decomposition applies to the sale probability plotted in Figure 2. Clicks and position changes use position-days as their denominator, whereas the sale share conditions on a nonzero net position change. The sale probability combines the frequency of position changes with the share that are sales. The comparatively stable sale share makes the normalized sale and position-change schedules nearly identical, indicating that changes in trading frequency account for most of the sale schedule's

Figure IA-2: Mean-Normalized Clicks and Sales by Prior Holding Day



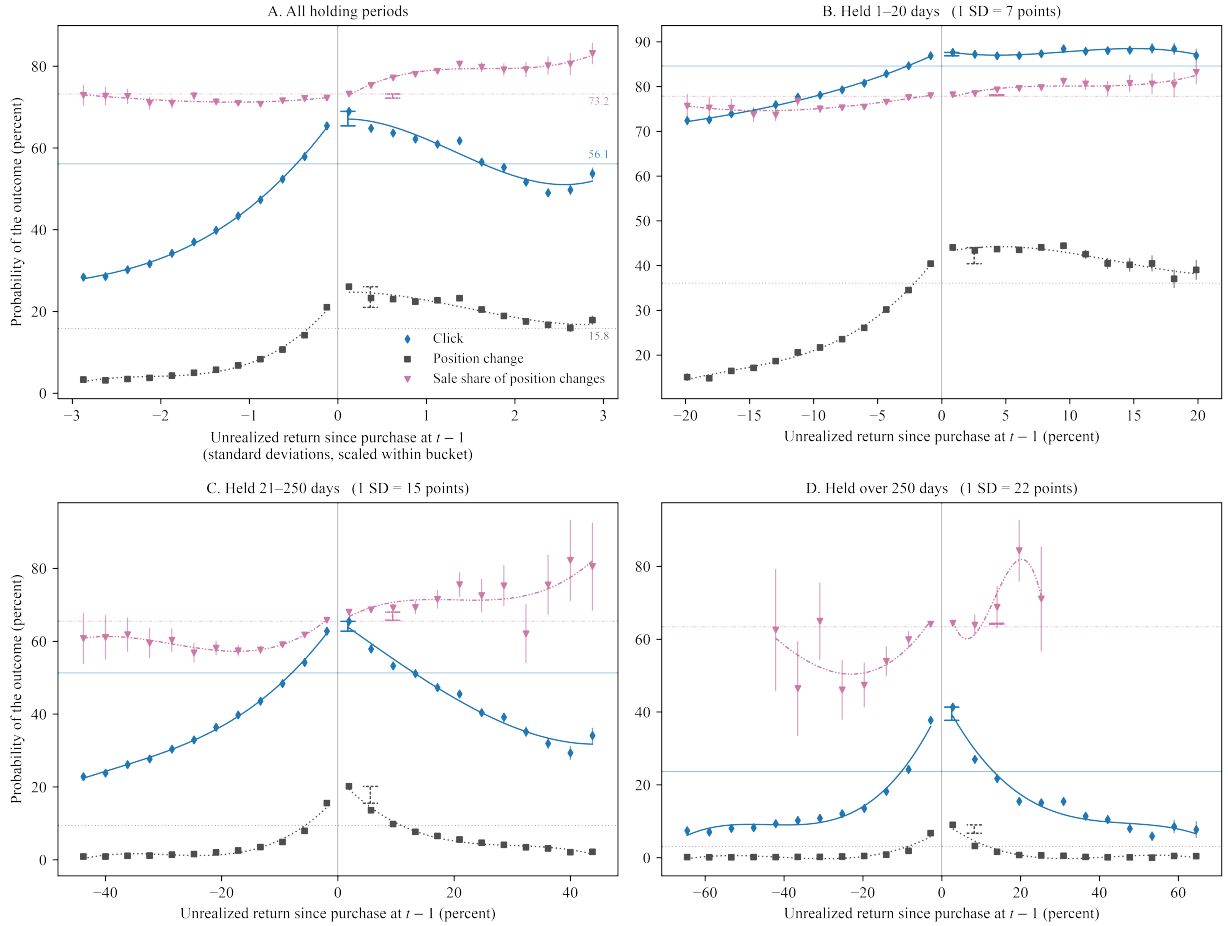
Note: The figure plots Figure IA-1's click and sale probabilities as percentages of their means against previous-close unrealized returns. Panels A–D fix prior holding days at 1, 2, 5, and 20, respectively. Quarter-standard-deviation bins omit returns beyond three standard deviations and bins with fewer than 30 observations. Bars are 95% binomial confidence intervals; curves are cubics fitted separately on either side of zero. Returns are standardized within holding day, following □ Ben-David and Hirshleifer (2012)□ . The mean is 100; brackets compare adjacent bins. The sample includes approximately 10,000 retail investors of a large Chinese online trading platform between January 2022 and May 2023.

shape. This separates the frequency and direction of position changes without treating their accounting relation as a separate selling mechanism.

4. Prior Clicks and Push Notifications

This section supplements Sections 5.1 and 5.2 of the main text with the full specification sequences for prior clicks and push notifications. Table IA-12 expands the prior-click sale specifications in Table 5. Table IA-13 expands Table 6's sale specifications in Panel A and supplies the click specifications in Panel B, allowing the selling and click patterns to be assessed across the same sequence of controls and fixed effects.

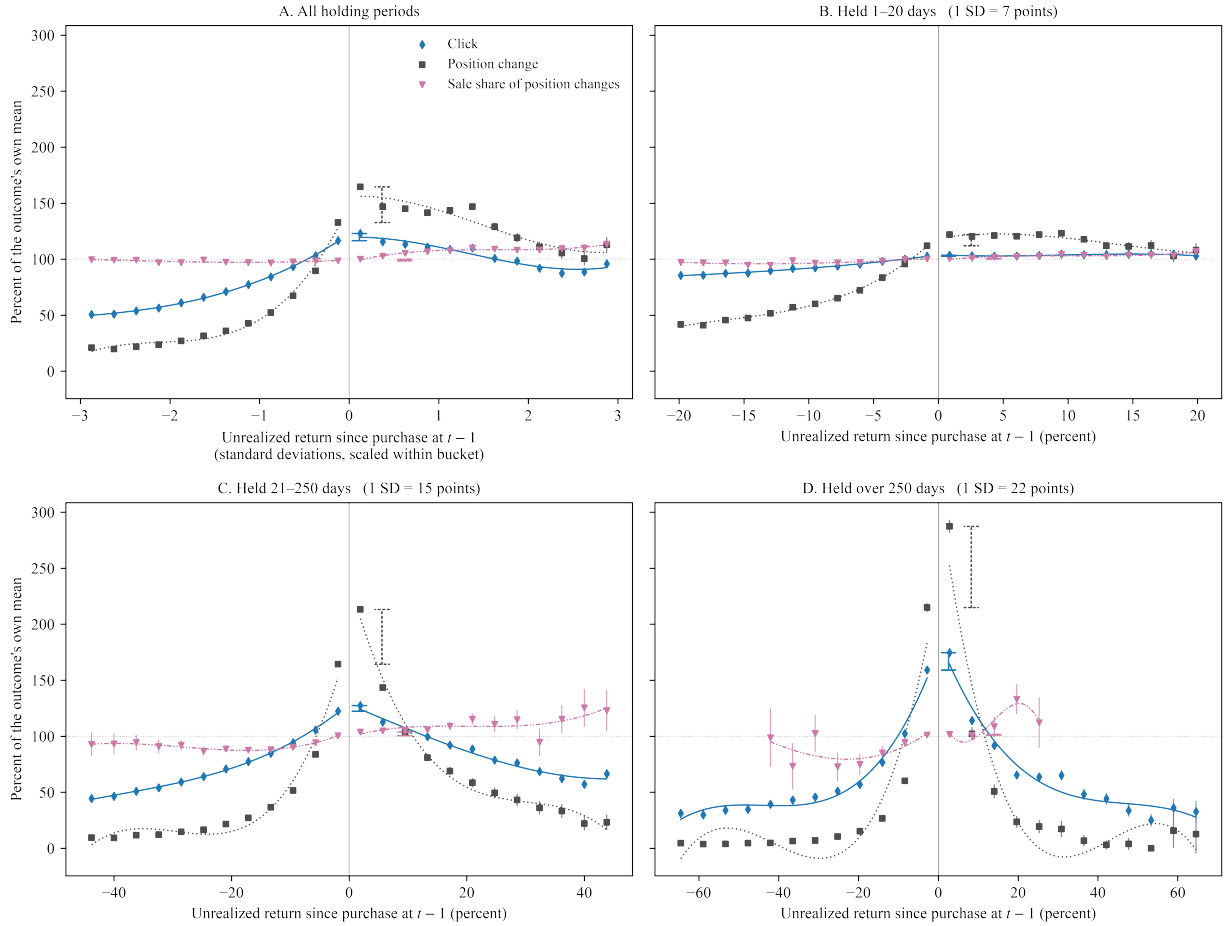
Figure IA-3: Clicks, Position Changes, and Sale Share



Note: The figure plots click probabilities, probabilities of nonzero net position changes, and sales as a share of changes, in percent, against previous-close unrealized returns. *Click (t)* records whether an investor clicks on a position the investor holds; sales are negative net changes. Click and position-change rates use position-days; the sale share uses only position-days with a change. Panel A pools holding periods; Panels B–D cover 1–20, 21–250, and over 250 holding days. Returns are standardized within holding-period groups for quarter-standard-deviation bins; returns beyond three standard deviations and bins with fewer than 30 observations are omitted, following Ben-David and Hirshleifer (2012). Bars are 95% binomial confidence intervals; curves are cubics fitted separately on either side of zero. Panel A's axis is standardized; B–D use percent. Faint lines mark each series' mean over plotted bins; brackets compare adjacent bins, not fitted discontinuities. Panel scales differ. The sample includes approximately 10,000 retail investors of a large Chinese online trading platform between January 2022 and May 2023.

Prior clicks. Table IA-12 retains *Sale (t)*, *Click (t−1)*, and *Unrealized Loss* × *Click (t−1)* while including the intermediate specifications omitted from Table 5. The loss interaction is negative throughout, including under stock-day and investor-day fixed effects, so the stronger disposition effect among previously clicked positions does not depend on which specifications are printed in the main table. The *Click (t−1)* coefficient describes winning positions; adding the interaction to the no-prior-click loss coefficient gives the conditional loss association among clicked positions at the remaining moderators' reference values. The expanded sequence preserves Section 5.1's

Figure IA-4: Mean-Normalized Clicks, Position Changes, and Sale Share



Note: The figure plots Figure IA-3's click probabilities, nonzero-position-change probabilities, and sale shares as percentages of their own means against previous-close unrealized returns. Click and position-change rates use position-days; the sale share uses only position-days with a change, so its bins have fewer observations. Panel A pools holding periods; Panels B–D cover 1–20, 21–250, and over 250 holding days. Returns are standardized within holding-period groups for quarter-standard-deviation bins; returns beyond three standard deviations and bins with fewer than 30 observations are omitted, following □ Ben-David and Hirshleifer (2012)□ . Bars are 95% binomial confidence intervals; curves are cubics fitted separately on either side of zero. Panel A's axis is standardized; B–D use percent. The mean is 100; Figure IA-3 marks each series' own mean in levels. The sample includes approximately 10,000 retail investors of a large Chinese online trading platform between January 2022 and May 2023.

finding that more selling of winning positions coexists with a stronger disposition effect among positions clicked on the previous trading day.

Push notifications. Table IA-13 retains *Push (t−1)* and the delivery-log coverage window while expanding Table 6's control and fixed-effect sequence for sales and reporting the click specifications. This checks whether the associations with clicking and selling depend on the comparison used. The *Unrealized Loss* × *Push (t−1)* sale interaction is negative in the specifications printed in Table 6, whereas the click interaction is positive in Table IA-13, Panel B's stock-day and investor-day comparisons. The sale interaction is statistically significant in Table 6's columns (4) and (6), but statistically insignificant in column (5), with stock-day and investor fixed effects; the

Table IA-12: Prior Clicks and Sales of Losing and Winning Positions: Full Specifications

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
						Sale (t) × *100*						
Unrealized Loss	-2.24***	-1.29***	-0.83***	-0.06	-0.82***	-0.02	-0.41**	-0.75***	-0.47*	-0.68***	-0.75**	-0.69**
	(0.12)	(0.15)	(0.11)	(0.21)	(0.21)	(0.21)	(0.20)	(0.21)	(0.26)	(0.26)	(0.30)	(0.31)
Click ($t-1$)	21.84***	12.30***	10.80***	10.84***	11.17***	10.69***	10.56***	10.53***	8.79***	9.07***	11.87***	11.36***
	(0.39)	(0.28)	(0.23)	(0.23)	(0.24)	(0.23)	(0.21)	(0.22)	(0.23)	(0.24)	(0.37)	(0.34)
Unrealized Loss × Click ($t-1$)	-7.79***	-6.91***	-6.15***	-6.20***	-5.10***	-6.12***	-6.00***	-4.92***	-4.42***	-3.70***	-4.79***	-4.71***
	(0.23)	(0.20)	(0.18)	(0.18)	(0.17)	(0.18)	(0.17)	(0.17)	(0.19)	(0.19)	(0.25)	(0.25)
Controls Included:												
Position (Time Owned, Ret±)		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Other-position loss states and their interactions			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Fixed Effects Included:												
Investor					✓			✓		✓		
Date						✓		✓				
Stock							✓	✓				✓
Stock × Day									✓	✓		
Investor × Day											✓	✓
Base rate of sale	11.39	11.39	7.71	7.71	7.71	7.71	7.71	7.71	7.71	7.71	7.71	7.71
R-squared (%)	8.33	15.64	9.84	9.85	6.61	9.04	8.48	16.76	5.13	3.33	7.13	5.44
N	4,387,148	4,387,148	3,218,675	3,218,675	3,218,675	3,218,675	3,218,675	3,218,675	3,218,675	3,218,675	3,218,675	3,218,675

Note: The table reports Table 5's full specifications for *Sale (t)*, indicating negative net share change from trading. *Click (t−1)* indicates a stock-page visit on the previous trading day. Other variable definitions follow Table 2. Columns (1)–(4) add log time owned and the negative and positive parts of the lagged unrealized return (Ret±), then other-position loss states and interactions; columns (5)–(12) vary fixed effects. Columns (3)–(12) share observations; N is complete-case. Columns (11)–(12) omit the absorbed *Watchlist Loss* level. All columns use two-way clustering; column (8) implements the Cameron, Gelbach, and Miller covariance. Coefficients are multiplied by 100. Standard errors, clustered by investor and by stock, are in parentheses. The sample includes approximately 10,000 retail investors of a large Chinese online trading platform between January 2022 and May 2023. *, **, and *** denote significance at the 10%, 5%, and 1% levels.

Table IA-13: Push Notifications, Clicks, and Sales of Losing and Winning Positions: Full Specifications

Panel A: Sales

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
						Sale (t) × 100						
Unrealized Loss	-10.18***	-6.69***	-5.47***	-4.81***	-4.68***	-4.68***	-4.97***	-4.40***	-4.10***	-3.55***	-4.50***	-4.28***
	(0.26)	(0.18)	(0.16)	(0.26)	(0.24)	(0.25)	(0.25)	(0.24)	(0.30)	(0.28)	(0.35)	(0.35)
Push ($t-1$)	11.99***	7.04***	7.54***	7.50***	5.46***	8.27***	6.95***	6.03***	5.96***	4.78***	7.09***	6.54***
	(1.24)	(0.92)	(0.85)	(0.84)	(0.70)	(0.84)	(0.81)	(0.67)	(0.94)	(0.81)	(1.01)	(0.98)
Unrealized Loss × Push ($t-1$)	-2.25**	-3.36***	-3.30***	-3.27***	-2.38***	-3.12***	-3.19***	-2.31***	-1.61*	-1.09	-2.13**	-2.18**
	(0.95)	(0.71)	(0.72)	(0.72)	(0.69)	(0.69)	(0.70)	(0.67)	(0.85)	(0.85)	(0.94)	(0.92)
Controls Included:												
Position (Time Owned, Ret±)		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Other-position loss states and their interactions			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Fixed Effects Included:												
Investor					✓			✓		✓		
Date						✓		✓				
Stock							✓	✓				✓
Stock × Day									✓	✓		
Investor × Day											✓	✓
Base rate of sale	12.33	12.33	8.38	8.38	8.38	8.38	8.38	8.38	8.38	8.38	8.38	8.38
R-squared (%)	2.08	14.63	8.75	8.76	5.14	8.26	7.18	16.71	4.46	2.53	5.86	4.20
N	3,731,522	3,731,522	2,707,442	2,707,442	2,707,442	2,707,442	2,707,442	2,707,442	2,707,442	2,707,442	2,707,442	2,707,442

Note: The table reports Table 6's full specifications: *Sale (t)*, indicating negative net share change, in Panel A, and *Click (t)*, indicating a stock-page visit, in Panel B. *Push (t−1)* records delivery about the held stock on the previous trading day, not opening or reading. Messages are not investor-targeted. Observations are restricted to the delivery-log window, which ends on March 31, 2023, before the panel does. Variable definitions follow Table 2. Columns (1)–(4) add log time owned and the negative and positive parts of the lagged unrealized return (Ret±), then other-position states and interactions; columns (5)–(12) vary fixed effects. Each column reports complete-case N. Coefficients are multiplied by 100. Standard errors, clustered by investor and by stock, are in parentheses. The sample includes approximately 10,000 retail investors of a large Chinese online trading platform between January 2022 and May 2023. *, **, and *** denote significance at the 10%, 5%, and 1% levels.

(Continued)

Table IA-13—Continued

Panel B: Clicks

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
						Click (t) × 100						
Unrealized Loss	-15.26***	-4.20***	-4.46***	-7.05***	-4.82***	-6.76***	-6.13***	-3.86***	-6.77***	-3.34***	-5.70***	-4.60***
	(0.66)	(0.50)	(0.57)	(0.81)	(0.51)	(0.80)	(0.71)	(0.47)	(1.04)	(0.64)	(0.86)	(0.74)
Push ($t-1$)	20.78***	12.63***	13.18***	13.22***	12.03***	14.55***	12.39***	10.70***	11.31***	8.60***	14.53***	11.87***
	(1.60)	(1.36)	(1.57)	(1.56)	(1.05)	(1.61)	(1.41)	(0.97)	(1.99)	(1.13)	(1.63)	(1.42)
Unrealized Loss × Push ($t-1$)	8.98***	4.78***	3.99**	3.96**	1.92*	4.15***	3.85***	2.04**	5.59***	3.35***	2.28	1.93
	(1.60)	(1.37)	(1.56)	(1.56)	(1.07)	(1.59)	(1.45)	(1.04)	(2.01)	(1.26)	(1.61)	(1.42)
Controls Included:												
Position (Time Owned, Ret±)		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Other-position loss states and their interactions			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Fixed Effects Included:												
Investor					✓			✓		✓		
Date						✓		✓				
Stock							✓	✓				✓
Stock × Day									✓	✓		
Investor × Day											✓	✓
Base rate of click	57.19	57.19	54.09	54.09	54.09	54.09	54.09	54.09	54.09	54.09	54.09	54.09
R-squared (%)	2.22	22.77	20.60	20.61	15.08	19.66	16.87	48.55	13.56	7.47	16.51	11.46
N	3,731,522	3,731,522	2,707,442	2,707,442	2,707,442	2,707,442	2,707,442	2,707,442	2,707,442	2,707,442	2,707,442	2,707,442

click interaction is statistically significant in Table IA-13, Panel B's column (10), with stock-day and investor fixed effects, but statistically insignificant in column (12), with investor-day and stock fixed effects. Evidence that notifications narrow the winner–loser difference in clicks therefore comes from the stock-day comparison, without corresponding evidence of a weaker disposition effect.

Nonfocal pushes. We expand Table 7's sale specifications and report the corresponding click specifications in Table IA-14, retaining the delivery-log window and controlling in every column for the focal push, *Push (t−1)*, and its interaction with *Unrealized Loss*. Panel A reports the full sale specification sequence for *Nonfocal Push (t−1)*, including the intermediate specifications omitted from Table 7. The *Unrealized Loss* × *Nonfocal Push (t−1)* sale interaction remains negative and statistically significant throughout. Panel B uses *Click (t)* as the outcome. The *Nonfocal Push (t−1)* coefficient is positive and statistically significant throughout the specifications preceding investor-day effects; under investor-day effects, the level is absorbed, as in the sale specifications. The *Unrealized Loss* × *Nonfocal Push (t−1)* click interaction is small and never statistically distinguishable from zero. By comparison, the click interaction for *Push (t−1)* is positive and statistically significant through the stock-day specifications in Table IA-13, Panel B. Thus, a notification about the position is associated with a narrower winner–loser difference in clicks under those specifications, whereas a nonfocal push is associated with more clicks on winning and losing positions without a statistically detectable difference by gain/loss state.

5. Subsequent Returns

This section supplements Sections 6.1 and 6.2 of the main text. We first describe the construction of benchmark-adjusted returns, then examine how Table 8's subsequent-return comparisons depend on decision-day price limits, distance from the break-even point, and recent stock returns. Table IA-15 reports price-limit exposure and repeats the comparisons after excluding limit closes, using CH-4 as the main benchmark and reporting DGTW alongside it at the 240-trading-day horizon. Table IA-16 restricts the comparisons to positions near the break-even point, and Table IA-17 adds trailing-return controls.

Purpose and benchmarks. We adjust subsequent stock returns to distinguish performance associated with investors' stock choices from exposure to common factors and stock characteristics. Our main benchmark is CH-4, the factor model developed for Chinese stocks by Liu, Stambaugh, and Yuan (2019). We report DGTW characteristic-adjusted returns alongside it (Daniel et al., 1997). As in Akepanidtaworn et al. (2023), the constructions compare stock returns with a factor-based benchmark and with returns on characteristic-matched portfolios.

CH-4 factor adjustment. The daily factor-adjusted return is the stock return less the risk-free rate and the sum of its estimated factor loadings multiplied by the corresponding daily factor returns. The factors are market, size, value, and turnover, constructed following Liu, Stambaugh, and Yuan (2019); we do not subtract an intercept. We estimate loadings at each calendar-quarter end using daily regressions over the trailing 250 trading days, requiring at least 120 observations. Following Dimson (1979), the regressions include contemporaneous factors and a lead and lag of each factor; its loading is the sum of the corresponding coefficients. Estimation uses data through

Table IA-14: Nonfocal Push Notifications, Clicks, and Sales of Losing and Winning Positions: Full Specifications

Panel A: Sales

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
						Sale (t) × 100						
Unrealized Loss	-9.07***	-5.83***	-4.75***	-4.14***	-3.93***	-4.03***	-4.37***	-3.70***	-3.53***	-2.85***	-3.74***	-3.53***
	(0.33)	(0.23)	(0.21)	(0.29)	(0.26)	(0.28)	(0.27)	(0.26)	(0.33)	(0.30)	(0.41)	(0.41)
Nonfocal Push ($t-1$)	3.55***	2.02***	1.64***	1.61***	1.28***	1.58***	1.51***	1.27***	1.40***	1.43***		
	(0.48)	(0.35)	(0.28)	(0.28)	(0.23)	(0.28)	(0.27)	(0.22)	(0.27)	(0.25)		
Unrealized Loss × Nonfocal Push ($t-1$)	-1.75***	-1.34***	-1.12***	-1.09***	-1.17***	-1.06***	-0.96***	-1.08***	-0.91***	-1.09***	-1.17***	-1.16***
	(0.34)	(0.24)	(0.22)	(0.22)	(0.21)	(0.22)	(0.21)	(0.21)	(0.22)	(0.23)	(0.33)	(0.33)
Push ($t-1$)	10.72***	6.33***	6.97***	6.94***	5.14***	7.72***	6.44***	5.74***	5.46***	4.46***	6.81***	6.26***
	(1.23)	(0.91)	(0.84)	(0.84)	(0.70)	(0.84)	(0.80)	(0.67)	(0.94)	(0.81)	(1.02)	(0.98)
Unrealized Loss × Push ($t-1$)	-1.62*	-2.88***	-2.90***	-2.88***	-2.00***	-2.74***	-2.86***	-1.96***	-1.28	-0.73	-1.76*	-1.82**
	(0.95)	(0.71)	(0.72)	(0.72)	(0.69)	(0.69)	(0.70)	(0.67)	(0.85)	(0.85)	(0.94)	(0.92)
Controls Included:												
Position (Time Owned, Ret±)		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Other-position loss states and their interactions			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Fixed Effects Included:												
Investor					✓			✓		✓		
Date						✓		✓				
Stock							✓	✓				✓
Stock × Day									✓	✓		
Investor × Day											✓	✓
Base rate of sale	12.33	12.33	8.38	8.38	8.38	8.38	8.38	8.38	8.38	8.38	8.38	8.38
R-squared (%)	2.210	14.660	8.780	8.790	5.150	8.290	7.210	16.720	4.480	2.540	5.870	4.200
N	3,731,522	3,731,522	2,707,442	2,707,442	2,707,442	2,707,442	2,707,442	2,707,442	2,707,442	2,707,442	2,707,442	2,707,442

Note: The table reports Table 7's full specifications: *Sale (t)*, indicating negative net share change from trading, in Panel A, and *Click (t)*, indicating a stock-page visit, in Panel B. *Nonfocal Push (t−1)*, the delivery-log window, and variable definitions follow Table 7. Every column includes the focal push, *Push (t−1)*, and its interaction with *Unrealized Loss*. Controls and fixed effects vary by column as indicated. Each specification uses its own complete-case sample. Coefficients are multiplied by 100. Standard errors, clustered by investor and by stock, are in parentheses. The sample includes approximately 10,000 retail investors of a large Chinese online trading platform between January 2022 and May 2023. *, **, and *** denote significance at the 10%, 5%, and 1% levels.

(Continued)

Table IA-14—Continued

Panel B: Clicks

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
						Click (t) × 100						
Unrealized Loss	-15.50***	-4.65***	-5.21***	-7.81***	-4.61***	-7.54***	-6.90***	-3.80***	-7.71***	-3.34***	-5.15***	-4.19***
	(0.87)	(0.68)	(0.81)	(0.97)	(0.61)	(0.97)	(0.86)	(0.55)	(1.23)	(0.74)	(1.06)	(0.91)
Nonfocal Push ($t-1$)	6.09***	3.47***	2.51***	2.55***	3.56***	2.51***	2.54***	3.05***	2.17**	3.11***		
	(0.98)	(0.81)	(0.93)	(0.93)	(0.63)	(0.93)	(0.83)	(0.58)	(1.02)	(0.66)		
Unrealized Loss × Nonfocal Push ($t-1$)	0.35	0.67	1.10	1.06	-0.32	1.10	1.09	-0.08	1.41	0.04	-0.84	-0.64
	(0.85)	(0.67)	(0.81)	(0.81)	(0.55)	(0.81)	(0.72)	(0.48)	(0.95)	(0.61)	(0.94)	(0.80)
Push ($t-1$)	18.60***	11.42***	12.33***	12.35***	11.67***	13.71***	11.57***	10.45***	10.52***	8.36***	14.32***	11.72***
	(1.59)	(1.34)	(1.54)	(1.54)	(1.05)	(1.58)	(1.40)	(0.97)	(1.96)	(1.14)	(1.64)	(1.43)
Unrealized Loss × Push ($t-1$)	8.85***	4.55***	3.63**	3.61**	2.02*	3.79**	3.47**	2.07**	5.10**	3.34***	2.55	2.12
	(1.59)	(1.37)	(1.56)	(1.56)	(1.08)	(1.59)	(1.45)	(1.05)	(2.02)	(1.27)	(1.63)	(1.44)
Controls Included:												
Position (Time Owned, Ret±)		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Other-position loss states and their interactions			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Fixed Effects Included:												
Investor					✓			✓		✓		
Date						✓		✓				
Stock							✓	✓				✓
Stock × Day									✓	✓		
Investor × Day											✓	✓
Base rate of any click	57.19	57.19	54.09	54.09	54.09	54.09	54.09	54.09	54.09	54.09	54.09	54.09
R-squared (%)	2.600	22.920	20.710	20.720	15.110	19.760	16.980	48.570	13.670	7.510	16.510	11.460
N	3,731,522	3,731,522	2,707,442	2,707,442	2,707,442	2,707,442	2,707,442	2,707,442	2,707,442	2,707,442	2,707,442	2,707,442

Table IA-15: Price-Limit Exposure and the Return Comparisons Excluding Limit Days

Panel A: Price-limit exposure of the position groups, 240 trading days

	CH-4		DGTW	
	Upper-limit close on day t	Lower-limit close on day t	Upper-limit close on day t	Lower-limit close on day t
	Share of the group carrying the event, percent			
Losers:				
Losers Held	1.15	0.38	1.17	0.38
Losers Sold	5.41	2.04	5.43	2.06
Winners:				
Winners Held	1.85	0.71	1.84	0.72
Winners Sold	7.32	1.80	7.43	1.83
N, Losers Held	2,462,619	2,462,619	2,347,564	2,347,564
N, Losers Sold	239,770	239,770	230,175	230,175
N, Winners Held	856,779	856,779	828,043	828,043
N, Winners Sold	203,947	203,947	196,355	196,355
Investors	9,724	9,724	9,674	9,674
Trading days	336	336	336	336

Panel B: The Odean wedge and its two accounting routes, CH-4, 240 trading days

		Via the loser sold		Via the winner held	
	$R_{LH} - R_{WS}$	$R_{LH} - R_{LS}$	$R_{LS} - R_{WS}$	$R_{LH} - R_{WH}$	$R_{WH} - R_{WS}$
	Return after the decision day, percent, at 240 trading days				
No exclusion	2.96***	1.92**	1.04**	-0.47	3.43***
	(0.93)	(0.81)	(0.52)	(1.05)	(1.00)
Up-limit closes out	2.27**	1.46*	0.81	-0.62	2.89***
	(0.92)	(0.81)	(0.52)	(1.05)	(1.00)
Down-limit closes out	2.75***	1.74**	1.01*	-0.53	3.28***
	(0.92)	(0.81)	(0.53)	(1.05)	(1.00)
Either limit out	2.02**	1.25	0.77	-0.68	2.70***
	(0.92)	(0.81)	(0.53)	(1.05)	(1.00)

Panel C: The Odean wedge and its two accounting routes, DGTW, 240 trading days

		Via the loser sold		Via the winner held	
	$R_{LH} - R_{WS}$	$R_{LH} - R_{LS}$	$R_{LS} - R_{WS}$	$R_{LH} - R_{WH}$	$R_{WH} - R_{WS}$
	Return after the decision day, percent, at 240 trading days				
No exclusion	5.27***	3.33***	1.94***	0.79	4.48***
	(0.64)	(0.61)	(0.37)	(0.97)	(0.93)
Up-limit closes out	4.66***	2.99***	1.67***	0.67	4.00***
	(0.64)	(0.61)	(0.36)	(0.97)	(0.93)
Down-limit closes out	5.09***	3.16***	1.93***	0.73	4.36***
	(0.64)	(0.62)	(0.37)	(0.97)	(0.93)
Either limit out	4.45***	2.80***	1.65***	0.60	3.85***
	(0.64)	(0.61)	(0.37)	(0.97)	(0.93)

Note: The table repeats Table 8's comparisons at 240 trading days. Panel A reports weighted upper- and lower-limit closing shares, group-specific N, investors, and trading days for each benchmark's return sample. Samples can differ with return availability. Panels B and C report the Odean wedge and steps of the two accounting routes using CH-4 factor adjustment and DGTW (Daniel–Grinblatt–Titman–Wermers) characteristic adjustment, respectively. Exclusions remove upper-limit closes, lower-limit closes, or either across all groups, retaining original weights. Previous-close gain/loss states, decision-day net trading, and returns follow Table 8; held means no net change, and sales may be partial. Standard errors, clustered by investor and date, are in parentheses. The sample includes approximately 10,000 retail investors of a large Chinese online trading platform between January 2022 and May 2023. *, **, and *** denote significance at the 10%, 5%, and 1% levels.

Table IA-16: Subsequent Returns Near the Break-Even Point

Panel A: CH-4, 240 trading days

		Via the loser sold		Via the winner held	
	$R_{LH} - R_{WS}$	$R_{LH} - R_{LS}$	$R_{LS} - R_{WS}$	$R_{LH} - R_{WH}$	$R_{WH} - R_{WS}$
	Return after the decision day, percent, at 240 trading days				
No restriction	2.96***	1.92**	1.04**	-0.47	3.43***
	(0.93)	(0.81)	(0.52)	(1.05)	(1.00)
Nested bands around break-even:					
Within 2 points of break-even	1.59**	1.73**	-0.14	-0.24	1.82**
	(0.79)	(0.76)	(0.52)	(0.42)	(0.71)
Within 5 points of break-even	2.31***	2.10***	0.21	-0.43	2.74***
	(0.82)	(0.75)	(0.48)	(0.80)	(0.95)
Within 10 points of break-even	2.64***	1.95***	0.69	-0.41	3.05***
	(0.86)	(0.75)	(0.49)	(0.79)	(0.92)
Within 20 points of break-even	2.56***	1.76**	0.80	-0.85	3.41***
	(0.85)	(0.75)	(0.51)	(0.85)	(0.93)

Panel B: DGTW, 240 trading days

		Via the loser sold		Via the winner held	
	$R_{LH} - R_{WS}$	$R_{LH} - R_{LS}$	$R_{LS} - R_{WS}$	$R_{LH} - R_{WH}$	$R_{WH} - R_{WS}$
	Return after the decision day, percent, at 240 trading days				
No restriction	5.27***	3.33***	1.94***	0.79	4.48***
	(0.64)	(0.61)	(0.37)	(0.97)	(0.93)
Nested bands around break-even:					
Within 2 points of break-even	2.57***	2.30***	0.26	-0.12	2.69***
	(0.66)	(0.64)	(0.44)	(0.38)	(0.57)
Within 5 points of break-even	3.39***	2.75***	0.64	-0.47	3.87***
	(0.65)	(0.63)	(0.39)	(0.81)	(0.86)
Within 10 points of break-even	3.94***	2.68***	1.26***	-0.36	4.30***
	(0.64)	(0.59)	(0.37)	(0.78)	(0.83)
Within 20 points of break-even	4.22***	2.68***	1.54***	-0.32	4.54***
	(0.60)	(0.58)	(0.36)	(0.82)	(0.86)

Note: The table repeats Table 8's five return differences within nested symmetric bands around break-even. Distance is measured at the previous close in points of 100 times log unrealized return; exact zero is unclassified. Bands restrict all groups, retaining original weights. Panels A and B report 240-trading-day returns using CH-4 factor adjustment and DGTW (Daniel–Grinblatt–Titman–Wermers) characteristic adjustment, respectively. Panel C reports position-days for losers and *winners held* and sold in nested bands and nonoverlapping rings, using the CH-4 return sample. Group definitions and returns follow Table 8: held means no net change; sales may be partial. No additional controls or fixed effects enter. Standard errors, clustered by investor and date, are in parentheses. The sample includes approximately 10,000 retail investors of a large Chinese online trading platform between January 2022 and May 2023. *, **, and *** denote significance at the 10%, 5%, and 1% levels.

(Continued)

Table IA-16—Continued

Panel C: Position-days by distance from break-even, CH-4, 240 trading days

	Losers		Winners	
	Held	Sold	Held	Sold
	Number of position-days			
No restriction	2,462,619	239,770	856,779	203,947
Nested bands around break-even:				
Within 2 points of break-even	380,706	103,158	308,067	100,470
Within 5 points of break-even	841,105	176,262	545,115	159,769
Within 10 points of break-even	1,353,609	216,716	706,910	190,526
Within 20 points of break-even	1,899,000	234,936	801,259	201,421
Rings, which partition the baseline:				
Up to 2 points	380,706	103,158	308,067	100,470
2 to 5 points	460,399	73,104	237,048	59,299
5 to 10 points	512,504	40,454	161,795	30,757
10 to 20 points	545,391	18,220	94,349	10,895
Beyond 20 points	563,619	4,834	55,520	2,526

the quarter end, and the resulting loadings apply only to subsequent days. Each daily return therefore uses loadings from the most recent quarter end strictly before that day.

DGTW characteristic adjustment. The daily characteristic-adjusted return is the stock return less the return of its matched portfolio (Daniel et al., 1997). We form portfolios annually at the end of June using sequential $5 \times 5 \times 5$ sorts on size, book-to-market, and momentum across the A-share stocks being assigned. Size is total market capitalization at formation. Book-to-market uses book equity available by formation divided by market equity at the preceding December end; stocks with negative book equity are excluded. Momentum uses returns over months -13 to -1 and requires at least 200 daily prices. Portfolio returns are value-weighted on a buy-and-hold basis: initial weights use free-float market capitalization at formation and subsequently evolve with each stock's own return. Each stock's portfolio assignment remains fixed until the next annual formation.

Horizon returns and aggregation. We compound daily adjusted returns from the trading day after the decision over 5, 20, 60, 120, and 240 trading days and report the resulting horizon returns in percent. If any daily adjusted return in a window is missing, the horizon return is missing and the observation is excluded from that horizon's comparison; we do not fill missing returns. Returns are not winsorized. Aggregation across observations and statistical inference follow the weighting and clustering described in Section 6.1 of the main text.

Table IA-17: Winners' Subsequent Returns with Controls for Prior Returns

Panel A: CH-4, 240 trading days

	Sold, winners	N
	Return after the decision day, percent, at 240 trading days	
No controls: full sample	-3.43***	3,926,055
	(1.00)	
No controls: common sample	-3.37***	3,891,001
	(1.01)	
Controls: prior stock returns, common sample		
Previous trading day	-3.26***	3,891,001
	(1.00)	
Raw: 1, 5, and 21 trading days	-2.80***	3,891,001
	(0.98)	
Benchmark-adjusted: 1, 5, and 21 trading days	-1.89*	3,891,001
	(0.97)	

Panel B: DGTW, 240 trading days

	Sold, winners	N
	Return after the decision day, percent, at 240 trading days	
No controls: full sample	-4.48***	3,758,750
	(0.93)	
No controls: common sample	-4.45***	3,736,555
	(0.93)	
Controls: prior stock returns, common sample		
Previous trading day	-4.34***	3,736,555
	(0.92)	
Raw: 1, 5, and 21 trading days	-3.41***	3,736,555
	(0.92)	
Benchmark-adjusted: 1, 5, and 21 trading days	-2.85***	3,736,555
	(0.90)	

Note: The table adds prior stock-return controls to Table 8's winner comparison. The coefficient is sold minus held for winners, reversing Table 8's sign. N counts observations in the specification. Full- and common-sample baselines distinguish sample changes from controls. All controls use the same complete cases: previous-trading-day returns, raw returns, or DGTW (Daniel–Grinblatt–Titman–Wermers) characteristic-adjusted returns over the horizons shown, measured through the previous close. Purchase indicators and loss interactions remain but are not displayed. Subsequent returns, CH-4 and DGTW benchmarks, and weights follow Table 8. Returns are in percent; no fixed effects enter. Standard errors, clustered by investor and date, are in parentheses. The sample includes approximately 10,000 retail investors of a large Chinese online trading platform between January 2022 and May 2023. *, **, and *** denote significance at the 10%, 5%, and 1% levels.

Price-limit exposure and exclusions. Table IA-15 retains Table 8's groups – *Losers Held*, *Losers Sold*, *Winners Held*, and *Winners Sold* – and uses each benchmark's own return observations and weights at the reported horizon to measure decision-day upper- and lower-limit exposure in Panel A, with CH-4 and DGTW side by side. Sold positions have greater exposure than held positions within both gain/loss states, with upper-limit exposure highest among *Winners Sold* and lower-limit exposure highest among *Losers Sold*. Panels B and C then separately exclude upper-limit closes, lower-limit closes, or either across all groups, preserving the original weights of surviving observations. Panel B uses CH-4 and Panel C uses DGTW, both at the 240-trading-day horizon. Relative to the no-exclusion rows, every *held-minus-sold* difference remains positive and the Odean wedge remains positive and statistically significant, while the loser *held-minus-sold* difference in

Table IA-15's Panel B, under CH-4 at 240 trading days, is statistically insignificant after either-limit days are excluded.

Returns near the break-even point. Table IA-16 restricts Table 8's sale-side return comparisons to nested bands around the break-even point, retaining the position groups, original weights, benchmarks, and horizons. It asks whether the selection comparisons and the *sold loser–winner difference* depend on positions far from their cost basis. Under CH-4 at the main horizon, the *held-minus-sold* differences remain positive and statistically significant for both losing and winning positions, whereas the *sold loser–winner difference* is statistically insignificant in every band; under DGTW, the *sold loser–winner difference* is statistically significant only in the wider bands. Investors therefore continue to sell stocks that subsequently underperform their held alternatives close to the break-even point, but the CH-4 evidence for different subsequent returns after loss sales and gain sales does not extend to these restricted comparisons. Panel C reports position-day counts by band for each return group. Investors' loss sales are more concentrated near break-even than the losing positions they hold: at Table IA-16's Panel C, the within-band counts relative to the unrestricted counts show that 74 percent (= 176,262 / 239,770) of loss sales fall within 5 log points of break-even, compared with 34 percent (= 841,105 / 2,462,619) of held losing position-days.

Trailing-return controls. Table IA-17 adds the stock's raw or DGTW-adjusted trailing returns, measured through the previous close, to the return-group specification underlying Table 8. It retains the subsequent returns, weights, benchmarks, and horizons, and compares a fixed-sample baseline with specifications that include these controls, separating missing-control observations from the role of recent returns. The comparison asks how much of the selection pattern reflects stocks' recent price movements. Under CH-4 at the main horizon, adding DGTW-adjusted trailing returns reduces the magnitude of the winners' negative sold-minus-held difference by about half without fixed effects. Part of the winner selection pattern is thus associated with the stock's recent returns.

Figures and Tables

IA §2 Setting and Sample Construction

Table IA-1. Sample Construction

IA §3 Clicks and Sales

Figure IA-1. Clicks and Sales by Prior Holding Day

Figure IA-2. Mean-Normalized Clicks and Sales by Prior Holding Day

Figure IA-3. Clicks, Position Changes, and Sale Share

Figure IA-4. Mean-Normalized Clicks, Position Changes, and Sale Share

Table IA-2. Clicks on Losing and Winning Positions: Full Specifications

Table IA-3. Clicks on Losing and Winning Positions: Sale-Day Sample

Table IA-4. Clicks on Losing and Winning Positions: Conditional Logit

Table IA-5. Clicks on Losing and Winning Positions: Proportional Hazards

Table IA-6. Sales of Losing and Winning Positions: Full Specifications

Table IA-7. Sales of Losing and Winning Positions: Sale-Day Sample

Table IA-8. Sales of Losing and Winning Positions: Conditional Logit

Table IA-9. Sales on Losing and Winning Positions: Proportional Hazards

Table IA-10. Joint Comparison of Clicks and Sales

Table IA-11. Responses at the Break-Even Point: Polynomial Degree and Bandwidth

IA §4 Prior Clicks and Push Notifications

Table IA-12. Prior Clicks and Sales of Losing and Winning Positions: Full Specifications

Table IA-13. Push Notifications, Clicks, and Sales of Losing and Winning Positions: Full Specifications

Table IA-14. Nonfocal Push Notifications, Clicks, and Sales of Losing and Winning Positions: Full Specifications

IA §5 Subsequent Returns

Table IA-15. Price-Limit Exposure and the Return Comparisons Excluding Limit Days

Table IA-16. Subsequent Returns Near the Break-Even Point

Table IA-17. Winners' Subsequent Returns with Controls for Prior Returns