Inertia of Institutional Investors: Rational or Behavioral?

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Abstract

We examine institutional investors' tendency not to trade a single share of a stock for an extended period. Studying over 37 million investor-stock-quarter observations, we find that institutional investors do not trade a single share in one of four stocks in their portfolio over the reporting periods. Trading costs do not fully explain this inertia behavior. The institutional investors in the highest-inertia quintile group underperform those in the lowest quintile by 0.8% – 1.52% per year. The results suggest that the inertia is driven by a potential behavioral bias, rather than a rational attention allocation strategy aimed at improving overall performance.

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Keywords: inertia, institutional investors, limited attention, fund performance

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1. Introduction

Inaction is a widely observed behavior of economic agents. Literature on household finance shows that retail investors often do not change their portfolio positions for extended periods, often called portfolio inertia (e.g., Agnew, Balduzzi, and Sunden (2003), Madrian and Shea (2001)). Households' portfolio inertia increases risk premia for risky assets due to incomplete risk-sharing among investors (Chien, Cole, and Lustig (2012); Gust and Lopez-Salido (2009)). So far, however, there has been little research investigating institutional investors' inertia in portfolio management. It is unknown whether institutional investors engage in portfolio inertia as household investors do, and, if so, whether such inactions are the result of a strategic investment decision to minimize the cost of information collection and processing (Sims (2003, 2010), Steiner, Stewart, and Matějka (2017)) or just a manifestation of investors' behavioral biases (Gabaix (2019)). Investigating the inertia of institutional investors and the potential reasons for such behaviors is crucial to understand the impact of increasing influence of institutional investors on asset prices in recent years. In this paper, we first document the degree of inertia among institutional investors in managing their portfolios, and evaluate potential reasons for it. Specifically, we assess how institutional investors' inertia is related to their overall future performance.

We first document the extent of institutional investors' inertia in portfolio management by examining stock-holding information in their 13F filings. We consider a stock untraded during a calendar quarter if the number of shares held by an institutional investor has not changed from the number held in the previous calendar quarter. Our analysis shows that institutional investors engage in portfolio inertia to a large degree. On average, they do not trade any shares for one out of four stocks in their portfolio. Moreover, there is great heterogeneity across institutional investors in their inertia behavior. Institutional investors with small portfolios are likely to choose inertia in their stock trading. This behavior is more likely to happen when a stock's portfolio weight is small relative to the overall portfolio value and the investor has a concentrated portfolio.

Regarding stock-level characteristics, inertia stocks are likely to be small and illiquid, suggesting that the transaction cost at least partially contributes to the inertia behavior. Size and illiquidity, however, do not fully explain institutional investors' decision to choose inertia for such stocks. Inertia stocks also have lower volatility, lower profitability, and lower institutional ownership. Interestingly, inertia stocks do not have higher book-to-market ratios. The characteristics of inertia stocks are not consistent with the common belief that institutional investors just buy-and-hold value stocks for extended periods to benefit from the value premium.

In addition, we show that security lending is not the main reason institutional investors choose inertia. Overall, these findings are consistent with the argument that institutional investors have limited attention, and focus on a certain group of stocks for trading (Kacperczyk, Van Nieuwerburgh, and Veldkamp (2016), Van Nieuwerburgh and Veldkamp (2010)), while allowing the possibility of losing money on their non-traded stocks. Another noteworthy finding is that institutional investors sell fewer or buy more shares (rather than choosing inertia) in high-momentum stocks, which is at least partially consistent with the rational motive for inertia.

To further explore the main driver of inertia, we next evaluate how institutional investors' inertia relates to their overall future performance. According to the rational inattention literature (Verrecchia (1982), Geanakoplos and Milgrom (1991), Sims (2003)), inertia should be a strategic decision for institutional investors, based on the calculation of the overall costs and benefits of allocating attention across stock holdings. This idea predicts that inertia should not adversely affect institutional investors' overall performance. In contrast, the literature on behavioral inattention (Gabaix (2019)) posits that inertia is an indication of behavioral bias (e.g., disposition effect for losing stocks, lack of attention) and would be adversely related to future performance. We distinguish between the rational and behavioral motivations for institutional investors' inertia by evaluating how inertia is related to their risk-adjusted returns in the future.

We find that the inertia negatively affects the overall performance of institutional investors in the future. Every quarter, we sort institutional investors into quintile groups based on their inertia level. For each quintile group, we measure annualized alphas from monthly time-series regressions of portfolio returns on the Fama-French three factors (Fama and French (1992)), the momentum factor (Carhart (1997)), the Pastor-Stambaugh liquidity factor (Pastor and Stambaugh (2003)), the Fama-French five factors (Fama and French (2016)), and the Hou-Xue-Zhang q-factors (Hou, Xue, and Zhang (2015)). The portfolios of the institutional investors in the highest inertia quintile generate lower returns than those from the lowest quintile. The return differentials between the high- and low-inertia portfolios range from -0.8% to -1.52% per year.

We also evaluate the performance implication of inertia at the aggregate level, for all institutional investors, with a hypothetical trading strategy. Every quarter, we categorize each institutional investor's stock trades into inertia and active trading groups. We then compute one-month-ahead value-weighted returns on each trading strategy for each fund. Averaging such returns across all funds, we form a time-series of portfolio returns representing inertia and active trading strategies. We measure annualized alphas from time-series regressions of the portfolio

returns representing inertia and active tradings based on various asset pricing models. The results show that the risk-adjusted returns for the inertia trading are negative and statistically significant across all asset pricing models employed. The risk-adjusted returns for the inertia trading are lower than those for the active trading by 5.95% – 7.42% per annum depending on the asset pricing model employed, suggesting that inertia might undermine professional asset managers' performance at the industry level.

To further investigate the impact of inertia on performance, we estimate predictive regressions of each institutional investor's overall risk-adjusted performance on the lagged inertia level, controlling for the institutional investor's other characteristics, such as size, turnover rate, and portfolio concentration level measured by portfolio Herfindahl-Hirschman index (HHI). The estimated model indicates that the inertia level of institutional investors negatively predicts their future performance. As the institutional investors' inertia level increases, it significantly undermines their overall performance. Subsample analyses show that the negative impact of inertia on performance is most pronounced for institutional investors with large asset under management and concentrated portfolios. This result is more consistent with the behavioral explanation, which predicts that inertia is not a strategic choice, but rather signifies slack in institutional investors' portfolio management due to limited attention. Managers of big funds would be more distracted due to various corporate events (Kempf, Manconi and Spalt (2017), Schmidt (forthcoming)). And a concentrated portfolio is likely to reflect investors' initial lack of efficiency in allocating their attention across a large group of stocks.

We then evaluate a possible rational motivation, namely that institutional investors choose inertia to buy-and-hold well-performing stocks. We calculate the inertia ratio for each stock as the fraction of non-traded shares out of the total number of shares held by institutional investors. Every quarter, we sort stocks into quintile portfolios based on the inertia ratio. The portfolio-sorting analysis shows that the risk-adjusted returns are lower for stocks with higher inertia ratios than for those with lower inertia ratios. Stocks in the highest-inertia portfolio are likely to underperform those in the lowest by 3.13% – 6.59% per annum. We also run Fama-MacBeth regressions of the excess returns of stocks, on the inertia ratio and other well-documented firm characteristics associated with stock returns, such as size, book-to-market, momentum, volatility, leverage, and profitability. The analysis results show that there is a negative and significant correlation between the inertia ratios of stocks and future stock returns.

Taken together, the analysis results are more consistent with the behavioral motivation for inertia, suggesting that institutional investors do not choose inertia as a way of improving their performance. The inertia stocks are likely to underperform, hence undermining the overall performance of institutional investors. Although institutional investors are making some profit from actively trading other stocks, the risk-adjusted returns are not big enough to cover the losses from inertia, and the overall performance deteriorates as inertia increases. This result suggests that institutional investors have limited attention, thus focusing on a specific group of stocks in their trading (Van Nieuwerburgh and Veldkamp (2010)). Given the value-destroying effect of the inertia trading strategy, we attribute this evidence to a behavioral bias of institutional investors.

In several robustness checks, we extend the length of the period with no trading to 6 or 12 months to define institutional investors' inertia. The analysis results based on these stringent criteria still show that institutional investors with a high degree of inertia underperform their peers with a lower degree. Our result is also not adversely biased by potential intra-quarter round-trip trading. Puckett and Yan (2011) report that intra-quarter round-trip trading by institutional investors generates higher returns, implying that our result of negative returns for inertia funds is upward biased. The returns for actual inertia would be even more negative than we report in our analysis. We also redo our analysis, omitting institutional investors that frequently engage in round-trip stock trades (Puckett and Yan (2011), Chakrabarty, Moulton, and Trzcinka (2017)). We still find that inertia negatively affects the overall performance of institutional investors. In a series of untabulated analyses, we find our results most pronounced for independent investment advisors, and not driven by a specific sample period (e.g., financial crisis). The result is also robust to excluding institutional investors with a short lifespan in the sample.

The rest of our paper proceeds as follows. Section 2 discusses this paper's contribution to the literature on the trading behaviors of institutional investors. Section 3 develops hypotheses and section 4 describes the data and key variables, with summary statistics. Section 5 provides our analysis results for the determinants of institutional investors' inertia trading. Section 6 presents the analysis results for the impact of inertia on institutional investors' overall performance. Section 7 reports a heterogeneity analysis of fund portfolios' concentration and size. Section 8 reports the asset pricing implications of inertia stocks. Section 9 presents the robustness checks. Section 10 concludes.

2. Contribution to the literature on the trading behaviors of institutional investors

Institutional investors are considered more rational decision-makers compared to retail investors. For example, they are less overconfident (Chuang and Susmel (2011)) and less prone to the disposition effect (O'Connell and Teo (2009)). Institutional investors also respond sensitively to profitable news, correcting prices to their equilibrium level (Froot, Scharfstein, and Stein (1992)). However, an emerging literature shows they are also affected by behavioral biases. Institutional investors chase returns (Grinblatt, Titman, and Wermers (1995)), do not profit from well-documented stock market anomalies, or even exacerbate such anomalies (Lewellen (2011), Edelen, Ince, and Kadlec (2016)). They are also overly distracted by events relating to the firms in which they invest (Kempf, Manconi, and Spalt (2017), Schmidt (forthcoming)), and often herd due to psychological factors.[1] Our paper contributes to the literature by documenting another seemingly irrational behavior of institutional investors, portfolio inertia, a tendency not to trade any shares in some of their holdings for an extended period of time.

As often posited in the household finance literature, inertia could be a manifestation of institutional investors' behavioral bias, such as anchoring or the disposition effect. Lack of attention could also generate portfolio inertia.[2] Alternatively, the inertia could be a strategic investment decision to maximize performance by minimizing the cost of information collection and processing (Sims (2003)).[3] Depending on the underlying mechanism of the inertia behavior of institutional investors, we could infer different implications for their portfolio management practices and their potential impact on asset prices. In this paper, we provide evidence that inertia is related to the underperformance of institutional investors, which is consistent with behavioral bias.

The existing literature on trading behaviors of institutional investors is extensive. A large body of the literature focuses particularly on their trading skills, but empirical evidence is mixed. Starting with the seminal work by Jensen (1968), this literature finds that actively managed mutual funds underperform the passive benchmark, net of fees (Gruber (1996), Carhart (1997), Wermers (2000), Fama and French (2010)). Edelen, Ince, and Kadlec (2016) report that institutional

[1] See, for example, Froot, Scharfstein, and Stein (1992), Lakonishok, Shleifer, and Vishny (1994),Wermers (1999), Sias (2004), Dasgupta, Prat, and Verardo (2011a), and Dasgupta, Prat, and Verardo (2011b).

[2] Investor inattention can influence a wide range of phenomena in the financial markets. See, for example, Dellavigna and Pollet (2009), Hirshleifer and Teoh (2003), Peng and Xiong (2006), Da, Gurun, and Warachka (2014), Cohen and Frazzini (2008), and Hirshleifer, Lim, and Teoh (2009).

[3] Literature on the rational inattention posits that information acquisition and processing is costly and economic agents do not fully extract information about their environment, which often leads to decision-making based on imperfect information (Stigler (1961), Verrecchia (1982), Geanakoplos and Milgrom (1991), Sims (2003)).

investors are not sophisticated enough to exploit traditional asset pricing anomalies, and even contribute to the emergence of mispricing. Studying intra-quarter data on institutional investors' trading, Chakrabarty, Moulton, and Trzcinka (2017) report that most of their short-term investments have negative returns. Another strand of literature argues that institutional investors have superior trading skills. Nofsinger and Sias (1999) document a positive relationship between institutional ownership and stock returns and Puckett and Yan (2011) report that institutional investors consistently generate positive abnormal returns on their intra-quarter round-trip trades. Studying institutional investors' portfolios internationally, Choi et al. (2017) document that those with concentrated portfolios outperform the benchmark because they concentrate their investments on a few countries or sectors, about which they have an informational advantage (Van Nieuwerburgh and Veldkamp (2010)). Kacperczyk, Nieuwerburgh, and Veldkamp (2014) argue that fund managers' skills are time-varying. They find evidence that skilled fund managers have superior stock-picking ability during booms and superior market-timing ability during recessions.[4] Our paper contributes to the literature by finding a novel predictor, portfolio inertia, of the future performance of institutional investors.

In contrast to most studies focusing on institutional investors' trading, our paper focuses on their non-trading activity. To date, stocks seldom traded by institutional investors for an extended period have received little attention, and it is unclear to what extent institutional investors are involved in such behavior. Additionally, there is no study investigating the rationale for such behavior, nor assessing the impact of institutional investors' non-trading behavior on fund-level returns[5] or on the types of stocks they are likely to hold.[6] A recent study by Cremers and Pareek (2016) explores the relation between 'patient capital' and future fund performance. They find that the institutional investors that deviate more from their benchmarks, as measured by 'active share,' outperform their benchmarks only when they trade infrequently.[7] In our paper, we further

[4] Other studies that find persistent investment skills among institutional investors include, among others, Grinblatt and Titman (1992), Elton, Gruber, and Blake (1996), Busse and Irvine (2006), Kosowski et al. (2006), Chen, Jegadeesh, and Wermers (2000), Kacperczyk, Sialm, and Zheng (2005), and Alexander, Cici, and Gibson (2007).

[5] A large body of research has investigated the impact of institutional investors' trading on asset prices. Because of their appetite for large stocks, institutional ownership of large stocks has contributed to the mitigated size of the small stock premium (Gompers and Metrick (2001)). Stocks held by distressed mutual funds are likely to experience a price drop (Wermers (1999)). Other papers on the impact of mutual fund flows on stock prices include, among others, Frazzini and Lamont (2008) and Coval and Stafford (2007). Institutional ownership is associated with an increase in stock volatility (Sias (1996), Bushee and Noe (2000)).

[6] For instance, institutional investors prefer to buy stocks that are big in size (Gompers and Metrick (2001), Ferreira and Matos (2008)) and have superior disclosure practices (Healy, Hutton, and Palepu (1999), Bushee and Noe (2000)).

[7] Our measure of inertia is different from their patient capital measure. Cremers and Pareek (2016) use a weighted-average duration of stock holdings of a portfolio to capture the non-trading tendency of institutional investors. As long as an investor holds a stock, even with marginal buys and sells in intermediate periods, that stock contributes to their

investigate the characteristics of stocks and the types of institutional investors that often engage in the non-trading of stocks in their portfolios.

Unlike the literature on institutional investors, the literature on retail investors has well-documented investors' inactive trading behavior. Analyzing Panel Study of Income Dynamics (PSID) data, Bilias, Georgarakos, and Haliassos (2010) document that up to 70% of stock account owners do not trade any stocks they held in the previous year. The inertia behavior of retail investors is widely observed in retirement plan accounts too.[8] We extend this literature by documenting that professional asset managers, who are more sophisticated investors than the retail investors, also show inertia behavior in managing their portfolios.

3. Hypothesis development

Attention is a scarce resource and investors' decision-making is often affected by their limited attention (Simon (1971)). As discussed above, the inertia of institutional investors could be arising from either rational or behavioral decision-making under conditions of limited attention. The rational inattention literature (e.g., Verrecchia (1982), Geanakoplos and Milgrom (1991), Sims (2003), Kim, Maurer, and Mitchell (2016)) argues that inertia may be a strategic decision for institutional investors. They will calculate the costs and benefits of allocating attention across stock holdings, and optimally allocate their attention to more profitable stocks, temporarily ignoring trading opportunities in other stocks. Although some stocks are seemingly ignored, the profits from the actively traded stocks will outweigh the costs of those non-traded stocks. Thus, the rational inattention theory predicts that inertia will positively influence institutional investors' overall performance.

On the other hand, the literature on behavioral inattention (Gabaix (2019)) argues that inertia is a symptom of behavioral bias. For example, institutional investors may hold their stock positions when the stock price is below the original purchase price (e.g., Wang, Yan, and Yu (2017)). Institutional investors are distracted by major corporate events regarding some stocks in

non-trading measure. However, we characterize those marginal changes as active trading.

[8] Studying TIAA-CREF accountholders, Ameriks and Zeldes (2004) show 73% of investors never altered their portfolio over a decade-long horizon. Additional evidence of inertia among retail investors is provided by Agnew, Balduzzi, and Sunden (2003), Calvet, Campbell, and Sodini (2009), Choi et al. (2002), DellaVigna and Pollet (2009), and Madrian and Shea (2001). Barber and Odean (2000) document over-trading behavior among retail investors at a large discount brokerage company, but this may be because active traders would have been more likely to open brokerage accounts in order to trade more. Kim, Maurer, and Mitchell (2016) provide a theoretical explanation for the inertia behavior. They show that the attention cost (in terms of time) of active stock trading can be significant over the life-cycle because individuals lose valuable time to accumulate job-specific skills in a learning-by-doing fashion.

their portfolio, and lose dearly on other stock holdings in their portfolio (e.g., Kempf, Manconi, Spalt (2017), Schmidt (forthcoming)). The behavioral inattention theory predicts that the inertia of institutional investors will negatively predict their future performance.

We distinguish between the rational and behavioral motivations for institutional investors' inertia by evaluating how inertia is related to the overall future returns of institutional investors.

The rational inattention channel postulates that institutional investors' inertia is a way to improve their overall performance at the expense of some seemingly ignored stocks:

Hypothesis (rational inertia)*: The inertia of institutional investors is positively related to their future returns.*

To the extent that institutional investors are suboptimal in allocating their attention across stocks, or even negligent regarding some stocks, the inertia will be a manifestation of their limited information-processing ability, subsequently hurting their overall returns:

Hypothesis (behavioral inertia): *The inertia of institutional investors is negatively related to their future returns.*

4. Inertia stocks of institutional investors

This section introduces the dataset used in the analysis and key variables related to institutional investors' inertia in their stock trading.

4.1. Data and inertia stocks

The data for this paper come from three different sources. First, we retrieve institutional investors' quarterly stock holdings from the Thomson Financial CDA/Spectrum database of Securities and Exchange Commission (SEC) 13F filings.[9] The SEC requires all institutional investors to report their holdings on Form 13F if they have more than $100 million of securities under management. Institutions have needed to disclose all common stock positions greater than $200,000 or 10,000 shares, every quarter since 1980. Second, we obtain daily and monthly stock returns from CRSP. We exclude firms in the financial (SIC 6000-6999) and regulated utility (SIC 4000-4999) industries and only include US common stocks (CRSP share codes of 10 or 11) traded on the NYSE, Amex, and Nasdaq. To avoid delisting bias, we follow Shumway (1997) and

[9] Instead of focusing on equity mutual funds, we consider all institutional investors in our sample because our main research question is about institutional investors' behavior encompassing mutual funds. The extensive sample also helps us to investigate the overall impact of institutional investors' portfolio inertia on stock returns in later sections.

Shumway and Warther (1999) in adjusting stock returns for delistings. Finally, the accounting information and short interest data come from the Compustat database. The final sample includes 7,813 unique institutional investors with 37,989,220 investor-stock-quarter-level observations, from March 1980 to December 2017.

The key variable in our analysis is institutional investors' inertia in stock trading. We construct a binary variable of stock trading inertia (*Inertia*), in the following way:

$$Inertia_{i,s,t} = \begin{cases} 1, & N_{i,s,t} = N_{i,s,t-1} \\ 0, & N_{i,s,t} \neq N_{i,s,t-1}, \end{cases} \quad (1)$$

where $N_{i,s,t}$ represents the number of shares of firm *s* held by institutional investor *i* at quarter *t*. *Inertia* for each stock held by an institutional investor is hence equal to one if the number of shares held in quarter *t* is unchanged from the number held in the prior quarter *t-1*. To ensure the above definition properly captures the inertia behavior of institutional investors, we carefully examine potential issues arising from the data. The holding information on one reporting date (RDATE) could be associated with multiple filing dates (FDATE) due to, for example, delayed reporting by the institutional investor. We therefore employ the information as of the RDATE. When a stock split happens between the RDATE and the FDATE, Thomson Financial reports the number of shares held by the investors on the latter date. To minimize potential bias arising from this mismatch, we adjust the number of shares to reflect the fact that the split had not happened at the RDATE. To ensure that reused manager identification variables in 13F (*mgrno*) do not bias our main variable, we consider an *mgrno* as a new investor if there is more than a nine-month time lag between its current and previous reports. To the extent that exact round-trip trading (i.e., buying and selling exactly the same number of shares) within the reporting periods is not widespread, our inertia measure captures non-active-trading of institutional investors well.

As an equally weighted measure of inertia at the institutional investor level, we compute the fraction of non-traded stocks out of the total number of stocks held by an institutional investor (*Inertia holdings (EW)*), in the following way:

$$Inertia\ holdings\ (EW)_{i,t} = \frac{\sum_{s \in Q} I_{i,s,t}}{H_{i,t}}, \quad (2)$$

where *i* and *t* index the investor and calendar quarter, respectively. *Q* is the set of firms institutional investor *i* holds shares in, at quarter *t*, $I_{i,s,t}$ is the binary variable (*Inertia*), equal to one if institutional investor *i* does not trade a single share of firm *s* at time *t* and zero otherwise, and $H_{i,t}$ is the number of firms held in the portfolio of institutional investor *i* at quarter *t*. In a similar manner, we compute a value-weighted measure of inertia (*Inertia holdings (VW)*) in the following way:

$$Inertia\ holdings\ (VW)_{i,t} = \sum_{s \in Q} (\omega_{i,s,t-1} \times I_{i,s,t}), \tag{3}$$

where $\omega_{i,s,t-1}$ is the portfolio weight of firm *s* in the portfolio of institutional investor *i* at quarter *t-1*. *Inertia holdings (VW)* represents the ratio of the non-traded stocks' value to the total portfolio value for a given institutional investor.

We also derive the fraction of non-traded shares of a given stock, out of the total shares in that stock held by institutional investors (*Inertia ownership*), in the following way:

$$Inertia\ ownership_{s,t} = \frac{\sum_{i \in K} (O_{i,s,t} \times I_{i,s,t})}{\sum_{i \in K} O_{i,s,t}}, \tag{4}$$

where *K* is the set of institutional investors holding stock *s* at quarter *t*, $O_{i,s,t}$ is the number of shares of firm *s* held by institutional investor *i* at quarter *t*, and $I_{i,s,t}$ is defined as above.

In the analysis, we include characteristics of institutional investors such as the portfolio weight for each stock (*Port. weight*), the size of the stock portfolio, calculated as the natural logarithm of the total market value of all stocks held (*Ln(fund size)*), the concentration of the portfolios, defined as the Herfindahl-Hirschman index based on each stock held in a portfolio (*Port. HHI*), and the portfolio turnover ratio, calculated as the percentage of holdings that have changed from the previous quarter to the current quarter (*Turnover ratio*). We also include variables for stock-level characteristics, to analyze the types of stocks not traded by institutional investors. We include each firm's size, *Ln(ME)*, book-to-market ratio (*BE_ME*), momentum returns in the months -12 to -2 (*Momentum*), Amihud (2002) illiquidity measure (*Amihud illiq.*), leverage ratio (*Firm leverage*), return on equity (*Profitability*), tangibility of assets (*Tangibility*), fraction of shares held by all institutional investors (*Inst_share*), return volatility in the prior 12 months (*Firm vol.*), beta coefficient from the market model of daily returns during the past 12 months (*Firm beta*), standard deviation of residuals from the market model estimated during the past 12 months (*Firm idio. vol.*), and ratio of number of shares sold short to total number of outstanding shares (*Short interest*). To construct the stock-level variables, we mainly follow the procedures detailed in Lemmon, Roberts, and Zender (2008). To control for stock-market-wide shocks, we also include calendar time (monthly or quarterly) fixed effects in the multivariate regressions. Detailed definitions of all variables are given in Appendix A. We winsorize all variables at the 1% level to mitigate the impact of extreme values, except in the case of the return variables.

4.2. Summary statistics

Panel A of Figure 1 illustrates the trend in institutional investors' inertia in their stock trading over time. The vertical axis represents the ratio of inertia, measured as *Inertia holdings (EW)* and *Inertia holdings (VW)*, at the fund level. On average, institutional investors do not trade a single share in about 25% of firms in their portfolios (*Inertia holdings (EW)*) and in stocks comprising around 15% of their portfolio value (*Inertia holdings (VW)*) for more than three months. The graph shows that there were major reshufflings of stock portfolios following the 1987 Black Monday crash and the 2008 Financial Crisis. However, there was a downward trend in inertia behaviors until 2008. This trend may have been due to the emergence and popularity of index-tracking investment vehicles (e.g., ETFs, index funds), which need to rebalance their portfolios as a firm's market capitalization changes, or because of inflows and outflows. Following the 2008 Financial Crisis period, the fraction of inertia reverts to an upward trend. Another notable aspect of this graph is that there is a large degree of heterogeneity in inertia across institutional investors. The 80th percentile line and the 20th percentile line of *Inertia holdings (EW)* are on average a distance of 33 percentage points apart, and this gap does not narrow over time. A similar pattern is observed in the portfolio-value-based inertia measure (*Inertia holdings (VW)*).

Panel B of Figure 1 presents the pattern of the inertia fraction of stock shares held by institutional investors. The vertical axis shows the ratio of non-traded shares out of all shares held by institutional investors for each stock. As with the investor-level inertia (Panel A, Figure 1), there is a downward trend in inertia at the stock level, but on average, 13% - 48% of shares held by institutional investors are not traded in each quarter over the sample period.

Panel A, Table 1 presents the summary statistics for the main variables at the institutional-investor-stock-quarter level. Average *Inertia* is 0.18, implying that the likelihood of an institutional investor choosing inertia over trading is 18% at the investor-stock-quarter level. This likelihood corresponds to the fact that an institutional investor does not trade any shares in one out of four firms in its portfolio, for at least a quarter (average *Inertia holdings (EW)* = 22.2%). Moreover, there is a wide dispersion of inertia across institutional investors, as shown in the percentiles of the *Inertia (trading)* variable. The 10^{th} percentile of *Inertia* is 0%, and the 90^{th} percentile is 100%.

Average *Inertia holdings (EW)* is 22.2%, suggesting that one out of four firms in institutional investors' portfolios are not traded, even a single share, for more than three months at a time. Again, the inertia level is widely dispersed across investors, as shown by the 10^{th} and 90^{th} percentile values, at 0% and 55.6%, respectively. Based on the inertia measure with portfolio

weighting (*Inertia holdings (VW)*), we observe that, on average, about 12.9% of the total portfolio value is not traded by institutional investors for more than three months at a time.

At the stock level, *Inertia ownership* has an average of 26.2%, with 10th and 90th percentile values of 1.2% and 80.8%, respectively. These numbers imply that, on average, 26.2% of shares held by institutional investors are not traded, and this non-trading tendency is widely dispersed across stocks.

As for other variables, at the stock and fund levels, an individual stock's weight in the portfolio (*Port.weight*) has a mean of 0.6%, and the median is 0.1%, implying that institutional investors generally have highly diversified portfolios. At the same time, its distribution is highly skewed, with the 10th percentile at less than 0.1% and the 90th at 1.5%, suggesting that institutional investors tilt their portfolio allocations towards a relatively small group of stocks. The average size of portfolios managed by institutional investors (*fund size*) is $4.27 billion. The portfolio concentration measure based on the Herfindahl-Hirschman index (*Port. HHI*) has a mean of 0.04 and a standard deviation of 0.048. Its distribution is right-skewed with a 10th percentile value of 0.009 and a 90th percentile value of 0.082. This distribution implies that a small group of institutional investors are likely to hold much more highly concentrated portfolios than the majority of institutional investors. The average market capitalization of stocks held by institutional investors is $2.21 billion, and the book-to-market has a mean of 0.59. The average returns for the past 11 months are 16%. The Amihud illiquidity measure has a mean of 0.085. The leverage ratio is, on average, 30.3%. The average net income scaled by book assets (ROE) is 8.9%. The average institutional investor ownership is 66.9% of outstanding shares.[10] The averages of return volatility, beta, and idiosyncratic volatility are 2.6%, 1.085, and 2.3%, respectively. On average, about 4% of a stock's total outstanding shares are shorted over the sample period.

Panel B of Table 1 reports a matrix of Pearson correlations among the variables of analysis. This table suggests that institutional investors are likely to choose inertia (*Inertia*) when they put only a small proportion of the portfolio's weight (*Port. weight*) on a given firm, when the size of the fund is small (*Ln(fund size)*), and when they have a more concentrated portfolio (*Port.HHI*). Regarding stock-level characteristics, non-traded stocks are likely to be small (*Ln(ME)*), have high book-to-market values (*BE_ME*), negative momentum returns (*Momentum*), and lower liquidity (*Amihud illiq.*), to be highly leveraged (*Firm leverage*), and to have lower profitability

[10] Please note that the average institutional ownership at the institutional-investor-stock-quarter level is higher than that at the stock-quarter level (26.2%) because stocks with high institutional ownership will naturally be weighted more heavily when calculating averages at the institutional-investor-stock-quarter level.

(*Profitability*) and higher volatility (*Firm vol.*). Moreover, they have less institutional ownership (*Inst.shares*), more tangible assets (*Tangibility*) and lower short-interest ratios (*Short interest*). Overall, the simple correlation results suggest that institutional investors are likely to choose inertia for stocks with high information uncertainty.

In Panel C of Table 1, we separately report descriptive statistics for inertia trading and active trading, respectively. There is substantial heterogeneity of variables at the investor and stock levels between inertia trades and active trades. Generally, the differences in the variables are consistent with the correlation matrix results.

Panel D of Table 1 presents summary statistics for *Inertia holdings (EW) and Inertia holdings (VW)* by legal type of institutional investor, namely banks (BNK), insurers (INS), investment companies (INV), independent investment advisors (IIA), corporate (private) pension funds (CPS), public pension funds (PPS), university and foundation endowments (UFE), and miscellaneous (MSC). There is a wide dispersion of trading inertia across and within types of institutional investor. For example, insurance companies do not trade a single share, on average, for 40% of the firms in which they invest in a given quarter. Corporate pension funds, public pension funds and university endowments are similarly inactive. Independent investment advisors are the most active group, but they still do not trade a single share of 20% of the firms in their portfolio, on average. Even within the same type of institutional investor, there is substantial dispersion of *Inertia holdings (EW)*. For the most active group (IIA), the 10^{th} and 90^{th} percentile values of *Fund inertia (EW)* are 0% and 50%, respectively. When we group institutional investors based on Bushee's categorization (Bushee (2001) and Bushee and Noe (2000)), the summary statistics for *Fund inertia* are generally consistent with the rationale behind Bushee's categorization. Transient investors (TRA) and quasi-indexers (QIX) have average trading inertia of 14.4% and 24.6%, respectively. Dedicated investors (DED) have a higher average inertia of 38.3%.

5. Determinants of inertia

To characterize the determinants of institutional investors' inertia with regards stock trading, we estimate the following multivariate model:

$$Inertia_{i,s,t} = \beta' X_{i,t-1} + \delta' W_{s,t-1} + \alpha_i + \tau_t + \epsilon_{i,s,t,} \quad (5)$$

where *i* indexes the investors, *s* the stocks, and *t* time at a year-quarter level. The dependent variable (*Inertia*) is a binary variable equal to one if institutional investor *i* does not trade a single share of firm *s* at time *t*, and zero otherwise. We match one-quarter-lagged investor-level ($X_{i,t-1}$) and firm-

level ($W_{s,t-1}$) characteristics to avoid look-ahead bias. We include investor fixed effects (α_i) to control for omitted institutional investor characteristics that are constant over time. We also incorporate time fixed effects (τ_t) at the year-quarter level, so our estimates from the regression model (5) are not biased by any market-wide shocks at a quarter level.

Given the binary nature of the dependent variable, we can use probit, logit or linear probability models. We adopt the linear probability model to avoid biases that could occur when using the probit or logit with investor fixed effects (Chamberlain (1980)). We cluster standard errors at the investor and year-quarter level to correct for potential serial and cross-sectional correlation in the error term.

Table 2, Panel A presents coefficient estimates from the linear probability model of inertia versus active trading on investor- and stock-level characteristics, with varying control variables across columns 1–4. In the baseline specification of column 1, the coefficient estimate on *Port.weight* is negative and statistically significant at the 1% level, implying that institutional investors are likely to choose inertia when the portfolio weight of a stock is small compared to other stocks in their portfolio. Institutional investors with a small fund size are likely to choose inertia, as shown by the negative and significant coefficient on *Ln(fund size)*. The coefficient on *Port.HHI* is positive and significant at the 1% level, suggesting that institutional investors with concentrated portfolios are likely to choose inertia. This result is consistent with Van Nieuwerburgh and Veldkamp (2010), who show that investors with limited information-processing capacity hold more concentrated portfolios, and, according to Table 2's results, they are also likely to choose inertia instead of actively trading securities. Not surprisingly, a fund's turnover ratio (*Turnover ratio*) is negatively correlated with inertia. Across the different specifications in columns 1-4, the above results are all statistically significant. Taken together, this analysis result is consistent with the argument that institutional investors with limited information-processing capacity are likely to choose inertia in their portfolios.

The estimated coefficients on the stock-level controls also reveal interesting characteristics of inertia stocks. Inertia stocks are likely to be small (a negative coefficient on *Ln(ME)*), have low book-to-market ratios (a negative coefficient on *BE_ME*), have high prior momentum returns (a positive coefficient on *Momentum*), and to be illiquid (a positive coefficient on *Amihud illiq.*). Surprisingly, inertia stocks are less profitable (a negative coefficient on *Profitability*) and to a lesser extent held by institutional investors (a negative coefficient on *Inst. shares*). Inertia stocks also have low volatility (negative coefficients on *Firm vol*, *Firm beta,* and *Firm idio. vol.*), suggesting

that investors choose inertia when the level of uncertainty is low. Although some of the characteristics are as expected (e.g., illiquid stocks), the characteristics of inertia stocks are not perfectly consistent with the notion that institutional investors might choose inertia to earn higher returns. The negative (or sometimes insignificant) coefficient on *BE_ME* suggests that institutional investors do not buy-and-hold value stocks to benefit from future appreciation (Edelen, Ince, and Kadlec (2016)). The negative coefficient on *Profitability* implies that institutional investors would not earn much stock price appreciation going forward (Novy-Marx (2013)). Although it is a hard call to assess the return implications of inertia stocks based on this result, the trading-level analysis implies that institutional investors are potentially losing money by doing nothing on unattractive stocks. In the following sections, we formally evaluate investor-level performance in relation to investors' degree of inertia.

To address a potential concern that inertia stocks are actually traded in the market through security lending for short positions,[11] we include short interest as one of the regressors in columns 3 and 4. Interestingly, the coefficient on *Short interest* is negative and significant at the 1% level, suggesting that inertia stocks are likely to have lower short interest, which goes against the security-lending and short-selling channel. This result shows that security lending followed by shorting is not the main driver of the inertia of institutional investors.

Overall, the results in Table 2, Panel A imply that funds with limited attention, proxied by a small size and high portfolio concentration (Van Nieuwerburgh and Veldkamp (2010)), are more likely to choose inertia in their trading of stocks. Those inertia stocks tend to have lower portfolio weights, a small size, lower book-to-market, higher momentum, lower liquidity, lower profitability, lower volatility, and lower institutional ownership.

We further investigate the determinants of inertia over each type of active trading: selling and buying. Panel B of Table 2 replicates Panel A but replacing the dependent variable. In columns 1-4, the dependent variable is a binary variable equal to one if an institutional investor chooses inertia and zero if it chooses to sell the stock. In columns 5-8, the dependent variable is a binary variable equal to one if an institutional investor chooses inertia and zero if it chooses to buy additional shares of the stock. The coefficient estimates on most variables are similar to those in Panel A. A notable finding is that the coefficients on *Momentum* are positive when inertia is considered in contrast to selling the stock (columns 1-4) and it is negative when inertia is

[11] Asquith, Pathak, and Ritter (2005), among others, presume that institutional investors lend shares for short-selling activities in the market.

considered in contrast to buying more shares (columns 5-8). This finding suggests that institutional investors are at least partially rational in choosing inertia for stocks with high momentum returns. By choosing to sell fewer or buy more shares over inertia for high momentum stocks, institutional investors would expect to gain higher returns on such stocks in the future. However, the trading-level analysis does not provide a comprehensive assessment of the impact of inertia on the overall performance of institutional investors. We investigate the fund-level performance implications of inertia in the next section.

6. Inertia and performance of institutional investors

In this section, based on the inertia measures defined above, we evaluate the impact of institutional investors' inertia on their future returns. We first calculate the institutional investor's performance as holdings-based gross returns, defined as a value-weighted average of individual stock returns.[12] Following Cremers and Pareek (2016), we assume that all trades happen just before the holdings reports become public, and weights are based on the market capitalization of the previous month.

Every quarter, the institutional investors' funds are sorted into quintile groups based on their inertia level (*Inertia holdings (VW)*).[13] We rebalance the portfolio monthly, based on the inertia level of the fund. For each quintile group, we measure annualized alphas from monthly time-series regressions of portfolio returns on the Fama-French three factors (Fama and French (1992)), momentum factor (Carhart (1997)), Pastor-Stambaugh liquidity factor (Pastor and Stambaugh (2003)), Fama-French five factors (Fama and French (2016)), and Hou-Xue-Zhang q-factors (Hou, Xue, and Zhang (2015)).

Table 3, Panel A presents the performance of the inertia-based portfolios of funds. Q5 (Q1) denotes the portfolio of stocks with the highest (lowest) inertia measure (*Inertia holdings (VW)*), defined as the value-weighted sum of non-traded stocks out of all stocks held by institutional investors. Q5-Q1 refers to the alphas from a portfolio long in Q5 and short in Q1. The result based on the equal-weighted portfolio of funds shows the excess returns for stocks in the highest quintile inerta to be 13.32%, which is lower than the excess returns for stocks in the lowest quintile of

[12] To avoid bias from funds that hold a small number of stocks, we only consider funds with at least five stock holdings in their portfolio. In a robustness check (untabulated), we only include funds with at least 10 or 20 stocks. The results are qualitatively and quantitatively similar (and available upon request).

[13] The results in Table 2 indicate that the institutional investors put lower weights on the inertia stocks. We hence use *Inertia holdings (VW)* instead of *Inertia holdings (EW)*, which gives the same weight to both inertia and traded stocks, throughout the portfolio-sorting and multivariate regression analyses.

Inertia holdings (VW) (14.38%). The difference, -1.06%, is statistically significant at the 1% level. Similarly, the risk-adjusted annualized return differences between Q5 and Q1 range from -1.25% to -0.8% and are statistically significant at the 1% or 5% level across all asset pricing models. [14] The result that high-inertia funds perform less well than low-inertia funds is not driven by small funds with noisy information. The results based on the value-weighted portfolio of funds show that funds with high inertia generate lower returns than funds with low inertia. The long-short strategy of value-weighted portfolios with high- vs. low-inertia funds generates negative risk-adjusted annualized returns ranging from -1.52% to -0.84%. Overall, the portfolio-sorting results show that funds with high inertia are likely to underperform compared to those with low inertia.

We also evaluate the performance implication of inertia at the aggregate level, for all institutional investors, with a hypothetical trading strategy. Every quarter, we categorize each institutional investors' stock trades into inertia and active trading groups. We then compute one-month-ahead value-weighted returns on each trading strategy, for each institutional investor. Averaging such returns across all funds, we form time-series of equal- or value-weighted portfolio returns, representing the inertia and active trading strategies. We measure the annualized alphas from the time-series regressions of the portfolio returns of the inertia and active trading strategies on the Fama-French three factors (Fama and French (1992)), momentum factor (Carhart (1997)), Pastor-Stambaugh liquidity factor (Pastor and Stambaugh (2003)), Fama-French five factors (Fama and French (2016)), and Hou-Xue-Zhang q-factors (Hou, Xue, and Zhang (2015)).

Panel B of Table 3 reports the risk-adjusted returns of the inertia and active trading strategies of the institutional investors. Columns 1 and 2 show the alphas from the time-series regressions of the inertia and active trading strategies on the risk factors, respectively. Column 3 reports the risk-adjusted returns of a hedged portfolio, long in inertia and short in active-trading stocks. The results show that inertia trading is related to future losses. The annualized excess returns on the inertia and active trading are -1.29% (*t*-statistic=-2.85) and 11.51% (*t*-statistic=4.99), respectively. A portfolio long in inertia stocks and short in active-trading stocks generates an annualized -12.8% (*t*-statistic=-6.73). When adjusted for risk factors, inertia trading still generates lower returns than active trading, and the differences in the returns are statistically significant across all asset pricing models. The annualized return differentials range from -7.42% to -6.86%. In columns 4-6 of Panel A, Table 3, we report the case of the value-weighted portfolios. The results

[14] Although seemingly sizable, the magnitude of excess returns and alphas is in line with those reported in Cremers and Pareek (2016), Table 8 and 9, investigating the impact of patient capital on mutual fund returns.

still show that the inertia trading strategy generates lower returns than an active trading strategy. In other words, the subpar performance of inertia trading is also attributable to large stocks in institutional investors' portfolio holdings. Overall, the results suggest that inertia will undermine institutional investors' performance at the industry level.

Next, we run a predictive regression of the overall stock portfolio performance of institutional investors on their inertia level in stock trading, with a one-month lag, and controlling for institutional-investor-level characteristics. We include institutional investor and year-month fixed effects to control for time-invariant unobserved heterogeneity across investors and market-wide omitted variables, respectively. Standard errors are clustered at the investor and year-month level.

Table 4 presents coefficient estimates from regressions of monthly institutional investors' performance on the fund-level inertia measure (*Inertia holdings (VW)*) and other control variables. In column 1, we evaluate the impact of inertia on simple excess returns of institutional investors. In columns 2-6, we use the risk-adjusted returns from various asset pricing models as the dependent variables. Across all risk-adjusted return measures, the estimated coefficients on *Inertia holdings (VW)* are negative and statistically significant at the 1% level. The coefficient estimate on *Inertia holdings (VW)* suggests that a one-standard-deviation increase in *Inertia holdings (VW)* is associated with a reduction in risk-adjusted returns of about 10% of the average fund performance. This result suggests that institutional investors with high inertia levels are likely to underperform in the future, even after controlling for important fund characteristics such as size, portfolio concentration, and turnover ratio. This result confirms the above findings that inertia trading hurts the overall performance of institutional investors.

Regarding the estimated coefficients on the other controls, one notable finding is that the portfolio concentration (*Port.HHI*) is positively correlated with risk-adjusted returns, implying that institutional investors with less diversified portfolios are likely to generate higher returns (c.f., Choi et al. (2017)).

Overall, the results in Tables 4 and 5 provide clear evidence that institutional investors' inertia is not related to superior performance in the future. This implies that taking no actions on some stocks may not be a result of institutional investors' optimal attention allocation across their holdings. The result supports the *behavioral inertia hypothesis* rather than the *rational inertia hypothesis* as a rationale for the inertia of institutional investors.

7. Portfolio concentration, fund size, and the impact of inertia on fund performance

A rational explanation for inertia predicts that funds with more concentrated portfolios (high *Port.HHI*) will optimally allocate their limited attention to a small group of stocks. Meanwhile, other non-traded stocks should not undermine their overall performance because rational institutional investors would have used their limited attention (carved out by not trading the inertia stocks) to increase their overall performance. On the other hand, the behavioral explanation for inertia holds that inertia is not a strategic choice, but rather signifies a slack in institutional investors' portfolio management. Here, a more concentrated portfolio (high *Port.HHI*) proxies for the limited attention level of investors, and funds with higher *Port.HHI* will be more adversely affected by inertia in terms of their overall performance.

Table 5, Panel A reports the coefficients from regressions of future risk-adjusted fund returns on inertia and other controls, for the subsample with portfolio concentration levels (*Port.HHI*) above the median. Panel B reports the results for the subsample of funds with *Port.HHI* below the median. The results show that the adverse impact of inertia on future returns is stronger for funds with higher portfolio concentration levels, supporting the behavioral explanation for inertia.

We also investigate whether the fund size affects inertia's impact on fund performance. A rational explanation for inertia would claim that big funds were better equipped with more human or physical capital for information collection and processing. Inertia would thus be a strategic choice for them, and they would be able to focus more on their choice of stocks for trading. Thus, inertia would predict superior returns in the future, especially for big funds, ceteris paribus. However, the behavioral explanation would say that the managers of big funds would be more distracted due to various corporate events (Kempf, Manconi and Spalt (2017), Schmidt (forthcoming)). Inertia is a manifestation of ignorance or lack of attention, and its negative impact would be greater for big funds.

Table 6, Panel A presents the coefficient estimates from regressions of future risk-adjusted fund returns on inertia and other controls, for a subsample with fund size (*Ln(fund size)*) above the median. Panel B reports the result for the subsample of funds with *Ln(fund size)* below the median. We observe that the adverse impact of inertia on future returns is stronger for bigger funds, supporting the behavioral explanation for inertia.

Taking the results from Tables 5 and 6 together, we find further evidence that the inertia of institutional investors is driven by behavioral bias rather than optimal attention allocation across their portfolio holdings.

8. Inertia and cross-section of stock returns

We next evaluate the impact of institutional investors' inertia on stock returns. The above-mentioned linear probability regression results indicate that institutional investors are likely to choose inertia on stocks with lower profits, which would lead to lower returns going forward. However, they keep holding small stocks with less volatility, potentially benefiting from the small-stock premium and the low-volatility premium (Ang et al. (2006)). It is thus a hard call to assess the return implications of inertia stocks based on this set of results. To do so, we first examine the relationship between inertia and the cross-section of stock returns, by analyzing the performance of inertia-based portfolios of stocks, sorted by institutional investors' trading inertia.

Every quarter, we sort the stocks into quintile portfolios based on the stock's inertia measure, defined as the ratio of non-traded shares in a given stock to its total number of shares held by all institutional investors (*Inertia ownership)*. We calculate annualized alphas from monthly time-series regressions of the value-weighted returns of the stocks in each portfolio, on the Fama-French three factors (Fama and French (1992)), momentum factor (Carhart (1997)), Pastor-Stambaugh liquidity factor (Pastor and Stambaugh (2003)), Fama-French five factors (Fama and French (2016)), and Hou-Xue-Zhang q-factors (Hou, Xue, and Zhang (2015)).

Table 7 reports the performance of the inertia-based portfolios of stocks. Q5 (Q1) as before denotes a value-weighted portfolio of the stocks with the highest (lowest) inertia measure (*Inertia ownership*). Q5-Q1 refers to alphas from a portfolio long in Q5 and short in Q1. The results show that the excess returns for stocks in the highest quintile of *Inertia ownership* are 3.21% per annum, while those for stocks in the lowest quintile are 8.24%. The difference, -5.03%, is statistically significant at the 5% level. Similarly, the risk-adjusted return differentials between Q5 and Q1 range from -6.59% to -3.13% and are statistically significant at the 1% or 5% level across all asset pricing models. The result, that high-inertia stocks perform worse than low-inertia stocks, is not driven by small stocks with noisy information. Omitting stocks with prices less than $5 at the time of portfolio formation, we find a similar result, that high inertia is correlated with lower risk-adjusted future returns.[15]

[15] To address the potential concern that all the results are driven by microcap stocks (Fama and French (2008), Hou, Xue, and Zhang (2015)), we repeat the test using only NYSE stocks to construct the quintile portfolios for *Inertia*

We next study the impact of inertia on stock returns, controlling for traditional firm characteristics. Table 8 presents coefficient estimates from Fama-MacBeth regressions of excess stock returns on the inertia measure, from 1980:Q2 to 2017:Q4. The dependent variable is the monthly stock returns in excess of the three-month Treasury bill rate. The key independent variable of interest is *Inertia ownership*. We include traditional firm characteristics, such as size, value and momentum returns. We also control for other firm-level characteristics, as in Table 2 for the analysis of institutional investors' inertia. All control variables are lagged by one month to avoid a look-ahead bias. Because the inertia is based on the institutional investors' ownership of stocks, the impact of the inertia on the stock returns is also likely to be influenced by institutional ownership. To this end, we estimate the Fama-MacBeth regressions separately for subsamples with institutional ownership above and below the median.[16]

For the subsample of stocks with institutional ownership above the median, the estimated coefficient on *Inertia ownership* is negative and statistically significant at the 5% or 10% level in all specifications. This result implies that stocks not traded by institutional investors are likely to have lower returns than those that are actively traded. If holding stock shares and choosing inertia for them, institutional investors are likely to have lower returns on those stocks. The coefficient estimate on *Inertia ownership* suggests that a one-standard-deviation increase in *Inertia ownership* is associated with a reduction in returns of about 1% – 1.7% per annum. For the subsample of stocks with institutional ownership below the median, the impact of *Inertia ownership* is reduced, with lower economic and statistical significance. This result signifies the role institutional investors' presence plays in determining the impact inertia has on the cross-section of stock returns. This finding further supports the argument that the inertia of institutional investors is mainly driven by behavioral motivation (*behavioral inertia hypothesis*).

Other firm characteristics have loadings consistent with prior studies in the asset pricing literature. Firm size (*Ln(ME)*) has a negative loading, and the book-to-market ratio (*BE_ME*) a positive loading on stock returns (Fama and French (1992)). Momentum return (*Momentum*) has a positive loading (Jegadeesh and Titman (1993)). Stock volatility (*Firm vol.*) has a negative loading, consistent with findings of Ang et al. (2006). None of the above results change when *Short interest* is included in the regression specification.

ownership. We continue to find that stocks with high inertia have lower future risk-adjusted returns. We do not report these results for brevity reasons, but they are available upon request.

[16] When we do not split our sample based on institutional ownership, we still find a negative relation between *Inertia ownership* and the risk premium, though the statistical significance is reduced. We do not report those results, for brevity reasons, but they are available upon request.

Taken together, our findings suggest that inertia stocks held by institutional investors are likely to underperform, undermining the overall performance of institutional investors. If inertia stocks are likely to underperform in the future, rational institutional investors should have sold, rather than held, them. This evidence goes against the rational motivation for portfolio inertia (*rational inertia hypothesis*), rather supporting a behavioral motivation (*behavioral inertia hypothesis*).

9. Robustness checks

9.1. Inertia over longer periods

In additional analyses, we replicate Panel A of Table 3 using longer-term inertia of institutional investors. We now define the inertia as non-trading behavior exhibited by institutional investors over more than 6 months or 12 months. In Table B1 (Appendix B), we report risk-adjusted returns for portfolios of funds sorted by inertia over 6-month and 12-month periods. In Panel A, with inertia defined over 6 months, Q5 (high-inertia funds) generates lower returns than Q1 (lower-inertia funds) and the return differentials are statistically significant across all asset pricing models at the 1% level. In Panel B, we expand the non-trading period to one year. The results still show that funds with a higher level of inertia generate lower returns than funds with a lower level of inertia.

Taken together, these tests show that our main result of the inertia of institutional investors predicting lower returns is robust to a longer period of inertia, further supporting the idea that inertia is a manifestation of a potential behavioral bias among institutional investors (*behavioral inertia hypothesis*).

9.2. Intra-quarter round-trip trading

A potential concern about measurement error regarding inertia trading arises from the fact that stock-holding information in the 13F dataset is disclosed quarterly, and intra-quarter round-trip trading of institutional investors may be mistakenly labeled as inertia trading based on our definition. Studying intra-quarter trading data provided by Ancerno Ltd.,[17] Puckett and Yan (2011) indeed report that institutional investors engage in round-trip trading within a calendar quarter.

[17] We note that the sample provided by Ancerno Ltd. does not properly represent the population of institutional investors. The firm provided a consulting service to institutional investors aimed at minimizing stock-trading costs, and naturally had more actively trading institutional investors in their clientele base than would be seen across the whole population of institutional investors.

They report, however, that intra-quarter round-trip trading generates higher returns and the return is persistent in the following quarters. Puckett and Yan (2011)'s finding implies that our result of subpar returns on inertia stocks is upwardly biased. Because some inertia trades could have been short-term round-trip trading, generating positive returns, the returns for the actual inertia trading could be even more negative than in our analysis reported above.

To further mitigate potential biases arising from the round-trip trading, we redo our analysis omitting institutional investors who frequently engage in round-trip stock trading. Puckett and Yan (2011) and Chakrabarty, Moulton and Trzcinka (2017) report that independent investment advisors (type IIA) actively trade their shares and are more likely to engage in short-term round-trip trading. We omit this group of investors and replicate our key analysis of fund performance, reporting the results in Panel A of Table B2 in Appendix B. The analysis shows that our key results are not affected when we control for intra-quarter round-trip trades initiated by active investment advisors. Inertia trades predict the subpar performance of institutional investors in subsequent quarters.

9.3. Additional robustness checks

We also study the impact of inertia on the future risk-adjusted return, by legal type of institutional investor (reported in Panels B through F of Table B2 in Appendix B). The analyses indicate that the underperformance of the inertia choice is absent for banks, insurance companies, and investment companies, but is evident for independent investment advisors, pension funds, university endowments, and foundations. Surprisingly, the independent investment advisors (such as mutual funds) are professional asset managers and are paid by their clients to rebalance their portfolios actively. However, their inaction has reduced their clients' wealth. In similar analyses for the Bushee classification of investors (untabulated), we find a negative relationship between the inertia holdings and future risk-adjusted returns only for the transient funds and quasi-indexers, and not for the dedicated funds. The dedicated funds group has the highest inertia among the three but the coefficient on the inertia holdings is not significant. Overall, these results suggest that the value-destroying impact of inertia is not homogeneous and indeed varies across different types of institutional investor.

The inertia is trending downwards during our sample period. One concern might be that our findings stem mainly from the early part of the sample, during which index-tracking investment vehicles were not widespread. We thus split our sample period into two equal subperiods and repeat our analysis from Table 4. In untabulated results, we still find significant results in both subperiods. Also, we continue to find a significant negative relationship between a fund's inertia and its future

portfolio return when we exclude the recent financial crisis period (i.e. from Dec. 2007 to Jun. 2009) from the data.

There are institutional investors that appear in our sample period for only a short period of time. Such funds might go out of business quickly or might be non-professional equity investors. In either case, they might invest differently to typical long-term funds to improve their survival rates. To address potential bias arising from this type of fund, we replicate our analysis only including institutional investors that feature in our sample for at least 1, 2, 3, 4, or 5 years. In untabulated results, we continue to find quantitatively and qualitatively similar results to those reported in Table 4.

10. Conclusion

The main goal of this paper is to examine the extent of institutional investors' inertia in their stock trading and potential reasons for such behavior. Our analysis results show that institutional investors often do not trade any shares of certain stocks in their portfolio for an extended period. On average, institutional investors do not trade even a single share in one out of four firms in their portfolio for more than three months at a time. The inertia stocks are likely to have lower portfolio weights, small market capitalization, lower profitability, lower liquidity, and lower volatility. Interestingly, being an inertia stock is not positively correlated with the book-to-market ratio. These characteristics are not consistent with the common belief that institutional investors buy-and-hold stocks for extended periods to benefit from the value premium.

A fund-level performance analysis shows that institutional investors' inertia is negatively related to their overall future performance. A stock-level performance analysis based on portfolio sorting and the Fama-MacBeth regression also shows that inertia stocks are likely to underperform in the future, undermining the overall performance of institutional investors.

Taken together, these results suggest that institutional investors are not optimally allocating their attention across stocks in their portfolios, which may underperform in the future. These findings are more consistent with the behavioral motivation for such actions, rather than rational inattention. Institutional investors might improve their overall performance by understanding the adverse effect of inertia stocks.

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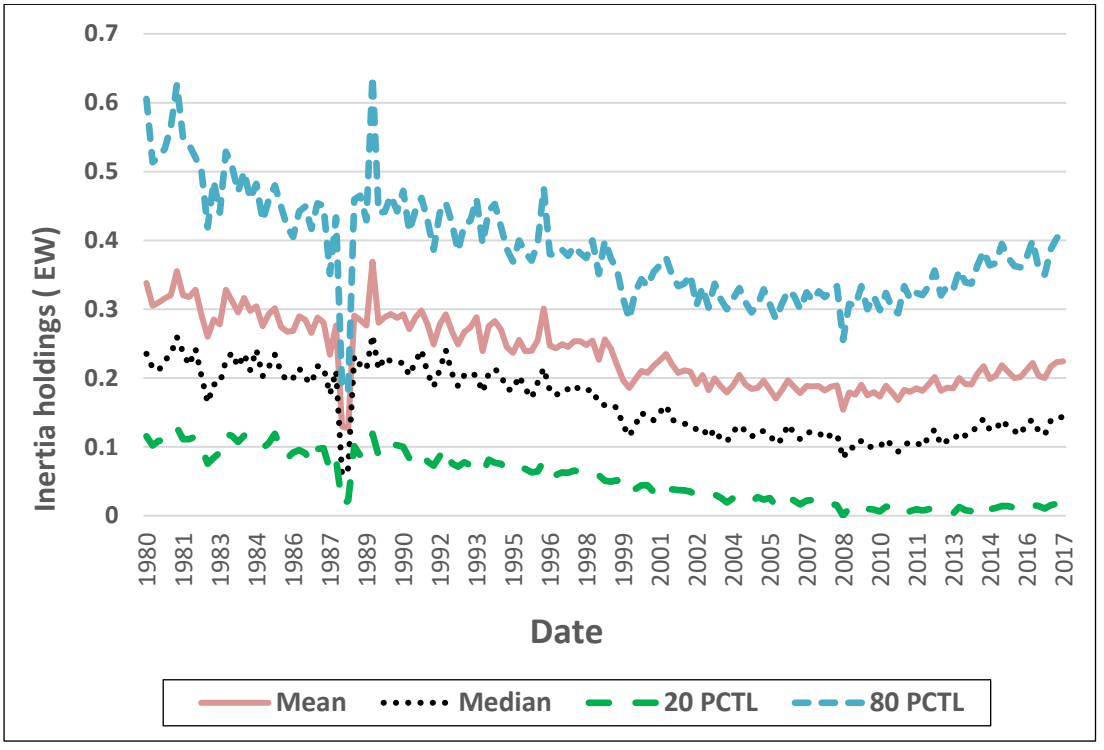
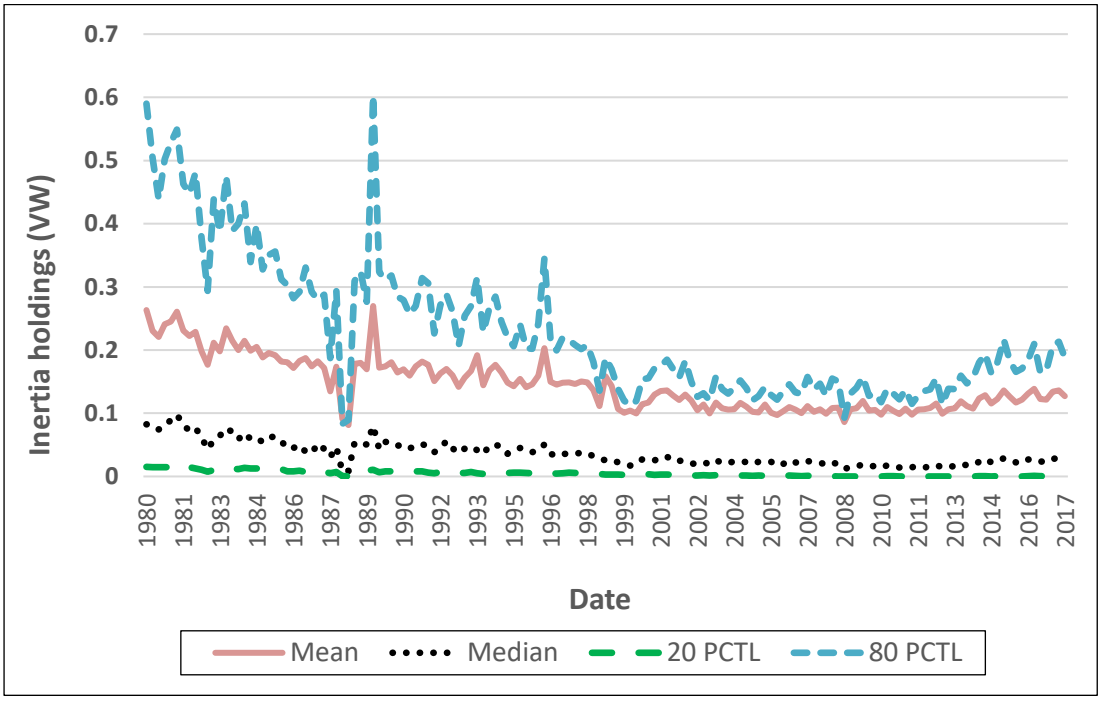
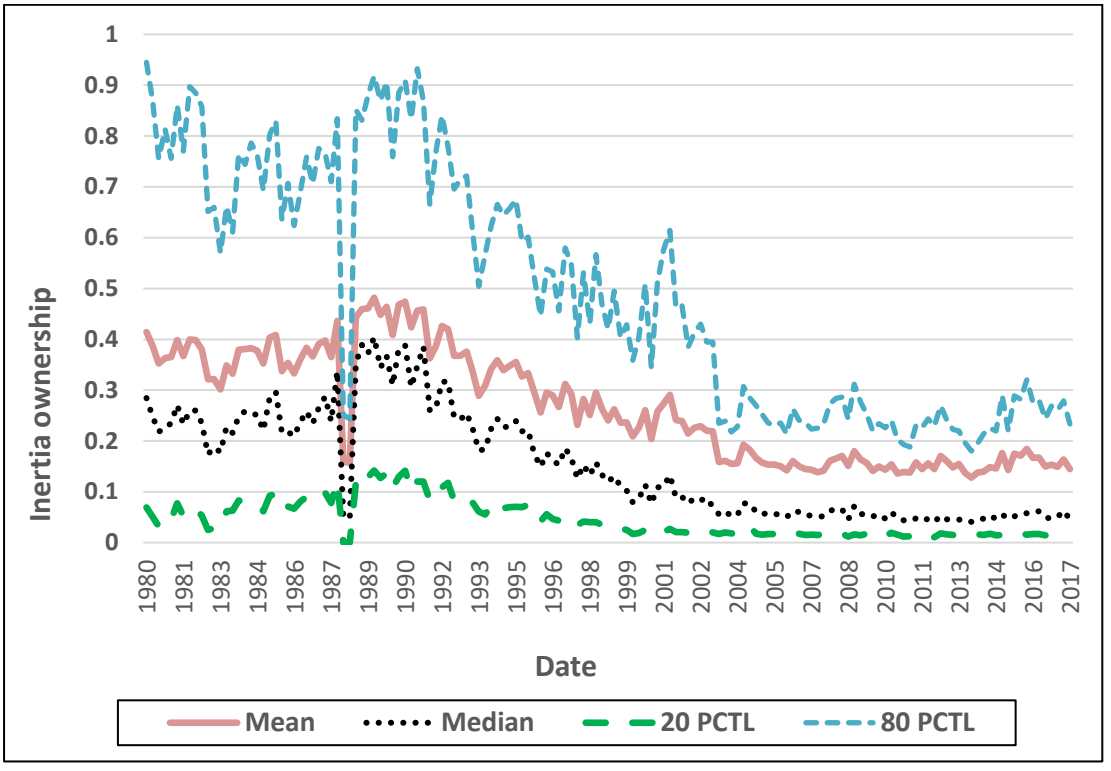
Figure 1: Distribution of institutional investors' inertia in stock trading over time

Panel A: Pattern of inertia fraction of stocks for institutional investors (*Inertia holdings*)





Panel B: Pattern of non-traded shares of stocks by institutional investors (*Inertia ownership*)



Note: These graphs plot the trend of institutional investors' inertia in their stock trading over time. In Panel A, the vertical axis is representing the ratio of inertia measured as *Inertia holdings (EW)* and *Inertia holdings (VW)* at the fund level. *Inertia holdings (EW)* is a sum of non-trade firms scaled by the total number of firms held by an institutional investor at each quarter. *Inertia holdings (VW)* is a value-weighted sum of non-traded firms held by an institutional investor at each quarter. In Panel B, the vertical axis is representing a sum of non-traded shares of a stock scaled by its total shares held by institutional investors (*Inertia ownership*). All variables are formally defined in Appendix. Source: Authors' calculation.

Table 1: Descriptive statistics for the sample

Panel A presents the summary statistics for the sample used in this paper. *Inertia* is a binary variable equal to one if the number of shares of a firm held by an institutional investor in the year-quarter *t* is the same as the number of shares held in the year-quarter *t*-1. *Inertia holdings (EW)* is the number of firms having *Inertia* equal to one scaled by the total number of firms in a portfolio held by an institutional investor at each quarter. *Inertia holdings (VW)* is the weighted-sum of firms having *Inertia* equal to one scaled by the total number of firms in a portfolio held by an institutional investor at each quarter. *Inertia ownership* is the sum of non-traded shares of a stock (*Inertia* =1) scaled by its total shares held by all institutional investors. Definitions of all other variables are provided in Appendix A. The sample includes 7,813 unique institutional investors with 37,989,220 institutional investor-stock-quarter observations from 1980:Q2 to 2017:Q4. Panel B reports the correlation between the fund and firm characteristics used in the analysis. Panel C presents the summary statistics for inertia and active trading subsamples and compares the difference between their averages using Welch's (1947) unpaired unequal variance option of the *t-test*. Panel D reports the summary statistics for fund inertia by legal types of institutional investors and types as defined in Bushee (2001). Statistical significance at the 10%, 5%, and 1% levels is denoted by *, **, and ***, respectively.

Panel A: Summary statistics for the sample

	N	Mean	St.Dev.	10^{th} percentile	Median	90^{th} percentile
Inertia	37,989,220	0.181	0.385	0.000	0.000	1.000
Inertia holdings (EW)	750,719	0.222	0.235	0.000	0.147	0.556
Inertia holdings (VW)	750,719	0.129	0.230	0.000	0.026	0.440
Inertia ownership	1,395,201	0.262	0.299	0.012	0.133	0.808
Port. weight	37,989,220	0.006	0.014	0.000	0.001	0.015
Ln(fund size)	37,989,220	21.996	2.228	18.945	22.067	24.857
Port. HHI	37,989,220	0.040	0.048	0.009	0.025	0.082
Turnover ratio	37,989,220	0.336	0.374	0.060	0.207	0.803
Ln(ME)	37,989,220	21.731	2.122	19.005	21.691	24.635
BE_ME	37,989,220	0.597	0.281	0.240	0.574	0.980
Momentum	37,989,220	0.160	0.391	-0.279	0.150	0.598
Amihud illiq.	37,989,220	0.085	0.459	0.000	0.001	0.050
Firm leverage	37,989,220	0.303	0.198	0.068	0.270	0.588
Profitability	37,989,220	0.089	0.365	-0.128	0.124	0.300
Tangibility	37,989,220	0.269	0.216	0.046	0.209	0.607
Inst. shares	37,989,220	0.699	0.231	0.367	0.733	0.988
Firm vol.	37,989,220	0.026	0.014	0.012	0.022	0.044

Firm beta	37,989,220	1.085	0.503	0.489	1.036	1.744
Firm idio. vol.	37,989,220	0.023	0.013	0.010	0.019	0.040
Short interest	32,607,320	0.040	0.048	0.004	0.022	0.101
Excess returns	750,719	0.0109	0.0569	-0.0524	0.0128	0.0716
Excess ret. (3 factors)	750,719	0.0042	0.0323	-0.0247	0.0030	0.0339
Excess ret. (4 factors)	750,719	0.0041	0.0317	-0.0243	0.0030	0.0335
Excess ret. (PS 5 factors)	750,719	0.0040	0.0322	-0.0242	0.0029	0.0332
Excess ret. (FF 5 factors)	750,719	0.0036	0.0326	-0.0243	0.0022	0.0327
Excess ret. (HXZ q-factor)	750,719	0.0040	0.0321	-0.0247	0.0027	0.0339

Panel B: Correlation matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) *Inertia*	1.000											
(2) *Port. weight*	-0.064***	1.000										
(3) *Ln(fund size)*	-0.102***	-0.337***	1.000									
(4) *Port. HHI*	0.070***	0.239***	-0.249***	1.000								
(5) Turnover ratio	-0.111***	0.053***	-0.203***	0.017***	1.000							
(6) *Ln(ME)*	-0.146***	0.304***	-0.369***	0.100***	-0.037***	1.000						
(7) *BE_ME*	0.062***	-0.098***	0.089***	0.019***	-0.004***	-0.305***	1.000					
(8) *Momentum*	-0.030***	0.030***	0.027***	0.003***	0.026***	0.058***	-0.152***	1.000				
(9) *Amihud illiq.*	0.150***	-0.060***	0.102***	-0.014***	-0.021***	-0.372***	0.166***	-0.106***	1.000			
(10) *Firm leverage*	0.038***	-0.058***	0.031***	0.021***	-0.000	-0.137***	0.737***	-0.105***	0.104***	1.000		
(11) *Profitability*	-0.038***	0.080***	-0.091***	0.034***	-0.020***	0.262***	-0.141***	0.029***	-0.109***	-0.081***	1.000	
(12) *Tangibility*	0.016***	0.002***	0.002***	0.054***	-0.008***	0.030***	0.243***	-0.026***	-0.004***	0.192***	0.020***	1.000
(13) *Inst. shares*	-0.141***	0.004***	-0.107***	-0.077***	0.036***	0.290***	-0.096***	0.025***	-0.353***	-0.052***	0.096***	-0.109***
(14) *Firm vol.*	0.049***	-0.146***	0.181***	-0.072***	0.060***	-0.526***	0.063***	-0.040***	0.291***	0.011***	-0.310***	-0.084***
(15) *Firm beta*	-0.072***	-0.033***	0.020***	-0.020***	0.040***	-0.004***	-0.078***	0.100***	-0.195***	-0.079***	-0.118***	-0.078***
(16) *Firm idio. vol.*	0.070***	-0.161***	0.210***	-0.082***	0.058***	-0.589***	0.059***	-0.018***	0.334***	0.008***	-0.322***	-0.082***
(17) *Short interest*	-0.040***	-0.101***	0.066***	-0.084***	0.052***	-0.235***	-0.044***	-0.039***	-0.084***	-0.021***	-0.112***	-0.075***

	(13)	(14)	(15)	(16)
(14) *Firm vol.*	-0.235***	1.000		
(15) *Firm beta*	0.199***	0.350***	1.000	
(16) *Firm idio. vol.*	-0.294***	0.974***	0.246***	1.000
(17) *Short interest*	0.380***	0.294***	0.289***	0.288***

Panel C: Summary statistics by *Inertia (trading)*

	Inertia trading (*Inertia* = 1)			Active trading (*Inertia* = 0)			Difference (Inertia - Active)
	N	Mean	St.Dev.	N	Mean	St.Dev.	Mean difference
Port. weight	6,887,312	0.004	0.012	31,101,908	0.006	0.014	-0.002***
Ln(fund size)	6,887,312	21.515	2.268	31,101,908	22.103	2.206	-0.588***
Port. HHI	6,887,312	0.047	0.055	31,101,908	0.039	0.046	0.009***
Turnover ratio	6,887,312	0.247	0.314	31,101,908	0.356	0.383	-0.108***
Ln(ME)	6,887,312	21.074	2.278	31,101,908	21.876	2.057	-0.802***
BE_ME	6,887,312	0.634	0.294	31,101,908	0.589	0.278	0.045***
Momentum	6,887,312	0.135	0.396	31,101,908	0.166	0.390	-0.031***
Amihud illiq.	6,887,312	0.231	0.777	31,101,908	0.053	0.343	0.179***
Firm leverage	6,887,312	0.319	0.207	31,101,908	0.299	0.196	0.020***
Profitability	6,887,312	0.060	0.405	31,101,908	0.095	0.355	-0.036***
Tangibility	6,887,312	0.277	0.216	31,101,908	0.268	0.216	0.009***
Inst.shares	6,887,312	0.630	0.262	31,101,908	0.715	0.221	-0.084***
Firm vol.	6,887,312	0.027	0.016	31,101,908	0.025	0.014	0.002***
Firm beta	6,887,312	1.008	0.521	31,101,908	1.102	0.497	-0.094***
Firm idio.vol.	6,887,312	0.024	0.015	31,101,908	0.022	0.013	0.002***
Short interest	5,479,729	0.036	0.046	27,127,591	0.041	0.049	-0.005***

Panel D: Summary statistics for *Inertia holdings* by investor type

		Inertia holdings (EW)					*Inertia holdings (VW)*				
	N	Mean	St.Dev.	10^{th} percentile	Median	90^{th} percentile	Mean	St.Dev.	10^{th} percentile	Median	90^{th} percentile
Bank (BNK)	85,419	0.228	0.209	0.041	0.170	0.469	0.088	0.186	0.002	0.025	0.196
Insurance (INS)	27,714	0.399	0.312	0.027	0.330	0.878	0.325	0.348	0.001	0.155	0.916
Investment co. (INS)	21,549	0.322	0.255	0.034	0.264	0.714	0.240	0.287	0.002	0.106	0.730
Indep. investment adv. (IIA)	547,415	0.198	0.219	0.000	0.127	0.500	0.109	0.205	0.000	0.021	0.345
Corp. pension (CPS)	14,145	0.435	0.321	0.019	0.407	0.906	0.389	0.355	0.003	0.295	0.936
Pub. pension (PPS)	8,049	0.389	0.312	0.011	0.353	0.855	0.265	0.316	0.001	0.101	0.804
Univ. fund (UFE)	5,469	0.469	0.278	0.085	0.469	0.850	0.408	0.323	0.017	0.362	0.907
Miscellaneous (MSC)	40,959	0.219	0.232	0.000	0.143	0.545	0.136	0.227	0.000	0.032	0.457
Bushee classification											
Dedicated (DED)	26,826	0.383	0.281	0.056	0.333	0.813	0.326	0.343	0.003	0.173	0.923
Quasi-indexer (QIX)	490,631	0.246	0.238	0.013	0.174	0.588	0.135	0.234	0.000	0.030	0.469
Transient (TRA)	204,036	0.144	0.193	0.000	0.075	0.373	0.086	0.175	0.000	0.012	0.261
Others	29,226	0.223	0.255	0.000	0.125	0.609	0.153	0.247	0.000	0.036	0.523

Table 2: Determinants of inertia of institutional investors' portfolio

This table presents coefficient estimates from linear probability models of inertia on fund- and stock-level characteristics. In Panel A, the dependent variable is *Inertia* defined as a binary variable equal to one if the number of shares of a firm held by an institutional investor in the year-quarter *t* is same as the number of shares held in the year-quarter *t-1*, and zero otherwise. In Panel B, the dependent variable is similarly defined as *Inertia* but it equals to zero when the number of shares decreases (*Sell*) in columns 1-4 or increases (*Buy*) in columns 5-8. The sample includes 7,813 unique institutional investors with 37,989,220 institutional investor-stock-quarter observations from 1980:Q2 to 2017:Q4. *t*-statistics are reported in parentheses and are based on standard errors adjusted for heteroskedasticity and clustered at the institutional investor and year-quarter level. Adjusted R-squared is reported. The coefficient on the constant term is omitted for brevity. Statistical significance at the 10%, 5%, and 1% levels is denoted by *, **, and ***, respectively.

Panel A: Determinants of choosing *Inertia* over active trading (buying or selling shares)

	Dep. = *Inertia* vs. *Active trading (Buy or Sell)*			
	(1)	(2)	(3)	(4)
Port.weight	-2.656***	-2.659***	-2.886***	-2.891***
	(-27.508)	(-27.599)	(-31.065)	(-31.191)
Ln(fund size)	-0.041***	-0.041***	-0.041***	-0.041***
	(-17.137)	(-17.149)	(-18.066)	(-18.076)
Port.HHI	0.255***	0.255***	0.270***	0.271***
	(7.686)	(7.717)	(8.785)	(8.796)
Turnover ratio	-0.078***	-0.078***	-0.078***	-0.078***
	(-14.555)	(-14.569)	(-17.366)	(-17.370)
Ln(ME)	-0.036***	-0.035***	-0.037***	-0.036***
	(-29.254)	(-29.037)	(-28.047)	(-28.120)
BE_ME	-0.003	-0.002	-0.011***	-0.010***
	(-1.119)	(-0.906)	(-4.890)	(-4.408)
Momentum	0.004***	0.005***	0.006***	0.007***
	(2.812)	(3.397)	(4.048)	(4.652)
Amihud illiq.	0.066***	0.062***	0.069***	0.065***
	(15.150)	(14.909)	(11.804)	(11.919)
Firm leverage	-0.001	-0.002	0.007**	0.007**
	(-0.176)	(-0.756)	(2.571)	(2.307)
Profitability	-0.007***	-0.007***	-0.006***	-0.006***
	(-7.823)	(-8.520)	(-7.380)	(-8.040)
Tangibility	-0.002	-0.002	0.001	0.001
	(-1.130)	(-1.541)	(0.515)	(0.402)
Inst. shares	-0.111***	-0.104***	-0.090***	-0.085***
	(-16.212)	(-16.739)	(-13.721)	(-14.317)
Firm vol.	-1.108***		-1.070***	
	(-13.304)		(-11.745)	
Firm beta		-0.019***		-0.015***
		(-8.894)		(-6.856)

Firm idio. vol.		-0.677***		-0.768***
		(-6.273)		(-6.764)
Short interest			-0.131***	-0.121***
			(-10.392)	(-10.044)
Fund FE	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes
Clustered S.E.	Fund, Year-Quarter	Fund, Year-Quarter	Fund, Year-Quarter	Fund, Year-Quarter
Adj. R-squared	0.202	0.203	0.202	0.203
N	37,989,220	37,989,220	32,607,320	32,607,320

Panel B: Determinants of choosing inertia over each type of active trading

	Dep. = *Inertia* vs. *Sell*				Dep. = *Inertia* vs. *Buy*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Port.weight	-3.316***	-3.318***	-3.597***	-3.601***	-4.726***	-4.737***	-5.107***	-5.119***
	(-29.236)	(-29.334)	(-32.658)	(-32.789)	(-28.551)	(-28.706)	(-32.438)	(-32.576)
Ln(fund size)	-0.055***	-0.055***	-0.054***	-0.054***	-0.057***	-0.056***	-0.059***	-0.059***
	(-16.401)	(-16.418)	(-18.432)	(-18.445)	(-17.619)	(-17.560)	(-18.071)	(-18.049)
Port.HHI	0.298***	0.299***	0.324***	0.325***	0.380***	0.382***	0.417***	0.418***
	(7.289)	(7.319)	(8.643)	(8.654)	(8.755)	(8.804)	(9.753)	(9.768)
Turnover ratio	-0.129***	-0.129***	-0.124***	-0.124***	-0.028	-0.028	-0.047***	-0.047***
	(-25.359)	(-25.360)	(-27.117)	(-27.100)	(-1.584)	(-1.592)	(-3.119)	(-3.133)
Ln(ME)	-0.044***	-0.043***	-0.044***	-0.044***	-0.059***	-0.057***	-0.060***	-0.058***
	(-30.223)	(-30.367)	(-29.086)	(-29.523)	(-36.435)	(-35.368)	(-34.430)	(-33.763)
BE_ME	-0.008***	-0.008***	-0.017***	-0.016***	0.002	0.003	-0.014***	-0.011***
	(-2.974)	(-2.907)	(-6.095)	(-5.789)	(0.410)	(0.844)	(-3.997)	(-3.142)
Momentum	0.015***	0.016***	0.017***	0.018***	-0.011***	-0.010***	-0.006**	-0.005*
	(7.712)	(8.096)	(7.757)	(8.301)	(-4.635)	(-4.066)	(-2.510)	(-1.912)
Amihud illiq.	0.059***	0.055***	0.065***	0.062***	0.039***	0.034***	0.045***	0.040***
	(14.594)	(14.374)	(12.311)	(12.596)	(9.894)	(8.848)	(8.909)	(8.249)
Firm leverage	-0.004	-0.006*	0.006*	0.005	0.007*	0.004	0.017***	0.015***
	(-1.402)	(-1.866)	(1.795)	(1.573)	(1.702)	(0.872)	(4.195)	(3.811)
Profitability	-0.009***	-0.010***	-0.008***	-0.009***	-0.008***	-0.008***	-0.006***	-0.006***
	(-8.065)	(-8.759)	(-8.092)	(-8.862)	(-6.919)	(-7.256)	(-5.709)	(-5.947)
Tangibility	-0.000	-0.001	0.002	0.002	-0.003	-0.004*	0.001	0.000
	(-0.123)	(-0.489)	(1.112)	(0.979)	(-1.465)	(-1.941)	(0.328)	(0.241)
Inst. shares	-0.142***	-0.135***	-0.118***	-0.115***	-0.166***	-0.150***	-0.135***	-0.123***
	(-17.189)	(-18.553)	(-15.187)	(-16.481)	(-18.442)	(-18.520)	(-16.020)	(-16.017)
Firm vol.	-1.753***		-1.622***		-1.101***		-1.045***	
	(-17.017)		(-13.136)		(-10.583)		(-8.904)	

Firm beta		-0.020***		-0.016***		-0.033***		-0.028***
		(-7.527)		(-5.659)		(-12.008)		(-9.813)
Firm idio. vol.		-1.369***		-1.360***		-0.178		-0.302**
		(-10.060)		(-8.822)		(-1.343)		(-2.034)
Short interest			-0.172***	-0.158***			-0.221***	-0.204***
			(-10.288)	(-10.024)			(-11.055)	(-11.044)
Fund FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustered S.E.	Fund, Quarter	Fund, Quarter	Fund, Quarter	Fund, Quarter	Fund, Quarter	Fund, Quarter	Fund, Quarter	Fund, Quarter
Adj. R-squared	0.247	0.247	0.248	0.248	0.291	0.292	0.297	0.297
N	24,957,869	24,957,869	21,242,585	21,242,585	19,918,590	19,918,590	16,844,389	16,844,389

Table 3: The performance of institutional investors sorted by inertia

This table reports the impact of inertia on the performance of institutional investors. Panel A reports the risk-adjusted returns of portfolios of institutional investors funds sorted by the inertia level (*Inertia holdings (VW)*). Every quarter, institutional investors funds are sorted into quintile groups based on the institutional investors' inertia level. Q5 (Q1) denotes a portfolio of funds having the highest (lowest) inertia measures. Panel B reports the performance of hypothetical portfolios representing inertia and active trading strategies. Every quarter, we categorize each institutional investors' stock trades into inertia and active trading groups. We then compute one-month ahead value-weighted returns on each trading strategy. Averaging such returns across all funds, we form a time-series of portfolio returns representing inertia and active trading strategy. We measure annualized alphas from monthly time-series regressions of portfolio returns of quintile of the institutional investors' inertia level and inertia and active tradings on Fama-French 3 factors (Fama and French (1992)), momentum factor (Carhart (1997)), Pastor-Stambaugh liquidity factor (Pastor and Stambaugh (2003)), Fama-French 5 factors (Fama and French (2016)), and Hou-Xue-Zhang q-factors (Hou, Xue, and Zhang (2015)). *t*-statistics are reported in parentheses and are based on standard errors robust to Huber-White robust standard errors. Statistical significance at the 10%, 5%, and 1% levels is denoted by *, **, and ***, respectively.

Panel A: Portfolio of funds sorted by the inertia level

	Equal-weighted portfolio of funds (annual %)						Value-weighted portfolio of funds (annual %)					
	Q1	**Q2**	**Q3**	**Q4**	**Q5**	**(Q5 - Q1)**	**Q1**	**Q2**	**Q3**	**Q4**	**Q5**	**(Q5 - Q1)**
Excess Return	14.38***	13.97***	13.77***	13.73***	13.32***	-1.06***	14.71***	14.42***	14.92***	14.97***	13.78***	-0.93**
	(5.28)	(5.37)	(5.32)	(5.25)	(4.98)	(-2.95)	(5.43)	(5.38)	(5.51)	(5.55)	(5.41)	(-2.02)
Alpha (FF 3-Factors)	6.30***	6.33***	6.13***	5.89***	5.08***	-1.22***	7.35***	6.99***	7.25***	7.25***	6.29***	-1.06**
	(9.19)	(9.97)	(10.16)	(10.06)	(9.20)	(-3.50)	(9.12)	(9.67)	(9.59)	(10.08)	(9.34)	(-2.51)
Alpha (Carhart 4-Factor)	6.08***	6.04***	5.90***	5.74***	5.24***	-0.84***	6.75***	6.41***	6.76***	6.82***	5.81***	-0.94**
	(8.79)	(9.35)	(9.64)	(9.68)	(9.16)	(-2.62)	(8.88)	(9.05)	(9.09)	(9.61)	(8.51)	(-2.34)
Alpha (Pastor-Stambaugh 5-Factor)	5.93***	5.96***	5.89***	5.68***	5.13***	-0.80**	6.67***	6.31***	6.68***	6.76***	5.83***	-0.84**
	(8.52)	(9.12)	(9.46)	(9.45)	(9.03)	(-2.43)	(8.67)	(8.80)	(8.84)	(9.40)	(8.48)	(-2.07)
Alpha (Fama French 5-Factor)	6.02***	5.60***	5.45***	5.24***	4.77***	-1.25***	7.02***	6.59***	6.67***	6.83***	5.50***	-1.52***
	(7.81)	(7.98)	(8.21)	(8.22)	(8.40)	(-3.08)	(7.17)	(7.72)	(7.66)	(8.34)	(7.38)	(-3.11)
Alpha (HXZ q-Factor)	6.23***	5.80***	5.69***	5.57***	5.23***	-1.00**	7.11***	6.60***	6.73***	7.07***	5.67***	-1.44***
	(7.77)	(7.74)	(8.12)	(8.19)	(8.81)	(-2.33)	(6.55)	(6.98)	(7.05)	(8.04)	(7.23)	(-2.66)

Panel B: Performance of hypothetical strategies of inertia and active trading

	Equal-weighted portfolio of funds (annual %)			Value-weighted portfolio of funds (annual %)		
	(1) *Inertia*	(2) *Active*	(3) *(Inertia - Active)*	(4) *Inertia*	(5) *Active*	(6) *(Inertia - Active)*
Excess Return	-1.29***	11.51***	-12.8***	3.61***	13.91***	-10.3***
	(-2.85)	(4.99)	(-6.73)	(3.13)	(5.34)	(-6.52)
Alpha (FF 3-Factors)	-2.53***	4.63***	-7.16***	0.20	6.69***	-6.49***
	(-13.25)	(8.45)	(-13.01)	(0.47)	(9.03)	(-9.35)
Alpha (Carhart 4-Factor)	-2.51***	4.52***	-7.03***	-0.04	6.17***	-6.22***
	(-12.49)	(8.23)	(-12.93)	(-0.10)	(8.68)	(-9.80)
Alpha (Pastor-Stambaugh 5-Factor)	-2.46***	4.40***	-6.86***	0.11	6.06***	-5.95***
	(-12.58)	(7.98)	(-12.74)	(0.26)	(8.44)	(-9.49)
Alpha (Fama French 5-Factor)	-2.87***	4.41***	-7.28***	-0.87**	6.46***	-7.32***
	(-14.85)	(7.16)	(-11.42)	(-2.21)	(7.24)	(-8.81)
Alpha (HXZ q-Factor)	-2.72***	4.70***	-7.42***	-0.70	6.57***	-7.27***
	(-12.11)	(7.36)	(-11.48)	(-1.61)	(6.68)	(-7.76)

Table 4: Do institutional investors perform better by choosing inertia?

This table reports the coefficients estimates from regressions of risk-adjusted returns on fund inertia and fund characteristics. The dependent variables are excess returns of funds based on Fama-French 3 factors (Fama and French (1992)), momentum factor (Carhart (1997)), Pastor-Stambaugh liquidity factor (Pastor and Stambaugh (2003)), Fama-French 5 factors (Fama and French (2016)), and Hou-Xue-Zhang q-factors (Hou, Xue, and Zhang (2015)). The coefficient on the constant term is omitted for brevity. *t*-statistics are reported in parentheses and are based on standard errors robust to heteroskedasticity and clustered at the institutional investor and year-month level. Adjusted R-squared is reported. Statistical significance at the 10%, 5%, and 1% levels is denoted by *, **, and ***, respectively.

	(1) *Excess returns*	(2) *Excess ret.* *(3 factors)*	(3) *Excess ret.* *(4 factors)*	(4) *Excess ret.* *(PS 5 factors)*	(5) *Excess ret.* *(FF 5 factors)*	(6) *Excess ret.* *(HXZ q-factor)*
Inertia holdings (VW)	-0.00155***	-0.00166***	-0.00159***	-0.00161***	-0.00170***	-0.00159***
	(-2.678)	(-3.081)	(-2.976)	(-3.025)	(-3.200)	(-3.025)
Ln(fund size)	0.00036	0.00051**	0.00053**	0.00049**	0.00054**	0.00057**
	(1.214)	(2.255)	(2.499)	(2.419)	(2.489)	(2.411)
Port. HHI	0.01588***	0.01456***	0.01449***	0.01438***	0.01535***	0.01581***
	(3.192)	(3.251)	(3.325)	(3.328)	(3.544)	(3.515)
Turnover ratio	0.00065	0.00065**	0.00065**	0.00058**	0.00063**	0.00063**
	(1.640)	(2.135)	(2.239)	(2.033)	(2.185)	(2.044)
Fund FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Clustered S.E.	Fund, Year-Month	Fund, Year-Month	Fund, Year-Month	Fund, Year-Month	Fund, Year-Month	Fund, Year-Month
Adjusted. R-squared	0.633	0.098	0.098	0.150	0.162	0.106
N	750,719	750,719	750,719	750,719	750,719	750,719

Table 5: Portfolio concentration level (HHI) and the impact of inertia on the future performance of institutional investors

This table replicates Table 4 for samples with portfolio concentration (*Port. HHI*) above and below the median. The dependent variables are excess returns of funds based on Fama-French 3 factors (Fama and French (1992)), momentum factor (Carhart (1997)), Pastor-Stambaugh liquidity factor (Pastor and Stambaugh (2003)), Fama-French 5 factors (Fama and French (2016)), and Hou-Xue-Zhang q-factors (Hou, Xue, and Zhang (2015)). Other controls include *Ln(fund size)*, *Port. HHI*, and *Turnover ratio*. The coefficient on the constant term is omitted for brevity. *t*-statistics are reported in parentheses and are based on standard errors robust to heteroskedasticity and clustered at the institutional investor and year-month level. Adjusted R-squared is reported. Statistical significance at the 10%, 5%, and 1% levels is denoted by *, **, and ***, respectively.

Panel A: The impact of inertia on future performance of institutional investors with HHI above the median

	(1) *Excess returns*	(2) *Excess ret.* *(3 factors)*	(3) *Excess ret.* *(4 factors)*	(4) *Excess ret.* *(PS 5 factors)*	(5) *Excess ret.* *(FF 5 factors)*	(6) *Excess ret.* *(HXZ q-factor)*
Inertia holdings(VW)	-0.00182**	-0.00198***	-0.00189***	-0.00186***	-0.00195***	-0.00186***
	(-2.534)	(-2.956)	(-2.834)	(-2.823)	(-2.951)	(-2.838)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
Fund FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Clustered S.E.	Fund, Year-Month	Fund, Year-Month	Fund, Year-Month	Fund, Year-Month	Fund, Year-Month	Fund, Year-Month
Adjusted. R-squared	0.537	0.081	0.081	0.140	0.160	0.090
N	375,319	375,319	375,319	375,319	375,319	375,319

Panel B: The impact of inertia on the future performance of institutional investors with HHI below the median

	(1) *Excess returns*	(2) *Excess ret.* *(3 factors)*	(3) *Excess ret.* *(4 factors)*	(4) *Excess ret.* *(PS 5 factors)*	(5) *Excess ret.* *(FF 5 factors)*	(6) *Excess ret.* *(HXZ q-factor)*
Inertia holdings(VW)	0.00040	0.00024	0.00018	0.00007	0.00012	0.00024
	(0.833)	(0.591)	(0.456)	(0.186)	(0.323)	(0.611)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
Fund FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Clustered S.E.	Fund, Year-Month	Fund, Year-Month	Fund, Year-Month	Fund, Year-Month	Fund, Year-Month	Fund, Year-Month
Adjusted. R-squared	0.814	0.202	0.201	0.221	0.197	0.205
N	375,319	375,319	375,319	375,319	375,319	375,319

Table 6: Fund size and the impact of inertia on the future performance of institutional investors

This table replicates Table 4 for samples with fund size (*Ln(fund size*) above and below the median. The dependent variables are excess returns of funds based on Fama-French 3 factors (Fama and French (1992)), momentum factor (Carhart (1997)), Pastor-Stambaugh liquidity factor (Pastor and Stambaugh (2003)), Fama-French 5 factors (Fama and French (2016)), and Hou-Xue-Zhang q-factors (Hou, Xue, and Zhang (2015)). Other controls include *Ln(fund size)*, *Port. HHI*, and *Turnover ratio*. The coefficient on the constant term is omitted for brevity. *t*-statistics are reported in parentheses and are based on standard errors robust to heteroskedasticity and clustered at the institutional investor and year-month level. Adjusted R-squared is reported. Statistical significance at the 10%, 5%, and 1% levels is denoted by *, **, and ***, respectively.

Panel A: The impact of inertia on the future performance of institutional investors with fund size above the median

	(1) *Excess returns*	(2) *Excess ret.* *(3 factors)*	(3) *Excess ret.* *(4 factors)*	(4) *Excess ret.* *(PS 5 factors)*	(5) *Excess ret.* *(FF 5 factors)*	(6) *Excess ret.* *(HXZ q-factor)*
Inertia holdings (VW)	-0.00180**	-0.00165**	-0.00171**	-0.00174***	-0.00170**	-0.00178***
	(-2.468)	(-2.408)	(-2.527)	(-2.641)	(-2.499)	(-2.636)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
Fund FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Clustered S.E.	Fund, Year-Month	Fund, Year-Month	Fund, Year-Month	Fund, Year-Month	Fund, Year-Month	Fund, Year-Month
Adjusted. R-squared	0.711	0.167	0.163	0.195	0.169	0.167
N	375,313	375,313	375,313	375,313	375,313	375,313

Panel B: The impact of inertia on the future performance of institutional investors with fund size below the median

	(1) *Excess returns*	(2) *Excess ret.* *(3 factors)*	(3) *Excess ret.* *(4 factors)*	(4) *Excess ret.* *(PS 5 factors)*	(5) *Excess ret.* *(FF 5 factors)*	(6) *Excess ret.* *(HXZ q-factor)*
Inertia holdings (VW)	-0.00040	-0.00091	-0.00088	-0.00094	-0.00096	-0.00075
	(-0.536)	(-1.329)	(-1.283)	(-1.371)	(-1.417)	(-1.136)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
Fund FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Clustered S.E.	Fund, Year-Month	Fund, Year-Month	Fund, Year-Month	Fund, Year-Month	Fund, Year-Month	Fund, Year-Month
Adjusted. R-squared	0.572	0.065	0.066	0.132	0.170	0.079
N	375,340	375,340	375,340	375,340	375,340	375,340

Table 7: Inertia of institutional investors and the cross-section of stock returns

This table examines the profitability of inertia-based trading strategy of stocks sorted by institutional investors' inertia. Every quarter, stocks are sorted into quintile portfolios based on a stock's exposure to the inertia of institutional investors (*Inertia ownership*). *Inertia ownership* is the sum of non-traded shares of a stock (*Inertia*=1) scaled by its total shares held by all institutional investors. Q5 (Q1) denotes a value-weighted portfolio of stocks having the highest (lowest) inertia measures. We report annualized alphas from monthly regressions of value-weighted returns of stocks in each portfolio on Fama-French 3 factor (Fama and French (1992)), momentum factor (Carhart (1997)), Pastor-Stambaugh liquidity factor (Pastor and Stambaugh (2003)), Fama-French 5 factors (Fama and French (2016)), and Hou-Xue-Zhang q-factors (Hou, Xue, and Zhang (2015)). Q5-Q1 refers to alphas from a portfolio long in Q5 (quintile portfolio with highest *Inertia ownership*) and short in Q1 (quintile portfolio with lowest *Inertia ownership*). *t*-statistics are reported in parentheses and are based on Huber-White robust standard errors. Statistical significance at the 10%, 5%, and 1% levels is denoted by *, **, and ***, respectively.

	Full sample						Stocks with a share price > $5					
	Q1	Q2	Q3	Q4	Q5	(Q5 - Q1)	Q1	Q2	Q3	Q4	Q5	(Q5 - Q1)
Excess Return	8.24***	9.4***	8.48***	7.31***	3.21	-5.03**	8.59***	9.14***	8.94***	7.66***	6.16**	-2.44
	(2.99)	(3.69)	(3.23)	(2.67)	(1.01)	(-2.52)	(3.09)	(3.59)	(3.45)	(2.94)	(2.23)	(-1.52)
Alpha (FF 3-Factors)	0.77	1.77**	0.33	-0.70	-5.82***	-6.59***	1.23**	1.27*	1.28*	-0.33	-1.58	-2.81**
	(1.32)	(2.37)	(0.40)	(-0.61)	(-4.25)	(-4.52)	(2.01)	(1.70)	(1.74)	(-0.31)	(-1.54)	(-2.25)
Alpha (Carhart 4-Factor)	0.73	1.62**	0.55	-0.12	-4.33***	-5.07***	1.15*	1.20	1.07	-0.25	-1.38	-2.52*
	(1.21)	(2.12)	(0.63)	(-0.11)	(-3.11)	(-3.42)	(1.81)	(1.61)	(1.36)	(-0.23)	(-1.27)	(-1.90)
Alpha (Pastor-Stambaugh 5-Factor)	0.73	1.54**	0.73	0.18	-4.42***	-5.14***	1.11*	1.14	1.22	-0.05	-1.04	-2.15
	(1.17)	(2.00)	(0.85)	(0.16)	(-3.10)	(-3.42)	(1.72)	(1.49)	(1.56)	(-0.05)	(-0.96)	(-1.63)
Alpha (Fama French 5-Factor)	0.86	0.90	-0.65	-1.87	-4.09***	-4.96***	1.37**	0.17	0.41	-2.28**	-1.51	-2.89**
	(1.43)	(1.17)	(-0.77)	(-1.42)	(-2.96)	(-3.32)	(2.23)	(0.23)	(0.55)	(-2.14)	(-1.36)	(-2.17)
Alpha (HXZ q-Factor)	0.98	1.37	0.21	-1.21	-2.16	-3.13**	1.53**	0.70	0.87	-1.86	-0.71	-2.24
	(1.41)	(1.57)	(0.24)	(-0.86)	(-1.57)	(-2.12)	(2.09)	(0.87)	(0.99)	(-1.61)	(-0.59)	(-1.60)

Table 8: The coefficients estimates from Fama-MacBeth regressions of stock returns on the inertia of institutional investors

This table reports the results from Fama-MacBeth (1973) cross-sectional regressions of excess stock returns on stock's exposure to the inertia of institutional investors (*Inertia ownership*). The dependent variable is the monthly stock returns in excess of the three-month Treasury bill rate. *Inertia ownership* is the sum of non-traded shares of a stock (*Inertia*=1) scaled by its total shares held by all institutional investors. The sample includes 7,813 unique institutional investors with 1,395,201 stock-quarter observations from 1980:Q2 to 2017:Q4. *t*-statistics are reported in parentheses and are based on Newey-West standard errors with 11 lags. The coefficient on the constant term is omitted for brevity. Statistical significance at the 10%, 5%, and 1% levels is denoted by *, **, and ***, respectively.

	Institutional ownership> Median				Institutional ownership< Median			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Inertia ownership	-0.0034*	-0.0036*	-0.0039**	-0.0036*	-0.0025**	-0.0024*	-0.0016	-0.0014
	(-1.765)	(-1.763)	(-2.078)	(-1.853)	(-2.001)	(-1.923)	(-0.950)	(-0.818)
Ln(ME)	-0.0012***	-0.0011***	-0.0012***	-0.0014***	-0.0037***	-0.0037***	-0.0011**	-0.0012**
	(-2.831)	(-2.753)	(-3.185)	(-3.649)	(-7.296)	(-7.444)	(-2.176)	(-2.359)
BE_ME	0.0023	0.0023	0.0003	0.0003	0.0093***	0.0094***	0.0051**	0.0050**
	(1.316)	(1.377)	(0.174)	(0.151)	(5.633)	(5.798)	(2.430)	(2.371)
Momentum	0.0086***	0.0084***	0.0072***	0.0071***	0.0057***	0.0057***	0.0071***	0.0072***
	(4.054)	(3.926)	(3.326)	(3.215)	(3.914)	(3.876)	(3.992)	(4.067)
Amihud illiq.	-0.0058	-0.0065	-0.0101	-0.0109	0.0001***	0.0001***	0.0003***	0.0003***
	(-1.196)	(-1.204)	(-1.479)	(-1.458)	(3.692)	(3.918)	(3.544)	(3.434)
Firm leverage	-0.0013	-0.0017	0.0021	0.0021	-0.0071**	-0.0074**	-0.0011	-0.0014
	(-0.412)	(-0.564)	(0.734)	(0.728)	(-2.331)	(-2.439)	(-0.336)	(-0.408)
Profitability	0.0004	0.0002	0.0010	0.0009	0.0006*	0.0006*	0.0006	0.0006
	(0.299)	(0.124)	(0.614)	(0.552)	(1.844)	(1.662)	(0.953)	(0.936)
Tangibility	-0.0025	-0.0026	-0.0020	-0.0018	-0.0076**	-0.0074**	-0.0065*	-0.0066*
	(-1.115)	(-1.229)	(-0.855)	(-0.797)	(-2.255)	(-2.294)	(-1.797)	(-1.835)
Firm vol.	-0.1983**		-0.1694**		-0.2379***		-0.2363***	
	(-2.250)		(-2.009)		(-3.512)		(-3.295)	
Firm beta		-0.0010		0.0007		-0.0004		0.0003
		(-0.683)		(0.442)		(-0.344)		(0.234)
Firm idio. vol.		-0.1748**		-0.1990**		-0.2364***		-0.2324***

		(-2.400)		(-2.354)		(--3.823)		(-3.396)
Short interest			-0.0630***	-0.0700***			-0.1189***	-0.1220***
			(-4.248)	(-4.689)			(-6.150)	(-5.901)
Adj. R-squared	0.072	0.080	0.077	0.085	0.040	0.044	0.069	0.074
N	697,494	697,494	449,796	449,796	697,707	697,707	318,068	318,068

Appendix A

Table A1: Variable Descriptions

Variable	Description
"Inertia measures"	
Inertia	A binary variable equal to one if the number of shares of a firm held by an institutional investor in the year-quarter *t* is same as the number of shares held in the year-quarter *t*-1.
Inertia holdings (EW)	The ratio of stocks having *Inertia* =1 to the total number of stocks in the portfolio of an institutional investor.
Inertia holdings (VW)	The value-weighted sum of the number of stocks having *Inertia* equal to one in the year-quarter *t* in which weights are based on the value of each stock in the portfolio of an institutional investor in the year-quarter *t-1*.
Inertia owership	The sum of non-traded shares of a stock (*Inertia*=1) in the year-quarter *t* scaled by its total shares held by all institutional investors in the year-quarter *t*.
"Fund characteristics"	
Port. weight	The ratio of a stock's value to the total portfolio value of an institutional investor.
Ln(fund size)	The natural log of the market value of a stock portfolio held by an institutional investor.
Port. HHI	The Herfindahl-Hirschman index (HHI) of stock values for an institutional investor defined as the sum of squared portfolio weight of each stock.
Turnover ratio	The percentage of total value of holdings for an institutional investor that changed from the previous quarter to the current quarter.
"Firm characteristics"	
Ln(ME)	The natural log of the market value of a firm defined as the number of outstanding shares (in 1,000) multiplied by the market price per share.
BE_ME	The book value of equity defined as the total stockholder's equity plus deferred taxes and investment tax credit minus preferred stock value divided by the market value of a firm.
Momentum	Stock returns over the last 11 months (months *t*-12 to *t*-2).

Amihud illiq.	The ratio of the absolute daily return to daily dollar volume multiplied by 1,000,000 and averaged over a month.
Firm leverage	Total debt divided by total market value of assets.
Profitability	ROE, i.e. the ratio of net income over book value of total equity.
Tangibility	Net Property, Plant and Equipment/book assets.
Inst. Shares	A total number of shares held by institutional investors divided by the total number of outstanding shares.
Firm vol.	Standard deviation of daily stock returns over the last 12 months.
Firm beta	The coefficient from the market model, based on regressing daily stock returns on daily returns on the CRSP value-weighted index over the last 12 months.
Firm idio. vol.	The standard deviation of residuals from the market model estimated over the last 12 months.
Short interest	The ratio of the total number of shorted shares to the total numbers of outstanding shares.

"Fund returns"

Excess returns	Value-weighted average of monthly holding-based returns of a fund in excess of the three-month Treasury bill rate.
Excess ret. (3 factors)	Risk-adjusted holding-based excess returns of a fund based on the Fama-French 3 factors model (Fama and French (1992)).
Excess ret. (4 factors)	Risk-adjusted holding-based excess returns of a fund based on the Carhart 4 factors model (Carhart (1997)).
Excess ret. (PS 5 factors)	Risk-adjusted holding-based excess returns of a fund based on the Pastor-Stambaugh 5 factors model (Pastor and Stambaugh (2003)).
Excess ret. (FF 5 factors)	Risk-adjusted holding-based excess returns of a fund based on the Fama-French 5 factors model (Fama and French (2016)).
Excess ret. (HXZ q-factor)	Risk-adjusted holding-based excess returns of a fund based on the Hou-Xue-Zhang q-factors model (Hou, Xue, and Zhang (2015)).

Appendix B

Table B1: Inertia over longer periods and the fund performance

This table replicates Table 3 regarding the impact of inertia on the performance of institutional investors. Panel A reports the risk-adjusted returns of portfolios of institutional investors funds sorted by the inertia over 6 months. Panel B reports the risk-adjusted returns of portfolios of institutional investors funds sorted by the inertia over 1 year. We measure annualized alphas from monthly time-series regressions of portfolio returns of inertia and active tradings on Fama-French 3 factors (Fama and French (1992)), momentum factor (Carhart (1997)), Pastor-Stambaugh liquidity factor (Pastor and Stambaugh (2003)), Fama-French 5 factors (Fama and French (2016)), and Hou-Xue-Zhang q-factors (Hou, Xue, and Zhang (2015)). *t*-statistics are reported in parentheses and are based on standard errors robust to Huber-White robust standard errors. Statistical significance at the 10%, 5%, and 1% levels is denoted by *, **, and ***, respectively.

Panel A: Portfolio of funds sorted by the inertia over two quarters

	Equal-weighted portfolio of funds (annual %)						Value-weighted portfolio of funds (annual %)					
	Q1	**Q2**	**Q3**	**Q4**	**Q5**	**(Q5 - Q1)**	**Q1**	**Q2**	**Q3**	**Q4**	**Q5**	**(Q5 - Q1)**
Excess Return	13.19***	12.42***	12.02***	12.12***	11.71***	-1.48***	13.53***	12.57***	13.08***	13.26***	12.13***	-1.4***
	(4.49)	(4.4)	(4.34)	(4.33)	(4.09)	(-4.53)	(4.63)	(4.4)	(4.58)	(4.6)	(4.39)	(-3.25)
Alpha (FF 3-Factors)	5.18***	4.96***	4.64***	4.59***	3.76***	-1.43***	6.15***	5.42***	5.75***	5.75***	4.81***	-1.35***
	(3.61)	(3.51)	(3.35)	(3.30)	(2.68)	(-4.58)	(4.16)	(3.74)	(3.98)	(3.89)	(3.36)	(-3.36)
Alpha (Carhart 4-Factor)	4.88***	4.46***	4.16***	4.13***	3.65**	-1.23***	5.47***	4.66***	5.17***	5.11***	4.12**	-1.35***
	(2.98)	(2.77)	(2.63)	(2.59)	(2.28)	(-3.81)	(3.28)	(2.84)	(3.16)	(3.05)	(2.55)	(-3.25)
Alpha (Pastor-Stambaugh 5-Factor)	6.20***	5.87***	5.59***	5.62***	5.08***	-1.11***	6.87***	6.08***	6.59***	6.59***	5.62***	-1.24***
	(8.84)	(9.08)	(9.00)	(9.28)	(8.95)	(-3.33)	(8.86)	(8.85)	(9.18)	(9.13)	(8.78)	(-2.87)
Alpha (Fama French 5-Factor)	4.98***	4.60***	4.03***	4.00***	3.60***	-1.38***	5.86***	5.14***	5.46***	5.36***	4.37***	-1.49***
	(4.09)	(3.80)	(3.44)	(3.41)	(3.11)	(-4.42)	(4.57)	(4.06)	(4.35)	(4.20)	(3.57)	(-3.57)
Alpha (HXZ q-Factor)	6.05***	5.64***	5.00***	5.10***	4.99***	-1.07***	6.66***	5.94***	6.34***	6.27***	5.48***	-1.18***
	(8.52)	(8.00)	(7.52)	(7.86)	(8.51)	(-3.30)	(7.79)	(7.36)	(7.82)	(7.89)	(7.78)	(-2.62)

Panel B: Portfolio of funds sorted by the inertia over four quarters

	Equal-weighted portfolio of funds (annual %)						Value-weighted portfolio of funds (annual %)					
	Q1	**Q2**	**Q3**	**Q4**	**Q5**	**(Q5 - Q1)**	**Q1**	**Q2**	**Q3**	**Q4**	**Q5**	**(Q5 - Q1)**
Excess Return	12.96***	13.05***	12.68***	11.98***	11.87***	-1.09***	14.1***	13.02***	12.9***	13.12***	12.41***	-1.7***
	(4.42)	(3.5)	(4.51)	(4.31)	(4.2)	(-3.79)	(4.69)	(3.49)	(4.48)	(4.56)	(4.47)	(-3.28)
Alpha (FF 3-Factors)	4.75***	5.71**	5.02***	4.36***	3.87***	-0.88***	6.45***	6.06**	5.35***	5.41***	4.87***	-1.58***
	(3.31)	(2.43)	(3.56)	(3.10)	(2.77)	(-3.20)	(4.26)	(2.59)	(3.63)	(3.67)	(3.43)	(-3.56)
Alpha (Carhart 4-Factor)	4.41***	4.92*	4.41***	3.88**	3.59**	-0.81***	5.73***	5.13*	4.67***	4.69***	4.14**	-1.59***
	(2.67)	(1.81)	(2.74)	(2.41)	(2.23)	(-2.77)	(3.35)	(1.90)	(2.78)	(2.80)	(2.56)	(-3.45)
Alpha (Pastor-Stambaugh 5-Factor)	5.80***	7.47***	5.84***	5.42***	5.07***	-0.73**	7.21***	7.66***	6.12***	6.17***	5.60***	-1.61***
	(8.62)	(7.77)	(9.08)	(8.67)	(8.60)	(-2.41)	(8.89)	(8.20)	(8.63)	(8.73)	(8.06)	(-3.38)
Alpha (Fama French 5-Factor)	4.45***	5.71***	4.42***	3.62***	3.37***	-1.08***	6.26***	6.17***	4.85***	5.01***	4.24***	-2.02***
	(3.66)	(2.86)	(3.64)	(3.07)	(2.89)	(-3.99)	(4.78)	(3.08)	(3.84)	(3.91)	(3.48)	(-4.48)
Alpha (HXZ q-Factor)	5.60***	6.83***	5.47***	4.72***	4.70***	-0.89***	7.02***	7.30***	5.74***	5.94***	5.29***	-1.73***
	(8.25)	(7.02)	(7.58)	(7.08)	(7.70)	(-3.04)	(8.08)	(7.26)	(7.25)	(7.30)	(7.10)	(-3.61)

Table B2: The impact of inertia on the future performance of institutional investors by legal types

This table replicates Table 4 by the type of institutional investors. The dependent variables are excess returns of funds based on Fama-French 3 factors (Fama and French (1992)), momentum factor (Carhart (1997)), Pastor-Stambaugh liquidity factor (Pastor and Stambaugh (2003)), Fama-French 5 factors (Fama and French (2016)), and Hou-Xue-Zhang q-factors (Hou, Xue, and Zhang (2015)). Other controls include *Ln(fund size)*, *Port.HHI*, and *Turnover ratio*. Panel A reports the coefficients estimates from fund inertia on future performance for all institutional investors except for independent investment advisors (IIA). Panels B, C, D, E, and F report for independent investment advisors (IIA), banks, pension funds/endowment/foundations, insurers, and hedge funds, respectively. *t*-statistics are reported in parentheses and are based on standard errors robust to heteroskedasticity and clustered at the institutional investor and year-month level. Adjusted R-squared is reported. Statistical significance at the 10%, 5%, and 1% levels is denoted by *, **, and ***, respectively.

Panel A: The impact of inertia on future performance of institutional investors (all other types except independent investment advisors, IIA)

	(1) *Excess returns*	(2) *Return (3 factors)*	(3) *Return (4 factors)*	(4) *Return (PS 5 factors)*	(5) *Return (FF 5 factors)*	(6) *Return (HXZ q-factor)*
Inertia holdings (VW)	-0.00103	-0.00126	-0.00133*	-0.00134*	-0.00128*	-0.00115
	(-1.233)	(-1.613)	(-1.747)	(-1.818)	(-1.666)	(-1.528)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
Fund FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Clustered S.E.	Fund, Year-Month	Fund, Year-Month	Fund, Year-Month	Fund, Year-Month	Fund, Year-Month	Fund, Year-Month
Adjusted. R-squared	0.707	0.131	0.133	0.147	0.137	0.143
N	203,304	203,304	203,304	203,304	203,304	203,304

Panel B: The impact of inertia on the future performance of institutional investors (Independent investment advisors, IIA)

	(1) *Excess returns*	(2) *Return (3 factors)*	(3) *Return (4 factors)*	(4) *Return (PS 5 factors)*	(5) *Return (FF 5 factors)*	(6) *Return (HXZ q-factor)*
Inertia holdings (VW)	-0.00165**	-0.00167***	-0.00156**	-0.00159**	-0.00173***	-0.00163**
	(-2.390)	(-2.654)	(-2.464)	(-2.517)	(-2.764)	(-2.547)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
Fund FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Clustered S.E.	Fund, Year-Month	Fund, Year-Month	Fund, Year-Month	Fund, Year-Month	Fund, Year-Month	Fund, Year-Month
Adjusted. R-squared	0.614	0.092	0.092	0.154	0.170	0.100
N	547,415	547,415	547,415	547,415	547,415	547,415

Panel C: The impact of inertia on the future performance of institutional investors (Banks)

	(1) *Excess returns*	(2) *Return (3 factors)*	(3) *Return (4 factors)*	(4) *Return (PS 5 factors)*	(5) *Return (FF 5 factors)*	(6) *Return (HXZ q-factor)*
Inertia holdings (VW)	-0.00040	-0.00091	-0.00088	-0.00094	-0.00096	-0.00075
	(-0.536)	(-1.329)	(-1.283)	(-1.371)	(-1.417)	(-1.136)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
Fund FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Clustered S.E.	Fund, Year-Month	Fund, Year-Month	Fund, Year-Month	Fund, Year-Month	Fund, Year-Month	Fund, Year-Month
Adjusted. R-squared	0.849	0.278	0.274	0.282	0.258	0.285
N	85,419	85,419	85,419	85,419	85,419	85,419

Panel D: The impact of inertia on the future performance of institutional investors (Pension funds, University Endowments, Foundations)

	(1) *Excess returns*	(2) *Return (3 factors)*	(3) *Return (4 factors)*	(4) *Return (PS 5 factors)*	(5) *Return (FF 5 factors)*	(6) *Return (HXZ q-factor)*
Inertia holdings (VW)	-0.00178	-0.00199	-0.00215*	-0.00223**	-0.00207*	-0.00219*
	(-1.329)	(-1.620)	(-1.878)	(-2.068)	(-1.713)	(-1.886)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
Fund FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Clustered S.E.	Fund, Year-Month	Fund, Year-Month	Fund, Year-Month	Fund, Year-Month	Fund, Year-Month	Fund, Year-Month
Adjusted. R-squared	0.622	0.077	0.081	0.105	0.091	0.091
N	68,622	68,622	68,622	68,622	68,622	68,622

Panel E: The impact of inertia on the future performance of institutional investors (Insurers)

	(1) *Excess returns*	(2) *Return (3 factors)*	(3) *Return (4 factors)*	(4) *Return (PS 5 factors)*	(5) *Return (FF 5 factors)*	(6) *Return (HXZ q-factor)*
Inertia holdings (VW)	-0.00040	-0.00091	-0.00088	-0.00094	-0.00096	-0.00075
	(-0.536)	(-1.329)	(-1.283)	(-1.371)	(-1.417)	(-1.136)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
Fund FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Clustered S.E.	Fund, Year-Month	Fund, Year-Month	Fund, Year-Month	Fund, Year-Month	Fund, Year-Month	Fund, Year-Month
Adjusted. R-squared	0.716	0.150	0.150	0.151	0.145	0.151
N	27,714	27,714	27,714	27,714	27,714	27,714

Panel F: The impact of inertia on the future performance of institutional investors (Hedge funds)

	(1) *Excess returns*	(2) *Return (3 factors)*	(3) *Return (4 factors)*	(4) *Return (PS 5 factors)*	(5) *Return (FF 5 factors)*	(6) *Return (HXZ q-factor)*
Inertia holdings (VW)	-0.00040	-0.00091	-0.00088	-0.00094	-0.00096	-0.00075
	(-0.536)	(-1.329)	(-1.283)	(-1.371)	(-1.417)	(-1.136)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
Fund FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Clustered S.E.	Fund, Year-Month	Fund, Year-Month	Fund, Year-Month	Fund, Year-Month	Fund, Year-Month	Fund, Year-Month
Adjusted. R-squared	0.716	0.158	0.154	0.157	0.172	0.162
N	21,549	21,549	21,549	21,549	21,549	21,549