

# BETTING ON THE CEO\*

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## ABSTRACT

We study the extent to which actively managed mutual funds bet on the CEO. Focusing on firms with CEO turnovers in a particular month, we find significantly higher trading activity and exit rates for funds holding this stock in that month compared to all other months and compared to all other firms. The trading activity and exit rates are higher for raided CEOs and serial CEOs, consistent with some funds placing larger bets on CEOs with higher perceived managerial ability. In further tests, we find strong persistency in the tendency for some funds to bet on the CEO, and show that such funds are less likely to be team managed, and have larger portfolio weights on firms in industries where managerial skills are more valuable. They charge higher fees, but despite that, their net returns are similar. Overall, our results uncover that betting on the CEO is an investment strategy of some actively managed mutual funds. We finally show that this strategy is upheld in equilibrium in a model where the motive for trade is differences in opinion about the importance of the CEO.

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## I. Introduction

CEOs matter. This is almost a self-evident truth in corporate finance. The empirical literature, with increasingly better identification techniques, concludes that CEOs affect corporate policies and firm values. Specifically, CEO turnover, CEO experience, CEO characteristics, CEO compensation, CEO this, CEO that, affect corporations.<sup>1</sup> The theoretical literature takes for granted that CEOs matter. In fact, if CEOs did not matter, the large body of theoretical literature on corporate governance would cease to exist because there would be no conflicts of interest between managers and shareholders.<sup>2</sup>

A natural question to ask is whether actively managed mutual funds, who are large owners of publicly traded firms, care who the CEO is and, hence, bet on them?<sup>3</sup> Despite a large body of literature on mutual funds, evidence on whether funds bet on the CEO remain scant.

We examine a sample of 9,914 actively managed mutual funds in the United States from 2004 to 2020. We focus on CEO turnovers to test whether funds change their ownership significantly during a CEO turnover event.

Our focus is best illustrated by the story of Steve Jobs. Arguably the world's most famous CEO, Steve Jobs stepped down as Apple's CEO on August 24, 2011. How did mutual funds who held Apple's stock respond in that quarter? There were 742 distinct mutual funds who held Apple's stock in 2011Q3. For each of these funds, we rank ordered each quarter - percentile rank - by absolute changes in holdings observed in a given quarter among all quarters that the fund held Apple in its portfolio. If the highest change took place in a quarter, the quarter would receive a rank of 100. If the lowest change took place in a quarter, the quarter would receive a rank of 1.

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<sup>1</sup> Bertrand and Schoar (2003) formally document that there is a CEO fixed effect in U.S. corporations, and interpret this as evidence that CEOs have style. Fee, Hadlock and Pierce (2013) opine that CEO fixed effects might pick up firm characteristics (i.e., firm fixed-effects) if managers are not randomly assigned to firms. Tervio (2008), in an assignment model, finds that variation in CEO pay is driven mostly by variation in firm characteristics rather than by variation in CEO abilities. Bennedsen, Perez-Gonzalez and Wolfenzon (2020) is a recent paper confirming that CEOs matter. See Bertrand (2009) for a survey on the importance of CEOs. Interestingly, Ahn et al. (2009) find that there is no CEO fixed effect in Japan. They conclude that CEOs do not matter in Japanese society because their society places less emphasis on individualism than Western society. This is aptly summarized in the Japanese proverb: "The nail that sticks up gets hammered down".

<sup>2</sup> The early seminal papers on agency theory were by Jensen and Meckling (1976), Myers (1977) and Ross (1977).

<sup>3</sup> In 2017, institutional investors held 72% of U.S. equity (De La Cruz, Medina, and Tang 2019), with the top 10 institutional investors owning 26.5% of all U.S. equity assets in December 2016 (Ben-David et al. 2021). Table A.1 in Appendix A shows the assets under management (AUM) and the number of mutual funds from 2004 to 2020 for all funds, all equity funds, all passive funds, and all active funds. Figure A.1 depicts a graphical representation of this table. As can be seen from this graph, the rise of index investing and the consequent death of active mutual funds is exaggerated. The market share of active mutual funds has stabilized at about 40% in recent years.

We noted the rank of the quarter in which Steve Jobs stepped down (2011Q3) for this particular mutual fund. Figure I shows the distribution of the percentile rank of 2011Q3.

The median of this distribution is 83, which is greater than 50 and close to 100. This means that there was an unusual amount of trading activity by mutual funds in the shares of Apple in the quarter Steve Jobs stepped down. Mutual funds did indeed bet on Steve Jobs. However, the more interesting observation is the spread of the distribution. Quite a few actively managed mutual funds in the right tail bet heavily—we refer to them as “jockey funds” in this paper. In contrast, several actively managed mutual funds in the left tail bet little—we refer to them as “horse funds” in this paper.

We ask and answer the following questions in this paper. Is there abnormal trading by active mutual funds around CEO changes? If so, can these be interpreted as bets on the CEO rather than bets on changes in firm policies? Who are the jockey funds and who are the horse funds? More importantly, do jockey funds tend to remain jockey funds and do horse funds tend to remain horse funds, suggesting that betting or not betting on the CEO is not random but a persistent strategy employed by some active mutual funds? What are the characteristics of these funds? Do jockey funds who bet on the CEO put more weight in industries where human capital matters more? Do jockey funds who bet on the CEO tend to be managed by a sole individual rather than a team? Finally, who earns more, jockey funds or horse funds?

We find that there seems to be abnormal trading activity by active mutual funds around CEO turnover events. For all funds holding the CEO turnover stock in the sample, this is true in both the time-series – the trading activity is the highest in the CEO turnover month compared to other months – as well as in the cross-section – the trading activity is the highest in the CEO turnover stock compared to other stocks in the same month. We also find abnormal exit rates, but not entry rate, by active mutual funds around CEO turnover months. This is true in both the time-series – the exit rate is the highest in the CEO turnover month compared to other months – as well as in the cross-section – the exit rate is the highest in the CEO turnover stock compared to other stocks in the CEO turnover month.

Interestingly, for both trading activity and exit rates during the CEO turnover month, both in the time-series and in the cross-section, the abnormal effects are more pronounced for CEOs that are serial CEOs and even more pronounced for raided CEOs. One-time CEOs have been CEOs in only one firm; serial CEOs are CEOs who have been the CEO in more than one firm; we believe they have high perceived talent for them to be employed more than once. Raided CEOs are serial CEOs who depart as CEO from one firm and become a CEO in another firm in less

than 2 years; we believe they have even higher perceived talent for them to be raided by another company (Hayes and Schaeffer, 1999).

We next classify active mutual funds as jockey funds or horse funds or unclassified. A jockey fund is defined to be most reactive to the CEO departure, whereas a horse fund is defined to be the least reactive to the CEO departure. We notice that the change of weights in a CEO turnover stock ranges from 0% to 36.44% in the CEO turnover month suggesting that there are funds that do not react to the CEO departure – the horse funds – and there are funds that react vigorously – the jockey funds. This motivates us to use a cross-sectional ranking. We note the 25th percentile and 75th percentile of the absolute  $\Delta w$  for all the stocks held by a fund in the CEO departure month. For a fund to be classified as a jockey, its absolute  $\Delta w$  for the departure event has to be at least the 75th percentile; for a fund to be classified as a horse, its absolute  $\Delta w$  has to be at most the 25th percentile. For the funds that have the absolute  $\Delta w$  between 25th – 75th percentile, they are unclassified.

The above classification scheme implies that a fund is classified as jockey (funds that bet the most on the CEO) or horse (funds that bet the least on a CEO) or unclassified. For brevity, we refer to this classification as JoH in the month of a CEO departure. We then go on to construct a monthly time series starting from Jan 2004 (from inception year month if the fund is set up after Jan 2004) to Dec 2020. We flag the first JoH classification and carry forward until the next JoH classification. If a fund has more than one classification in the same month, we will take the net classification. This means that we allow a fund to be jockey in some periods and horse in other periods. Finally, as this method produces no classification in the period from Jan 2004 (or later if the fund is set up after Jan 2004) till the first flag, we assume that this period has the same classification as the first flag.

If betting on the CEO is an investment strategy, then we expect persistency: Jockey funds should tend to remain jockey funds and horse funds should tend to remain horse funds over time. Do we see such persistency? We notice very strong persistence. The conditional probability of remaining a jockey once classified as a jockey ranges from 78% to 84%; the conditional probability of remaining a horse once classified as a horse ranges from 84% to 89%. This implies that switches in strategies are uncommon. We do a more rigorous autocorrelation test. Though the coefficients decay as the lags increase, coefficients are largely positive and statistically significant. This suggests that betting on a CEO is indeed an investment strategy – some active mutual funds persistently bet on the CEO (the jockey funds) and some persistently do not bet on the CEOs (the horse funds).

Do jockey funds differ from horse funds? We notice that, compared to horse funds, jockey funds are smaller in size, hold fewer number of securities, and belong to smaller fund families. They are younger. Their flows are smaller.

Bennedsen et al. (2007) suggest that managerial skills are potentially more valuable in certain economic environments, such as innovative industries, and less important in others, such as mature industries. We follow Bennedsen et al. (2007) and use variety of measures to capture industry environments where human capital and managerial skills are more important: Industries with high output growth (nominal and real), high value added growth, high wages, high output growth volatility (nominal and real), high value added growth volatility, high import penetration and high intellectual property rights. We identify these industries every year from the 58 industries classified by the U.S. Bureau of Economic Analysis, and use the sample median as the cutoff between high and low industry classifications. We find that jockey funds have higher portfolio weights than do horse funds in industries where human capital and managerial skills are more important. This is very intuitive. Betting on the CEO can only be a smart strategy when the CEO can make a difference, and these are in industries where CEOs are perceived to be more valuable.

Do jockey funds who bet on the CEO tend to be managed by a sole individual rather than a team? Our tests suggest yes. This is intuitive. Only funds that are managed by individuals are likely to bet on other individuals like the CEO.

Finally, who earns higher returns, jockey funds or horse funds? We notice that though jockey funds charge higher fees than horse funds, but despite that, their net returns are similar. Actually, their net returns are higher for the case of raided CEOs. It seems, therefore, that betting on CEOs with high talent is a winning strategy. If we do benchmark-adjusted returns, jockey funds have lower risk-adjusted returns than horse funds, but they have higher style-adjusted returns.

To summarize, we do not have a clear answer to the question as to who earns more, suggesting that the jockey strategy and the horse strategy are two different investment strategies, like value funds and growth funds, that can coexist in an efficient market.

An alternative interpretation of our results is that funds are betting on firm policies rather than betting on a CEO. If firm policies change because of the CEO, then betting on firm policies is equivalent to betting on the CEO. If, on the other hand, corporate directors decide firm policies and recruit a CEO that can execute this policy, then mutual funds might appear to be betting on the CEO, while in reality they are betting on the firm's policy. Related to the alternative interpretation of our findings as evidence of mutual funds betting on firm policies, we note that

several of our findings raise the bar for whether this alternative explanation is plausible. We find stronger results for serial and raided CEOs, and larger holdings of jockey funds in industries where managers are relatively more important, and stronger bets on CEOs if the funds are managed by individuals rather than teams, provide suggestive evidence that mutual funds bet on the CEO. The alternative interpretation cannot explain these results, unless firm policies change more for serial or raided CEOs, or firm policies are more unique in industries where managers are perceived to be more important, or firm policies change more if the active mutual fund is managed by an individual rather than a team.

Till now we had tacitly assumed that higher trading activity by mutual funds around a CEO turnover occurs because the fund is placing larger bets on the CEO as a cause for the firm's stock return. This need not be so. Given diverse motives for trading, it is unclear whether there would be a one-to-one mapping of the preferences of actively managed mutual funds (specifically, how much importance they place on the CEO) to their trading behavior. Therefore, theoretical guidance is needed. We provide such guidance by outlining a theoretical model at the end of the study.

The main empirical contribution of our study is to the mutual funds literature where we uncover two new strategies – jockey funds persistently betting on the CEO, and horse funds persistently not betting on the CEO. Like value funds and growth funds, these two strategies can coexist in an efficient market. The theoretical contribution is that we can show that this strategy is upheld in equilibrium in a model where the motive for trade is differences in opinion about the importance of the CEO.

Our secondary contribution is to the corporate finance literature on the value of CEOs. A large body of evidence provides causal evidence of the contribution of CEOs to firm value (Johnson et al., 1985; Denis and Denis (1995), Hayes and Schaefer, 1999; Huson, et al., 2004; Pérez-González, 2006; Bennedsen et al., 2007; Nguyen and Nielsen, 2014; and Bennedsen, Pérez-González and Wolfenzon, 2020). In comparison to these studies, we provide evidence on the extent to which actively managed mutual bet on the CEO, and document that such bets are more prevalent when the CEO ability is perceived to be more valuable.

The paper is organized as follows. Section II describes the sources of the data and some relevant summary statistics of the data. Section III shows that the trading activity of active mutual funds around CEO turnovers is abnormal. Section IV describes the algorithm we use to classify funds as jockey funds or horse funds and shows that these two strategies are persistent strategies in some funds. Section V describes the different characteristics of these two types of funds. Section

VI presents results about the profitability of these two strategies. Section VII provides a model that provides a justification for a one-to-one mapping of the preferences of active institutional investors (specifically, how much importance they place on the CEO) to their trading behavior. Section VIII concludes.

## II. Data and descriptive statistics

We obtain monthly and quarterly mutual fund holding data from CRSP Survivor-Bias-Free U.S. Mutual Fund database and link this dataset to Thomson-Reuters Mutual Fund Holdings database using the Mutual Fund Links database (Wermers 2000). Mutual funds registered in the U.S. are required to report quarterly data to the U.S. Securities and Exchange Commission, but some of the funds also voluntarily report monthly data. As documented by several studies (Schwarz and Potter, 2016; Li, 2021), monthly disclosure has become increasingly popular among mutual funds; the portion reporting monthly data increases to 65% of all mutual funds in 2020. To better time the impact on fund holdings of CEO departure events, we use the monthly series as our primary data source. Effectively, we do not include funds that only report quarterly holdings in the period because the monthly change of holdings is absent. However, all results are replicated in the Appendix C using the quarterly series and we confirm that using quarterly data does not change the inferences.

Other fund information including fund returns, total asset value (TNA), fees, flows and other fund characteristics are readily available from the CRSP Mutual Fund database. We identify actively managed mutual funds following the classification scheme developed by Avramov, Cheng and Hameed (2020).<sup>4</sup> Our final sample consists of 9,914 active mutual funds during the period of Jan 2004 to Dec 2020.

Panel A of Table I reports summary statistics for our final sample of 9,914 active mutual funds. All variables reported are averaged over time for each active mutual fund. An average active mutual fund in the period holds 0.88 billion of total net assets (TNA), 141 securities and over 90% of the assets in equity. The average monthly gross return, expense ratio and net return are 0.86%, 0.065% and 0.77%, respectively.

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<sup>4</sup> Specifically, we focus on active U.S. equity funds that have one of the following Lipper objectives codes: “EP”, “G”, “GP”, “P”, “MC”, “MR”, “SG”, “LSE” or “EMN”. We exclude index funds by dropping funds with names that include any of the following strings: “Index”, “Ind”, “Ix”, “Indx”, “S&P”, “500”, “Dow”, “DJ”, “Nasdaq”, “Mkt”, “Barra”, “Wilshire” and “Russell”.

We use daily and monthly common stock return data from the Centre for Research in Security Price (CRSP) database and firm characteristics from quarterly and annual financial statement data from COMPUSTAT database. We obtain annual industry gross domestic product (GDP), value-added, wages & compensations, and import penetration, from the U.S. Bureau of Economic Analysis to identify industries where CEOs are more important. Fast growing industries with high relative wages or highly skilled labor forces are considered to be environments where CEO managerial skills are more valuable, leading to stronger mutual fund reaction by mutual funds who bet on the CEO.

Finally, we obtain the sample CEOs from Execucomp database provided by COMPUSTAT, which collect the data directly from the S&P 1500 plus companies' annual proxy (DEF14A SEC form). We exclude CEO turnovers due to firm bankruptcy. Our sample consists of 3,604 CEOs from 2004 to 2020. We constructed three sub-samples: 3,299 (91.5%) one-time CEOs, who are employed only once; 305 (8.5%) serial CEOs, who are employed by another S&P 1500 company after leaving the original firm; and 93 (2.6%)<sup>5</sup> raided CEOs who are serial CEOs employed by another S&P 1500 company within 2 years after leaving the original firm.<sup>6</sup> Our raided CEOs sample includes CEOs with no non-compete agreements (NCA) and ones with NCA. It would not cause a concern because excluding CEOs with NCAs would only lead to a downward bias to our findings.

We believe the subsets provide intuitive indication of the importance of the CEO. Serial CEOs are considered to be more important CEOs due to their past multiple employments in the S&P 1500 companies. Raided CEOs, a subset of serial CEOs, are even more important since they are raided (they are employed shortly after the previous employment).

Table A.2 in Appendix A shows the number of CEOs with turnovers and the number of active mutual funds holding stocks with turnover events from 2004 to 2020. The percentage of one-time CEOs, serial CEOs and raided CEOs are also shown. As can be seen in this table, though the number of turnover events is steady over the years (order of 200s), the number of serial CEOs and raided CEOs have shown an upward tick in recent years, which is natural given our sample selection.

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<sup>5</sup> Cziraki and Jenter (2021) document that 3.2% of CEOs hires from 1993 to 2012 are CEOs raided from another firm.

<sup>6</sup> We use 2 years as the cut-off because Kini et al. (2021) documents that over the period of 1992 to 2014, 41.7% of the CEOs covered by ExecuComp have employment contracts reported in U.S SEC filings; 62.5% of CEOs with employment contracts have a non-compete agreement (NCA), which prohibits CEOs from competing with the company during employment; the median duration of this non-compete agreement is 1.6 years.



Panel B of Table I reports summary statistics for the active mutual funds which hold the stocks with CEOs turnover events, and Panels C, D, and E report summary statistics for each of the sub-samples of CEO turnover events. Compared to the average active mutual fund in Panel A, the active mutual fund holding stocks with CEO turnover events in Panel B has a slightly higher TNA, holds a higher proportion of assets in equity and holds more securities, and has higher gross return, expense ratio and net returns. The fund characteristics of the active mutual funds holding stocks with CEO turnover events in Panel B and its sub-samples – Panels C, D and E – are similar.

For each of the 58 industries classified by the U.S. Bureau of Economic Analysis, in the period 2004 to 2020, we obtain for every year the nominal output growth, real output growth, value added growth, wages, nominal output growth volatility, real output growth volatility, value added growth volatility, and import penetration. We will use this data later to identify industries where CEOs are more important.

Appendix D describes all the variables used in the paper.

### III. Trading Activity of Active Mutual Funds Around CEO Turnovers

#### III. A. Measure of Trading Activity

The classic measure of holdings used in all investment textbooks is the weight in the investor's portfolio. We denote this by  $w(i,s,t)$ . It is the weight in the portfolio of active institutional investor  $i$ , in stock  $s$ , at time  $t$ . Our primary measure of trading activity is the change in holdings  $\Delta w(i,s,t)$ , which is defined as

$$\Delta w(i,s,t) = \frac{N(i,s,t)P(s,t)}{TNA(i,t)=\sum_{s=1}^S N(i,s,t)P(s,t)} - \frac{N(i,s,t-1)P(s,t-1)}{TNA(i,t-1)=\sum_{s=1}^S N(i,s,t-1)P(s,t-1)} \quad (1)$$

where

$N(i,s,t)$  = number of shares of stock  $s$  held by investor  $i$  at time  $t$ ;

$P(s,t)$  = price per share of stock  $s$  at time  $t$ ; and

$TNA(i,t)$  = Total Net Asset value of investor  $i$  at time  $t$

An important early paper using this metric for holdings is Grinblatt and Titman (1989).

An issue with the above metric for trading activity is that weights may change during a period due to price changes without any buying or selling of shares by the investor. A price-free alternate measure that is used is the change in the proportion of the firm this fund holds,  $\Delta p(i,s,t)$ , where

$$\Delta p(i,s,t) = \frac{N(i,s,t)}{N(s,t)} - \frac{N(i,s,t-1)}{N(s,t-1)} \quad (2)$$

where

$N(i,s,t)$  = number of shares of stock  $s$  held by investor  $i$  at time  $t$ ; and

$N(s,t)$  = number of shares outstanding of firm with stock  $s$  at time  $t$

An important early paper using this metric is Chen, Jegadeesh and Wermers (2000). A disadvantage of this measure is that it focuses on how important the fund is as an owner of this firm rather than how important this firm is in the portfolio of the fund.

We will use the first metric as our primary metric for trading activity. Corresponding results with respect to the  $\Delta p$  metric are shown in Appendix B.

### *III. B. Trading Activity Around CEO Turnover Events*

Figure III shows the magnitude of trading activity by active mutual funds around a CEO turnover month. We require the funds to hold the stock that has the CEO turnover one month prior to the CEO departure month. We compute the change of weight ( $\Delta w$ ) from  $t-1$  to  $t$  for all stocks held by the firm for all  $t$  in the entire sample period. We ranked the absolute  $\Delta w$  for this CEO turnover stock across all the months that the fund has held the stock – Time-Series Rank. We then ranked the absolute  $\Delta w$  for this CEO turnover stock across all stocks held by the fund each month – Cross-Section Rank. Given the CEO departure date at month  $t$ , we constructed a 2-year window, 12 months prior to the departure ( $t-12$ ) to 12 months after the event ( $t+12$ ). The rank percentile is plotted across this window. Panel A shows the Time-Series Ranks whereas Panel B shows the Cross-Section Ranks.

We notice from Figure II that there seems to be abnormal trading activity around CEO turnover events. In Panel A, we observe that for stock  $i$  that has a turnover event in month  $t$ , the trading activity for that stock is the highest in that month  $t$  compared to all other months in the period  $t-12$  to  $t+12$ . Interestingly, the spike is the most pronounced for raided CEOs and then serial CEOs, and there seems to be a smaller spike for one-time CEOs.

The cross-sectional results shown in Panel B of Figure II are stronger. We observe that for stock  $i$  that has a turnover event in month  $t$ , the trading activity for that stock is the highest in that month  $t$  compared to all other stocks traded by this fund in that month  $t$ . Interestingly, the spike is the most pronounced for raided CEOs and then serial CEOs, and there seems to be a small spike for one-time CEOs as well.

Could the funds react to some information updates that coincides with the CEO departure events? In this case, the funds are not reacting to CEO departure but to other information updates. We consider the potential information updates to be either periodic or non-periodic. The most obvious periodic information updates would be company earnings announcement. Thus, we further separate each of the subsamples into months with earning announcement and months without earning announcement to address the concern that the funds are reacting to corporate earnings rather than the news of CEO departure. In Appendix E, we find that the spikes are more prevalent in months without earning announcements, implying spikes from earnings announcements are not corrupting our results. For non-periodic information update, we consider it less of a problem. First, the timing of non-periodic information updates, as well as the timing of CEO departure, is random to the observation window. Second, we consider the 2-year window sufficient in capturing the impact on trading activities induced by these random information updates.

Another concern could be that all investors have unusual activity in the CEO turnover stock in the month of the turnover, not just active mutual funds. To address this concern, we construct this ratio:  $Fund\ Turnover_{s,t} / Total\ Turnover_{s,t}$ , where “Total Turnover” is the share volume of CEO turnover stock  $s$  at time  $t$  by all investors and “Fund Turnover” is the share volume of CEO turnover stock  $s$  traded by mutual funds at time  $t$ . In Appendix F, we find that in the window  $t-12$  to  $t+12$ , this ratio is the highest at time  $t=0$  for all, one-time CEOs, serial CEOs and raided CEO. This suggests that though trading activity of everyone may spike at the month of the turnover, the trading activity of active mutual funds spike even more.

Taken together, Figure II suggests that firms are betting on the CEO. More specifically, the betting behavior is monotonically stronger in more important CEOs (serial CEOs and raided CEOs). The alternative interpretation – mutual funds are betting on changes in firm policies – can only explain these results, if firm policies change more for serial or raided CEOs.

### *III. C. Exit and Entry Around CEO Turnover Events*

Figure III shows the exit and entry rates around CEO turnovers. To compute the exit rate, we require the funds to hold the stock one month prior to the CEO turnover. We then measure the percentage of the funds that completely terminate their holding of the stock – i.e. exit – in the month of the CEO departure. To compute the entry rate, we require the funds not to hold the stock one month prior to the CEO turnovers. We then measure the percentage of the funds that establish a holding of the stock – i.e. entry – in the month of the CEO departure.

We notice from Figure III that there seems to be abnormal exit by active mutual funds from a stock in the month there is a CEO turnover event. As before, the spike is the most pronounced for raided CEOs and then serial CEOs. There seems to be a spike also for one-time CEOs. Interestingly, we do not see abnormal entry by active mutual funds in a stock in the month there is a CEO departure event.

#### **IV. Classification of Funds as Jockey Funds and Horse Funds**

We have established that there is unusual trading activity by active mutual funds around CEO turnover events. So it seems that some actively managed mutual funds care about who the CEO is. However, the more important question is not whether the typical fund cares who the CEO is, but to what extent they care. Who cares more and who cares less?

To further exploit the heterogeneity of the betting behavior, we now classify active mutual funds as jockey funds, horse funds or unclassified funds. A jockey fund is defined to be the most reactive to the CEO departure, whereas a horse fund is defined to be the least reactive to the CEO departure.

This is how we classified funds as jockey funds and horse funds in the month of a CEO departure. We use a cross-sectional ranking. We note the 25th percentile and 75th percentile of the absolute  $\Delta w$  for all the stocks held by a fund in the CEO departure month. For a fund to be classified as a jockey, its absolute  $\Delta w$  for the departure event has to be at least the 75th percentile; for a fund to be classified as a horse, its absolute  $\Delta w$  has to be at most the 25th percentile. For the funds that has the absolute  $\Delta w$  between 25th – 75th percentile, they are unclassified. The reason to use absolute  $\Delta w$ , rather than signed  $\Delta w$ , is that we consider the direction of the change unimportant in our setting. Our goal is to identify funds responsive to the CEOs and funds not responsive. If the fund considers the CEOs to be important (either constructive or destructive), the fund is considered as jockey; if the fund considers the CEOs to be not important, the fund is considered as horse.

The above algorithm implies that a fund is classified as jockey or horse or unclassified – called a JoH classification – in the month of a CEO departure. We then go on to construct a monthly time series starting from Jan 2004 (from inception year month if the fund is set up after Jan 2004) to Dec 2020. We flag the first JoH classification and carry forward until the next JoH classification. If a fund has more than one classification in the same month, we will take the net classification.

This means that we allow a fund to be jockey in some periods and horse in other periods, although the switch is rare in our sample as shown in a later test.

Table II presents some summary statistics of jockey funds and horse funds. Panel A presents the number of observations and the summary statistics of change of weight ( $\Delta w$ ) for the jockey and horse classifications. We notice that we have 186,865 fund-event level observations. Of these, most (168,861 – about 90%) are for one-time CEOs. Only a few of these are raided CEOs (5,201 – about 3%), suggesting that talent is scarce amongst CEOs.

We also notice that the absolute change of weights in a CEO turnover stock ranges from 0% to 36.44% suggesting that there are funds that do not react to the CEO departure – the horse funds – and there are funds that react vigorously – the jockey funds.

Panel B in Table II tells us we have a large number of jockey funds and horse funds in each column. The numbers are equal by construction because jockey funds are above 75<sup>th</sup> percentile of  $\Delta w$  and horse funds are below 25<sup>th</sup> percentile of absolute  $\Delta w$  for the CEO turnover stock in the CEO turnover month.

One of the main arguments of the paper is to establish that betting on the CEOs is an investment strategy of active mutual funds, not a random action on new information. In the earlier section, we showed that the reaction of mutual funds is unlikely to be driven by other information than CEO departure on departure month. Though if betting on the CEO is an investment strategy, we further expect persistency: Jockey funds should tend to remain jockey funds and horse funds should tend to remain horse funds over time. Do we see such persistency? Panel C represents the transition probability of the jockey and horse funds, conditional on the last jockey and horse classification. We notice very strong persistence. The conditional probability of remaining a jockey once classified as a jockey ranges from 78% to 84%; the conditional probability of remaining a horse once classified as a horse ranges from 84% to 89%. Therefore, it is uncommon for jockey funds and horse funds to switch strategies. The transitional probability is higher if we conditional on the same mutual fund manager conducting the CEO bets over time.<sup>7</sup> The conditional probability increases to 79% to 90% for jockey to jockey transition and increases to 89% to 95% for horse to horse transition, suggesting that the investment strategy is bonded with the mutual fund manager.

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<sup>7</sup> We consider only the mutual funds with a single manager because CRSP mutual funds database either reports the name of the individual manager or codes “team managed” for team managed funds. For the team managed funds, we would not be able to confirm if the team is the same across time.

We further exploit this result by examining mutual fund managers who manage more than one fund. There is a rich class of literature looking into cross-fund learning by investors (Jones and Shanken, 2005; Choi, Kahraman, and Mukherjee, 2016; Brown and Wu, 2016). The main driver of cross-fund learning documented by these papers appears to be common management and “common skills”, if they exist. An investment strategy is a realization of such common management or skills. We would like to know if the mutual fund managers carry the same CEO betting investment strategies across other managed funds. We find that 85% of the jockey funds remain jockey funds and 72% of the horse funds remain to be horse fund in affiliated funds, far from the 25% benchmark where the CEOs bettings are considered to be random or independent.

We now conduct a more rigorous test to check persistency. Table III presents the results from fund-event time lead-lag regressions using OLS. We require a particular fund to have at least two JoH classifications. JoH is a dummy variable which is 1 for jockey and 0 for horse. The dependent variable is  $JoH(t)$ , where  $t=2, 3$  or  $4$ , and the independent variables are  $JoH(t-1)$ ,  $JoH(t-2)$ ,  $JoH(t-3)$ ...

We observe from Table II that though the coefficients decay as the lags increase, coefficients are largely positive and statistically significant. This suggests that betting on a CEO is indeed an investment strategy – some active mutual funds persistently bet on the CEO (the jockey funds) and some persistently do not bet on the CEOs (the horse funds).

Figure IV shows persistency in another way. As before, JoH is a dummy variable which is 1 for jockey and 0 for horse. We create a persistency measure for each of the funds, and this is defined as (Sum of JoH classifications for each fund) / (Number of classifications for each fund). If a fund is classified as jockey every time, the consistency measure is 1; if a fund is classified as horse every time, the consistency measure is 0; if a fund is classified as jockey or horse 50% of the time, the consistency measure is 0.5. We left out funds with only one classification as these extreme values might distort the robustness of the result.

Figure IV shows that the biggest spike is at 1, which means that the highest fraction of funds are jockey funds. The second biggest spike is at 0, which means that a significant number of funds are horse funds. The spikes between 0 and 1 are small, suggesting, as before, that switches between the strategies are rare. We now leave out funds that have only one or two classifications. We conduct the same test. The patterns are preserved but the distribution is more spread out.

We now go to examine the characteristics of jockey funds and horse funds.

## V. Characteristics of Jockey Funds and Horse Funds

Table IV presents descriptive statistics of the jockey and horse funds. We notice that, compared to horse funds, jockey funds are smaller in size, hold fewer number of securities, and belong to smaller families. They are younger. Their flows are smaller. Perhaps the most interesting result is that though they charge higher fees, but despite that, their gross and net returns are not statistically different other than for the raided CEO subsample. We will examine this last observation more formally in the next section.

One of the concerns using absolute  $\Delta w$  to classify jockey funds and horse funds is that change of weight can heavily distorted by smaller funds. Also, it is possible that smaller funds are reacting to expected volatility of CEOs departure instead of the importance of the CEOs due to its smaller size and thus smaller room for error. Hence, they are not betting on the CEOs but trade to avoid the price volatility introduced by the CEOs departure. As a result, it is important to consider other trading measure that takes into account the size of the funds. In Appendix B, we report the descriptive statistics of the jockey funds and horse funds classified based on absolute  $\Delta p$ . We notice that a jockey fund classified using absolute  $\Delta p$  is larger in TNA and belongs to a larger fund family while all other characteristics are similar compared to classification using absolute  $\Delta w$ . The result complements our findings in the following way: 1) Betting on the CEOs is a prevalent in both smaller funds and larger funds and 2) Fund size or bias induced by the fund size cannot explain the betting on the CEOs.

Do horse funds and jockey funds differ in ways that one would expect? We found two intuitive differences.

First, funds that focus on particular type of industries are more likely to bet on the CEOs. We describe this below.

Bennedsen et al. (2007) suggest that industries above the median of cross-section industry comparisons in each of the following measures – output growth (nominal and real), value added growth, wages, output growth volatility (nominal and real), value added growth volatility, and import penetration<sup>8</sup>– are industries where human capital and managerial skills are more important. For each of the 58 industries classified by the U.S. Bureau of Economic Analysis, we computed every year the average of: nominal output growth, real output growth, value added growth, wages, nominal output growth volatility, real output growth volatility, value added growth volatility, import penetration and intellectual property investment. We then identify industries above the

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<sup>8</sup> We leave out intellectual property investment due to missing data.

median of cross-section comparisons in each of the measures that year. These are industries where CEOs are more important that year. We then conduct an out-of-sample test (exclude the weight of stock used for classification) by aggregating the total portfolio weights of the jockey and horse funds on these industries. The total portfolio weights may not add up to 100% due to 1) missing industry classification of equity holdings, 2) non-equity holdings within the portfolios and 3) the excluded weight of stock used for classification.

Table V presents these holdings. It shows that jockey funds have higher weights than do horse funds in industries where human capital is important. This is very intuitive. Betting on the CEO can only be a smart strategy when the CEO can make a difference, and these are industries where the CEO can make a difference.

The alternative interpretation – firms are betting on changes in firm policies rather than betting on a CEO – cannot explain these results, unless firm policies change more in industries where human capital is more important.

Second, individual-managed funds are more likely to bet on the CEOs. As jockey funds bet on an individual, the CEO, but horse funds do not, it is reasonable to check if jockey funds bet more on the CEO if the jockey fund is managed by an individual rather than a team.

Table VI presents the results from a logit regression. The dependent variable is JoH which is 1 for jockey and 0 for horse. The independent variables are important fund characteristics; the main independent variable of interest is whether the fund is team-managed.

Note from Table VI that the coefficient on the variable of interest – whether a fund is team-managed or not – is negative. This result in Table VI indicates that jockey funds tend not to be team-managed. This is intuitive. Only funds that are managed by individuals are likely to bet on other individuals like the CEO.

Another important point to note from Table VI is that the coefficient on the variable of interest – whether a fund is team-managed or not – becomes more negative as we move from one-time CEOs to serial CEOs to raided CEOs. This is also very intuitive. If raided CEOs are perceived to have more talent than serial CEOs, who in turn are supposed to have more talent than one-time CEOs, it is expected that funds which bet on the individual CEO because the funds themselves are managed by individuals, would bet more if the CEO is perceived to have higher talent.



The alternative interpretation – firms are betting on changes in firm policies rather than betting on a CEO – cannot explain these results, unless firm policies change more if the active mutual fund is managed by an individual rather than a team.

## **VI. Is betting on the CEO paying off?**

An important question to ask is whether one of these mutual fund strategies is more profitable than the others.

Table VII presents the results from a logit regression. The independent variable of interest is JoH which is 1 for jockey and 0 for horse. The independent variables are the classic dependent variables used in such regressions: fund size as measured by TNA (larger funds tend to be less profitable because of increasing returns to scale – Berk and Green, 2004); fund age; management fees; turnover ratio; and prior month flow. Panel A is for Gross Returns, Panel B is for Fees and Panel C is for Net Returns.

Panel A shows that gross returns are higher for one-time CEOs and raided CEOs for jockey funds compared to horse funds, but otherwise they are roughly similar.

Panel B shows that expense ratios are unambiguously higher for jockey funds compared to horse funds, implying that jockey funds, who bet on the CEO, charge more for their efforts in analyzing the fit of the CEO to this particular firm.

Panel C shows that net returns are higher for one-time CEOs and raided CEOs for jockey funds compared to horse funds, but otherwise they are roughly similar.

Table VIII presents the t-statistics of alpha comparison between jockey and horse funds. Panel A is for Risk-Adjusted Returns and Panel B is for Style-Adjusted Returns.

Table VIII shows that jockey funds have lower risk-adjusted returns than horse funds, but they have higher style-adjusted returns.

To summarize, we do not have a clear answer to the question as to who earns more, suggesting that the jockey strategy and the horse strategy are two different investment strategies, like value funds and growth funds, that can coexist in an efficient market.

A tacit assumption underlying our above empirical research design is that more the trade by an active mutual fund around a CEO turnover, more is the importance the fund is placing on the CEO as a cause for the firm's stock return, and so higher is the bet on the CEO. This need not be

so. Given diverse motives behind trading, it is unclear whether there would be a one-to-one mapping of the preferences of active institutional investors (specifically, how much importance they place on the CEO) to their trading behavior. Therefore, a theoretical model is needed to clarify the issues involved. We now outline such a model.

## VII. A Model

There are many classical motives for trade. An impatient agent may borrow now from a patient agent and promise to pay back with interest in the future. This is referred to as an intertemporal transfer. A more risk-averse agent may buy insurance from a less risk-averse agent. This is referred to as a transfer across risky states. There are also information motives for trade. An agent with inside information may transact with an agent with less information. This is known as adverse selection. Agents may also trade because they have different information, or they may have the same information but interpret it differently and agree to disagree. There are also behavioral motives for trade: overconfidence, gambling, etc.

Under the assumption that markets are efficient, and trades during a CEO turnover event occur only due to differences of opinion regarding the importance of this CEO, we present a model below.

We will first examine the case of a drop in share price of a firm,  $\Delta P$ , after a CEO turnover event. Ignoring search costs and switching costs, price drops occur whenever the incoming CEO is expected to be worse than the outgoing CEO.

Though  $\Delta P$  is the drop in the share price of a firm, active institutional investors may have different views on the magnitude of this drop. We assume that these different views arise due to active institutional investors having different views on the importance of the CEO.

To keep the analysis simple, we assume that there are five active institutional investors, labeled as A, B, C, D and E, and that they hold different beliefs on the importance of the CEO. Investor A believes that CEOs do not matter and the price change around CEO turnovers should be zero. Investor E believes that CEOs are very important and the price drop should be  $2\Delta P$ . Investors B, C and D are moderate, and their views are that the price drop should be  $0.5\Delta P$ ,  $\Delta P$ , and  $1.5\Delta P$  respectively. In other words, investors A and E hold extreme beliefs, where investor A believes that performance is 100% attributed to the firm (the horse) and 0% to the CEO (the jockey), whereas investor E believes that performance is  $x\%$  attributed to the firm (the horse) and (100-

$x$ )% attributed to the CEO (the jockey) with  $x > 0$ . Investors B, C and D hold moderate beliefs, where their weights are in between investors A and E, i.e between 0% and  $x$ %.

These five investors, who are the liquidity demanders, send market orders to a centralized limit order book. Liquidity suppliers submit limit orders to make up this book. We assume that liquidity suppliers all agree that the drop should be  $\Delta P$ . Therefore, the mid-point of the bid-ask spread is conjectured to be at  $\Delta P$ , and is set at  $\Delta P$ . This conjecture, we will show, is upheld in equilibrium.

We will not model these liquidity suppliers except to note that their inventory costs rise as their imbalances rise. Due to this feature, the liquidity suppliers will provide a rich menu of bid and ask quotes with their corresponding depths, such that transaction costs per share traded rise as liquidity demanders trade more shares. This is simply known as “walking up the book”.

We now look at the calculus of the five active institutional investors. These investors know that they will “walk up the book” if they want to trade. Therefore, their transaction cost is increasing at an increasing rate in the number of shares they trade. This is shown by the green curve in Figure V. Their revenue curves, however, will be different. Investor A believes that he will make a profit of  $\Delta P$  units per share if he buys; investor E believes that he will make a profit of  $\Delta P$  units per share if he sells. Investor B believes that he will make a profit of  $0.5\Delta P$  unit per share if he buys; investor D believes that he will make a profit of  $0.5\Delta P$  unit per share if he sells. Investor C sees no benefit in trading. The revenue curves of A, B, D and E are shown by the blue curves in Figure V.

Equilibrium occurs where the marginal cost equals the marginal benefit of each investor. Figure 2 shows that the investors with moderate beliefs, investors B and D, will have smaller volumes of trade than the investors with extreme beliefs, investors A and E. Investor C does not trade at all. In other words, investors with extreme beliefs, investors A and E, “walk up the book” more than the investors with moderate beliefs, investors B and D. The large number of shares investor A buys equals the number of shares investor E sells, and the smaller number of shares investor B buys equals the smaller number of shares investor D sells. Thus, the conjecture that the mid-point of the spread is  $\Delta P$ , is upheld in equilibrium.

Our model has the following prediction: price drops are associated with investors who sell more (sell less or buy) stock if they believe that the CEO is very (not so) important.

Similarly, one can consider the event where the share price increases by  $\Delta P$  after a CEO turnover event. Again, ignoring search costs, stock prices increase because the incoming CEO is expected to be better than the outgoing CEO. The analysis for this case is symmetric to the

previous case. Therefore, in this case, our model has the following prediction: price rises are associated with investors who buy more (buy less or sell) stock if they believe that the CEO is very (not so) important.

In short, trading activity around CEO turnover events are informative about whether active institutional investors bet on the CEO. It follows from the model outlined above that active institutional investors with the strongest beliefs will trade the most, and that their trades will be in the direction of their preferences about the importance of the CEO. In other words, there is a one-to-one mapping of the preferences of active institutional investors (specifically, how much importance they place on the CEO) to their trading behavior.

## **VIII. Concluding remarks**

In this paper, we document a prevailing yet overlooked investment strategy by actively managed mutual funds – Betting on the CEO. Active mutual funds trade abnormally in months when there is a CEO turnover in their portfolio. The trading activity in CEO departure month ranks highly across all the months that the fund holds the stock (time-series ranking) and the trading activity in CEO departure stock ranks highly across all other stocks that the fund holds on the departure month (cross-section ranking). We further find complementary evidence that the exit rate is starkly higher for the stocks with CEO departure on the departure month compared to other months. The trading activity and exit rates are higher for raided CEOs and serial CEOs, consistent with some funds placing larger bets on CEOs with higher perceived managerial ability. In further tests, we find strong persistency in the tendency for some funds to bet on the CEO. The persistency is stronger if we conditional on the same manager and such investment strategy is persistent in the affiliated fund. Also, we show that these funds are less likely to be team-managed, and have larger portfolio weights on firms in industries where managerial skills are more valuable. They charge higher fees, but despite that, their net returns are similar.

There could be other reasons why active mutual funds trade on CEO departure month. We show that the abnormal trading activities cannot be explained by the most prominent periodic information updates, the company earnings announcement, or other random, non-periodic information updates, nor can be explained by fund response to abnormal trading activities caused by other market participants.

An important alternate reason why active mutual funds trade on CEO departure month is that funds may bet on a more fundamental change of firm policy, and that involves a change of CEO.

However, the results from the subsamples show that it should only be a concern if the fundamental change of firm policies is correlated with the CEO's perceived managerial ability because the trading activity is stronger for serial and raided CEOs. If firm policies change more because of the CEO, then betting on firm policies is equivalent to betting on the CEO.

A tacit assumption underlying our above empirical research design is that more the trade by an active mutual fund around a CEO turnover, more is the importance the fund is placing on the CEO as a cause for the firm's stock return, and so higher is the bet on the CEO. This need not be so. Given diverse motives behind trading, it is unclear whether there would be a one-to-one mapping of the preferences of active institutional investors (specifically, how much importance they place on the CEO) to their trading behavior.

We provide a theoretical framework that justifies this assumption. The model assumes that the motive for trade is difference in opinion. The equilibrium in this model shows that active institutional investors with the strongest beliefs will trade the most, and that their trades will be in the direction of their preferences about the importance of the CEO. In other words, there is a one-to-one mapping of the preferences of active institutional investors (specifically, how much importance they place on the CEO) to their trading behavior.

To conclude, our results uncover that betting on the CEO is an investment strategy of some actively managed mutual funds, a strategy that is upheld in equilibrium in a model where the motive for trade is differences in opinion about the importance of the CEO.

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**Table I: Descriptive statistics on actively managed mutual funds, 2004-2020**

This table presents the descriptive statistics of the actively managed mutual funds analyzed in this paper. One-Time CEOs have been CEOs in only one firm; serial CEOs are CEOs who have been the CEO in more than one firm; raided CEOs are serial CEOs who depart as CEO from one firm and become a CEO in another firm in less than 2 years.

Panel A: Descriptive Statistics: Active Mutual Funds											
	Fund TNA	Positions	Equity (%)	Fund Age	Gross Ret (%)	Exp Ratio (%)	Net Ret (%)	Flow (%)	Turnover (%)	Family TNA	Family Size
Mean	0.88	141	90	14	0.86	0.065	0.77	102	1	359	329
SD	4.3	304	12	12	2.2	0.077	2.2	1223	2.8	644	675
Min	0.0001	1	50	0	-12	-0.0023	-9.9	-183	0	0.0001	1
p25	0.02	34	88	5.5	0.45	0.017	0.36	-1.1	0.32	2.6	10
p50	0.1	69	95	11	0.88	0.067	0.81	0.46	0.59	33	46
p75	0.46	121	97	19	1.3	0.097	1.2	5.8	1	290	122
Max	157	5,807	227	96	184	3.5	184	50,635	123	5,607	2,131
N	9,758	8,967	9,105	9,124	9,778	9,779	9,786	9,724	7,980	9,783	9,786
Miss	173	964	826	807	153	152	145	207	1,951	148	145
Panel B: Descriptive Statistics: Active Funds in Turnover											
	Fund TNA	Positions	Equity (%)	Fund Age	Gross Ret (%)	Exp Ratio (%)	Net Ret (%)	Flow (%)	Turnover (%)	Family TNA	Family Size
Mean	0.99	169	93	15	0.91	0.075	0.81	108	1	303	293
SD	4.8	330	8.9	13	2.4	0.082	2.4	1340	2.2	591	644
Min	0.0001	1.3	50	0	-9.4	0	-8.9	-183	0	0.0001	1
p25	0.03	51	92	6.1	0.49	0.041	0.38	-1.2	0.39	2.2	8.9
p50	0.13	82	95	12	0.96	0.078	0.87	0.067	0.66	25	38
p75	0.54	143	98	20	1.3	0.1	1.2	3.8	1.1	194	101
Max	157	5,807	227	96	184	3.6	184	50,635	82	5,607	2,122
N	7,379	7,323	7,158	7,383	7,380	7,380	7,385	7,368	6,248	7,382	7,385
Miss	22	78	243	18	21	21	16	33	1153	19	16
Panel C: Descriptive Statistics: Active Funds in One-Time CEOs											
	Fund TNA	Positions	Equity (%)	Fund Age	Gross Ret (%)	Exp Ratio (%)	Net Ret (%)	Flow (%)	Turnover (%)	Family TNA	Family Size
Mean	0.99	169	93	15	0.91	0.075	0.81	108	1	303	293
SD	4.8	330	8.9	13	2.4	0.082	2.4	1341	2.2	591	644
Min	0.0001	1.3	50	0	-9.4	0	-8.9	-183	0	0.0001	1
p25	0.03	51	92	6.1	0.49	0.041	0.38	-1.2	0.39	2.2	8.9
p50	0.13	82	95	12	0.96	0.078	0.87	0.064	0.66	25	38
p75	0.54	143	98	20	1.3	0.1	1.2	3.8	1.1	194	101
Max	157	5,807	227	96	184	3.6	184	50,635	82	5,607	2,122

N	7,375	7,320	7,156	7,379	7,376	7,376	7,381	7,364	6,245	7,378	7,381
Miss	22	77	241	18	21	21	16	33	1,152	19	16

Panel D: Descriptive Statistics: Active Funds in Serial CEOs

Mean	1	170	93	15	0.91	0.075	0.81	109	1	304	295
SD	4.8	330	8.8	13	2.4	0.082	2.4	1347	2.2	589	646
Min	0.0001	1.4	50	0	-9.4	0	-8.9	-183	0	0.0001	1
p25	0.03	52	92	6.2	0.49	0.04	0.38	-1.2	0.39	2.2	9
p50	0.13	83	95	12	0.96	0.078	0.88	0.056	0.66	25	39
p75	0.54	144	98	21	1.3	0.1	1.2	3.8	1.1	195	101
Max	157	5807	227	96	184	3.6	184	50,635	82	5,607	2,122
N	7,303	7,255	7,099	7,303	7,304	7,304	7,309	7,293	6,183	7,306	7,309
Miss	17	65	221	17	16	16	11	27	1,137	14	11

Panel E: Descriptive Statistics: Active Funds in Raided CEOs

Mean	1	172	93	15	0.91	0.074	0.81	111	1	308	299
SD	4.9	333	8.7	13	2.4	0.077	2.4	1363	2.2	593	650
Min	0.0001	1.8	50	0	-9.4	0	-8.9	-183	0	0.0001	1
p25	0.032	53	92	6.3	0.5	0.04	0.39	-1.2	0.39	2.4	9.3
p50	0.14	84	95	13	0.96	0.078	0.88	0.05	0.66	26	39
p75	0.57	148	98	21	1.3	0.1	1.2	3.7	1.1	197	101
Max	157	5807	227	96	184	3.6	184	50,635	82	5,607	2,122
N	7,126	7,088	6,943	7,123	7,129	7,129	7,132	7,117	6,040	7,129	7,132
Miss	12	50	195	15	9	9	6	21	1,098	9	6

**Table II: Classification of Funds as Jockey Funds or Horse Funds**

This table describes how funds are classified as jockey funds or horse funds. One-Time CEOs have been CEOs in only one firm; serial CEOs are CEOs who have been the CEO in more than one firm; raided CEOs are serial CEOs who depart as CEO from one firm and become a CEO in another firm in less than 2 years. Panel A presents the number of observations and the summary statistics of change of weight ( $\Delta w$ ) for the jockey and horse classifications. For each of the CEO turnovers, we rank the absolute  $\Delta w$  for the CEO turnover stock amongst all stocks held by the fund in the CEO turnover month. Funds in the top 25% of change (most responsive) are classified as jockey fund and those in the bottom 25% (most unresponsive) are classified as horse fund. Panel B presents the statistics of these classifications. Panel C represents the transition probability of the jockey and horse funds, conditional on the last jockey and horse classification.

Panel A: Summary Statistics of Betting on CEOs (Fund-Event level)				
	Turnover	One-Time CEOs	Serial CEOs	Raided CEOs
Statistics of Fund-Events:				
Total Observations	186,865	168,861	18,004	5,201
Statistics of $\Delta$ :				
Mean	0.20%	0.20%	0.23%	0.32%
SD	0.41%	0.41%	0.43%	0.56%
Min	0.00%	0.00%	0.00%	0.00%
P25	0.01%	0.01%	0.01%	0.02%
Median	0.05%	0.04%	0.06%	0.09%
P75	0.22%	0.21%	0.26%	0.37%
Max	36.44%	36.44%	8.50%	8.50%
Panel B: Classification of Jockey or Horse				
Jockey: Change of position above 75th Percentile	47,619	43,041	4,578	1,325
% of Bets	25%	25%	25%	25%
Horse: Change of position below 25th Percentile	47,619	43,041	4,578	1,325
% of Bets	25%	25%	25%	25%
Panel C: Transition Matrix				
Transition Probability of:				
Jockey to Jockey	84%	84%	81%	78%
Horse to Horse	84%	85%	85%	89%
Jockey to Horse	16%	16%	19%	22%
Horse to Jockey	16%	15%	15%	11%

**Table III: Persistency**

This table presents the results from fund-event lead-lag regressions using OLS. The definition of jockey and horse is given in Table II. One-Time CEOs have been CEOs in only one firm; serial CEOs are CEOs who have been the CEO in more than one firm; raided CEOs are serial CEOs who depart as CEO from one firm and become a CEO in another firm in less than 2 years. We require a particular fund to have at least two JoH classifications. JoH is a dummy variable which is 1 for jockey and 0 for horse. The definition of jockey and horse is given in Table II. The dependent variable is JoH(t), where t=2, 3 or 4, and the independent variables are JoH (t-1), JoH (t-2), JoH(t-3)... \*\*\*, \*\*, and \* denote statistical significance at the 1%, 5%, and 10% level.

	Turnover			One-Time CEOs			Serial CEOs			Raided CEOs		
	(1a)	(1b)	(1c)	(2a)	(2b)	(2c)	(3a)	(3b)	(3c)	(4a)	(4b)	(4c)
Jockey = 1 & Horse = 0	JoH2	JoH3	JoH4	JoH2	JoH3	JoH4	JoH2	JoH3	JoH4	JoH2	JoH3	JoH4
JoH1	0.51*** (0.01)	0.29*** (0.02)	0.20*** (0.02)	0.51*** (0.01)	0.27*** (0.02)	0.19*** (0.02)	0.56*** (0.02)	0.28*** (0.03)	0.23*** (0.03)	0.63*** (0.03)	0.29*** (0.06)	0.03 (0.09)
JoH2		0.40*** (0.02)	0.26*** (0.02)		0.42*** (0.02)	0.26*** (0.02)		0.40*** (0.03)	0.35*** (0.03)		0.52*** (0.07)	0.34*** (0.10)
JoH3			0.29*** (0.02)			0.31*** (0.02)			0.27*** (0.03)			0.47*** (0.09)
Constant	0.36*** (0.01)	0.23*** (0.01)	0.20*** (0.01)	0.36*** (0.01)	0.23*** (0.01)	0.19*** (0.01)	0.30*** (0.02)	0.21*** (0.02)	0.12*** (0.02)	0.18*** (0.02)	0.11*** (0.03)	0.07** (0.03)
Observations	3,878	3,290	2,905	3,755	3,173	2,770	1,472	1,039	754	520	231	139
R-squared	0.28	0.38	0.41	0.27	0.37	0.42	0.32	0.38	0.54	0.40	0.53	0.46

**Table IV: Descriptive Statistics on Jockey Funds and Horse Funds**

The definition of jockey and horse is given in Table II. One-Time CEOs have been CEOs in only one firm; serial CEOs are CEOs who have been the CEO in more than one firm; raided CEOs are serial CEOs who depart as CEO from one firm and become a CEO in another firm in less than 2 years. \*\*\*, \*\*, and \* denote statistical significance at the 1%, 5%, and 10% level.

	Turnover			One-Time CEOs			Serial CEOs			Raided CEOs		
	(1a) Horse	(1b) Jockey	(1c) Diff	(2a) Horse	(2b) Jockey	(2c) Diff	(3a) Horse	(3b) Jockey	(3c) Diff	(4a) Horse	(4b) Jockey	(4c) Diff
Fund TNA	2.05	1.06	0.99***	2.15	1	1.15***	2.42	1.1	1.32***	2.81	1.13	1.68***
Positions	465.89	116.61	349.28***	474.81	117.96	356.85***	516.19	127.64	388.55***	598.79	130.86	467.93***
Equity (%)	85.15	91.69	-6.54***	85.52	91.73	-6.21***	84.53	92.19	-7.66***	83.6	92.66	-9.07***
Fund Age	15.98	17.78	-1.80***	16.24	17.62	-1.38***	16.58	19.09	-2.51***	16.72	20.31	-3.58***
Gross Ret (%)	1.03	1.12	-0.09	1.04	1.13	-0.09	1.03	1.2	-0.18	0.97	1.07	-0.11***
Exp Ratio (%)	0.05	0.07	-0.02***	0.05	0.07	-0.02***	0.04	0.07	-0.02***	0.05	0.06	-0.02***
Net Ret (%)	0.98	1.04	-0.06	0.98	1.05	-0.07	0.98	1.13	-0.15	0.92	1	-0.09**
Flow (%)	233.06	121.99	111.07	260.03	109.8	150.24	299.67	93.55	206.12*	365.77	70.15	295.62**
Turnover (%)	0.75	0.85	-0.10***	0.73	0.85	-0.12***	0.74	0.83	-0.09***	0.7	0.8	-0.09***
Family TNA	644.78	391.73	253.05***	641.48	406.58	234.89***	740.24	462.25	277.99***	705.02	498.84	206.17***
Family Size	669.41	410.58	258.84***	653.12	431.48	221.64***	725.2	486.89	238.30***	658.63	535.59	123.04***

**Table V: Do Jockey Funds Bet on the CEOs in Industries Human Capital is More Important?**

This table presents the portfolio holdings of jockey and horse mutual funds in various industries where human capital is important. The definition of jockey and horse is given in Table II. One-Time CEOs have been CEOs in only one firm; serial CEOs are CEOs who have been the CEO in more than one firm; raided CEOs are serial CEOs who depart as CEO from one firm and become a CEO in another firm in less than 2 years. For each of the 58 industries classified by the U.S. Bureau of Economic Analysis, we compute the nominal output growth, real output growth, value added growth, wages, nominal output growth volatility, real output growth volatility, value added growth volatility, import penetration and intellectual property investment for each of the industries. Bennedson et al (2007) suggest that industries above the median of cross-section industry comparisons in each of the measures are industries where CEOs are more important. We then conduct an out-of-sample test (exclude the weight of stock used for classification) by aggregating the total portfolio weights of the jockey and horse funds on these industries. The total portfolio weights may not add up to 100% due to 1) missing industry classification of equity holdings and 2) non-equity holdings within the portfolios. \*\*\*, \*\*, and \* denote statistical significance at the 1%, 5%, and 10% level.

% of Portfolio Holdings in Industries with higher than median:	Turnover			One-Time CEOs			Serial CEOs			Raided CEOs		
	(1a)	(1b)	(1c)	(2a)	(2b)	(2c)	(3a)	(3b)	(3c)	(4a)	(4b)	(4c)
	Horse	Jockey	Diff	Horse	Jockey	Diff	Horse	Jockey	Diff	Horse	Jockey	Diff
Nominal Output Growth	36.9	41.2	-4.3***	36.8	41.3	-4.4***	35.4	41.1	-5.6***	34.8	40.6	-5.8***
Real Output Growth	41.2	45.2	-4.0***	41	45.2	-4.2***	39.2	44	-4.8***	38.8	44.4	-5.6***
Value Added Growth	41.3	45.3	-4.0***	41.1	45.5	-4.3***	39.4	44.5	-5.1***	39	44.6	-5.6***
Wages	61.1	65	-3.8***	61	65	-4.1***	59.1	65.3	-6.2***	57.9	64.7	-6.8***
Nominal Output Growth Vol	38.6	43.4	-4.8***	38.5	43.5	-5.0***	37.3	43.5	-6.3***	36.4	43.3	-6.9***
Real Output Growth Vol	40.7	43.7	-3.0***	40.5	43.7	-3.2***	39	43.4	-4.4***	38.6	43.8	-5.2***
Value Added Growth Vol	36.9	39.9	-3.0***	36.7	39.9	-3.2***	35.8	39.4	-3.6***	35.3	39.8	-4.5***
Import Penetration	47.1	52	-4.8***	47	52.1	-5.1***	45.1	51.6	-6.5***	44.5	52.1	-7.6***

**Table VI: Do Jockey Funds Bet Less on the CEOs if the Fund is Team Managed?**

This table presents the results from a logit regression. One-Time CEOs have been CEOs in only one firm; serial CEOs are CEOs who have been the CEO in more than one firm; raided CEOs are serial CEOs who depart as CEO from one firm and become a CEO in another firm in less than 2 years. The dependent variable is JoH which is 1 for jockey and 0 for horse. The definition of jockey and horse is given in Table II. \*\*\*, \*\*, and \* denote statistical significance at the 1%, 5%, and 10% level.

	Logit Regression on Team Managed Funds							
	Turnover		One-Time CEOs		Serial CEOs		Raided CEOs	
	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)	(4a)	(4b)
Team	-0.20*** (0.01)	-0.20*** (0.01)	-0.22*** (0.01)	-0.21*** (0.01)	-0.28*** (0.01)	-0.28*** (0.01)	-0.35*** (0.01)	-0.32*** (0.01)
Prior Year Gross Return		-0.00*** (0.00)		-0.00*** (0.00)		-0.00*** (0.00)		-0.00*** (0.00)
ln(TNA)		-0.13*** (0.00)		-0.13*** (0.00)		-0.15*** (0.00)		-0.14*** (0.00)
ln(Fundage)		0.43*** (0.00)		0.41*** (0.00)		0.49*** (0.01)		0.51*** (0.01)
Turnover Ratio		0.02*** (0.00)		0.05*** (0.00)		0.02*** (0.00)		0.04*** (0.00)
Prior Month Flow		0.00 (0.00)		0.00 (0.00)		-0.00 (0.00)		-0.00 (0.00)
Constant	0.96*** (0.01)	-0.38*** (0.02)	0.98*** (0.01)	-0.35*** (0.02)	0.87*** (0.01)	-0.68*** (0.02)	0.77*** (0.01)	-0.86*** (0.03)
Observations	289,838	253,603	287,665	252,366	173,350	156,892	104,420	94,592
Pseudo R-squared	0.00358	0.0431	0.00395	0.0450	0.00597	0.0550	0.00906	0.0565



**Table VII: Gross Returns, Fees and Net Returns of Jockey Funds vs Horse Funds**

This table presents the results from a logit regression. One-Time CEOs have been CEOs in only one firm; serial CEOs are CEOs who have been the CEO in more than one firm; raided CEOs are serial CEOs who depart as CEO from one firm and become a CEO in another firm in less than 2 years. The dependent variable is JoH which is 1 for jockey and 0 for horse. The definition of jockey and horse is given in Table II. Panel A is for Gross Returns, Panel B is for Fees and Panel C is for Net Returns. \*\*\*, \*\*, and \* denote statistical significance at the 1%, 5%, and 10% level.

Panel A: Regression on Gross Returns (Monthly)								
	Turnover		One-Time CEOs		Serial CEOs		Raided CEOs	
	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)	(4a)	(4b)
JoH	0.09 (0.07)	0.13 (0.11)	0.05** (0.02)	0.08*** (0.03)	0.18 (0.11)	0.25 (0.16)	0.11*** (0.03)	0.07* (0.04)
ln(TNA)		-0.04* (0.02)		0.01** (0.01)		-0.06 (0.04)		0.02 (0.01)
ln(Fund Age)		0.16** (0.07)		0.14*** (0.02)		0.17 (0.12)		0.19*** (0.03)
Management Fees		-2.66** (1.07)		-0.32 (0.30)		-5.08*** (1.90)		0.76 (0.61)
Turnover Ratio		-0.06* (0.03)		-0.04*** (0.01)		-0.06 (0.06)		-0.07*** (0.02)
Prior Month Flow		-0.00 (0.00)		-0.00 (0.00)		-0.00 (0.00)		-0.00 (0.00)
Constant	1.03*** (0.06)	0.73*** (0.22)	1.03*** (0.02)	0.68*** (0.06)	1.03*** (0.09)	0.84** (0.36)	0.97*** (0.03)	0.39*** (0.10)
Observations	364,498	273,843	361,287	271,936	227,924	164,481	138,400	99,144
Adjusted R-squared	1.10e-06	3.76e-05	1.55e-05	0.000618	6.92e-06	3.78e-05	7.34e-05	0.000862

Panel B: Regression on Expense Ratios (Monthly)								
	Turnover		One-Time CEOs		Serial CEOs		Raided CEOs	
	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)	(4a)	(4b)
JoH	0.02*** (0.00)	0.01*** (0.00)	0.02*** (0.00)	0.01*** (0.00)	0.02*** (0.00)	0.01*** (0.00)	0.02*** (0.00)	0.01*** (0.00)
Prior Year Gross Return		0.00*** (0.00)		0.00*** (0.00)		0.00 (0.00)		0.00 (0.00)
ln(TNA)		-0.01*** (0.00)		-0.01*** (0.00)		-0.01*** (0.00)		-0.01*** (0.00)
ln(Fund Age)		0.02*** (0.00)		0.01*** (0.00)		0.02*** (0.00)		0.01*** (0.00)
Turnover Ratio		0.00*** (0.00)		0.00*** (0.00)		0.00*** (0.00)		0.01*** (0.00)
Prior Month Flow		0.00 (0.00)		0.00* (0.00)		-0.00 (0.00)		-0.00 (0.00)
Constant	0.05*** (0.00)	0.02*** (0.00)	0.05*** (0.00)	0.02*** (0.00)	0.04*** (0.00)	0.02*** (0.00)	0.05*** (0.00)	0.02*** (0.00)
Observations	371,375	255,406	367,898	254,058	231,483	157,626	140,564	95,015
Adjusted R-squared	0.0362	0.162	0.0422	0.177	0.0354	0.164	0.0333	0.182

Panel C: Regression on Net Returns (Monthly)								
	Turnover		One-Time CEOs		Serial CEOs		Raided CEOs	
	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)	(4a)	(4b)
JoH	0.06 (0.07)	0.13 (0.11)	0.03 (0.02)	0.08*** (0.03)	0.15 (0.11)	0.25 (0.16)	0.09*** (0.03)	0.07* (0.04)
ln(TNA)		-0.04* (0.02)		0.01** (0.01)		-0.06 (0.04)		0.02 (0.01)
ln(Fund Age)		0.16** (0.07)		0.14*** (0.02)		0.17 (0.12)		0.19*** (0.03)
Management Fees		-3.66*** (1.07)		-1.32*** (0.30)		-6.08*** (1.90)		-0.24 (0.61)
Turnover Ratio		-0.06* (0.03)		-0.04*** (0.01)		-0.06 (0.06)		-0.07*** (0.02)
Prior Month Flow		-0.00 (0.00)		-0.00 (0.00)		-0.00 (0.00)		-0.00 (0.00)
Constant	0.98*** (0.06)	0.73*** (0.22)	0.98*** (0.02)	0.68*** (0.06)	0.98*** (0.09)	0.84** (0.36)	0.92*** (0.03)	0.39*** (0.10)
Observations	367,770	273,843	364,521	271,936	229,035	164,481	139,057	99,144
Adjusted R-squared	-6.34e-07	5.62e-05	2.30e-06	0.000700	4.39e-06	5.47e-05	4.72e-05	0.000839

**Table VIII: Risk- and Style-adjusted net returns of Jockey Funds vs Horse Funds**

This table presents the t-statistics of alpha comparison between jockey and horse funds. The definition of jockey and horse is given in Table II. One-Time CEOs have been CEOs in only one firm; serial CEOs are CEOs who have been the CEO in more than one firm; raided CEOs are serial CEOs who depart as CEO from one firm and become a CEO in another firm in less than 2 years. Panel A is for Risk-Adjusted Returns and Panel B is for Style-Adjusted Returns. \*\*\*, \*\*, and \* denote statistical significance at the 1%, 5%, and 10% level.

Panel A: Risk-adjusted Net Returns												
	Turnover			One-Time CEOs			Serial CEOs			Raided CEOs		
	(1a)	(1b)	(1c)	(2a)	(2b)	(2c)	(3a)	(3b)	(3c)	(4a)	(4b)	(4c)
	Jockey	Horse	Diff	Jockey	Horse	Diff	Jockey	Horse	Diff	Jockey	Horse	Diff
Alpha_Market	-0.15	-0.07	-0.08***	-0.15	-0.08	-0.08***	-0.17	-0.1	-0.07***	-0.15	-0.08	-0.07***
Alpha_FFC4	-0.11	-0.08	-0.03***	-0.11	-0.08	-0.03***	-0.1	-0.08	-0.02***	-0.1	-0.07	-0.03***

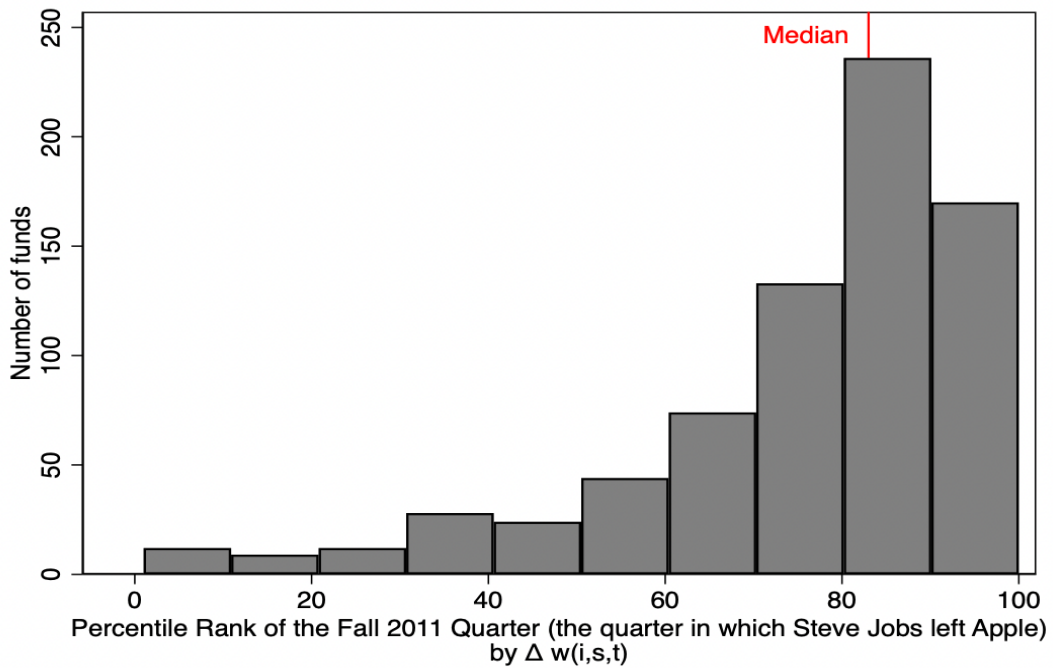
  

Panel B: Style-adjusted Net Returns												
	Turnover			One-Time CEOs			Serial CEOs			Raided CEOs		
	(1a)	(1b)	(1c)	(2a)	(2b)	(2c)	(3a)	(3b)	(3c)	(4a)	(4b)	(4c)
	Jockey	Horse	Diff	Jockey	Horse	Diff	Jockey	Horse	Diff	Jockey	Horse	Diff
Style-Adjusted	0.1	0.02	0.09***	0.11	0.02	0.09***	0.14	0.06	0.08***	0.12	0.05	0.07***

**Figure I:**

**Importance of the Quarter that Steve Jobs Left Apple**

This figure shows how did mutual funds who held Apple's stock respond in the quarter Steve Jobs left Apple. There were 742 distinct mutual funds who held Apple's stock in 2011Q3. For each of these funds, we rank ordered each quarter - percentile rank - by absolute changes in holdings observed in a given quarter among all quarters that the fund held Apple in its portfolio. If the highest change took place in a quarter, the quarter would receive a rank of 100. If the lowest change took place in a quarter, the quarter would receive a rank of 1. We noted the rank of the quarter in which Steve Jobs stepped down (2011Q3) for this particular mutual fund. Figure I shows the distribution of the percentile rank of 2011Q3.

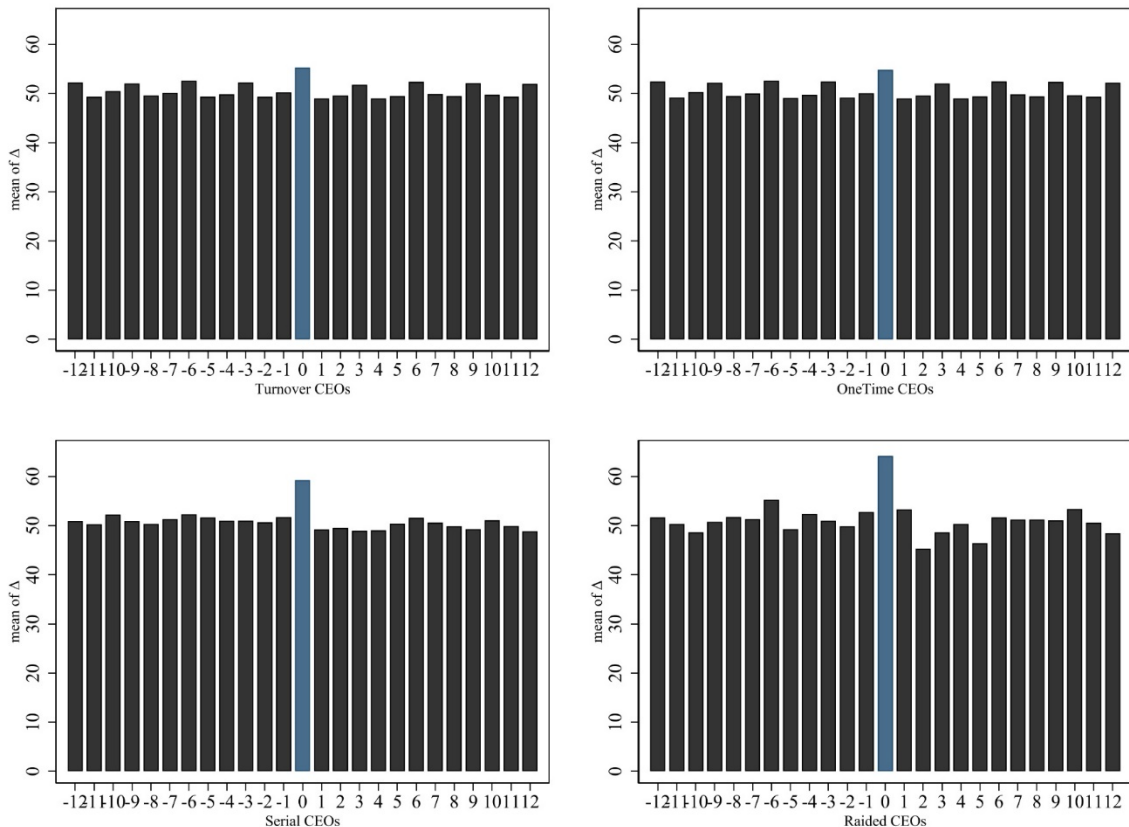


**Figure II:**

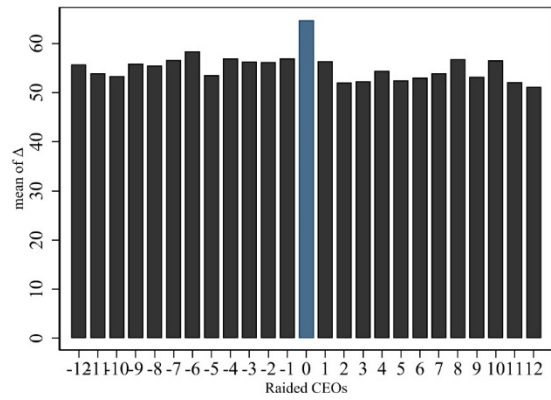
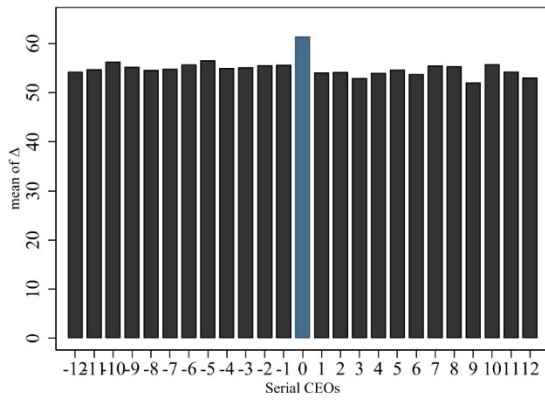
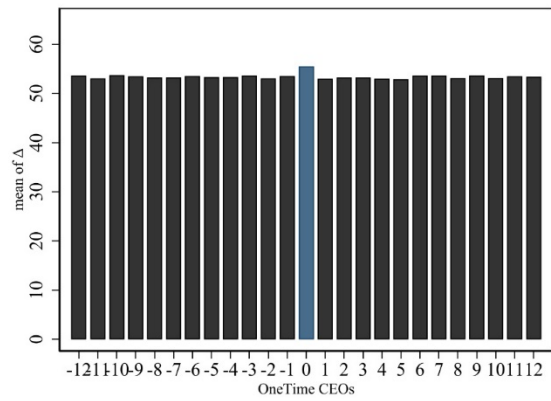
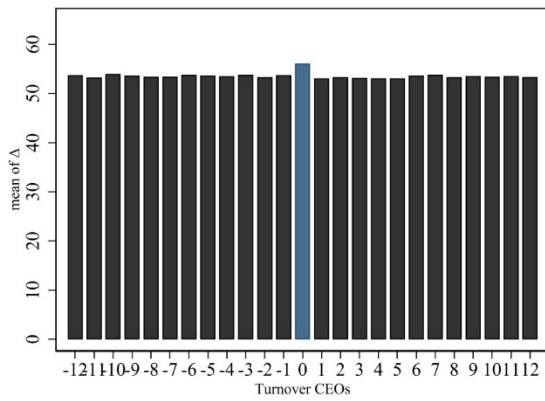
**Trading Activity Around CEO Turnovers**

This figure shows the magnitude of trading activity by active mutual funds around a CEO turnover month. One-Time CEOs have been CEOs in only one firm; serial CEOs are CEOs who have been the CEO in more than one firm; raided CEOs are serial CEOs who depart as CEO from one firm and become a CEO in another firm in less than 2 years. We require the funds to hold the stock that has the CEO turnover one month prior to the CEO departure month. We compute the change of weight ( $\Delta w$ ) from  $t-1$  to  $t$  for all stocks held by the firm for all  $t$  in the entire sample period. We ranked the absolute  $\Delta w$  for this CEO turnover stock across all the months that the fund has held the stock – Time-Series Rank. We then ranked the absolute  $\Delta w$  for this CEO turnover stock across all stocks held by the fund each month – Cross-Section Rank. Given the CEO departure date at month  $t$ , we constructed a 2-year window, 12 months prior to the departure ( $t-12$ ) to 12 months after the event ( $t+12$ ). The rank percentile is plotted across this window. Panel A shows the Time-Series Ranks whereas Panel B shows the Cross-Section Ranks.

**Panel A. Times-Series Rank Percentile of the Month**



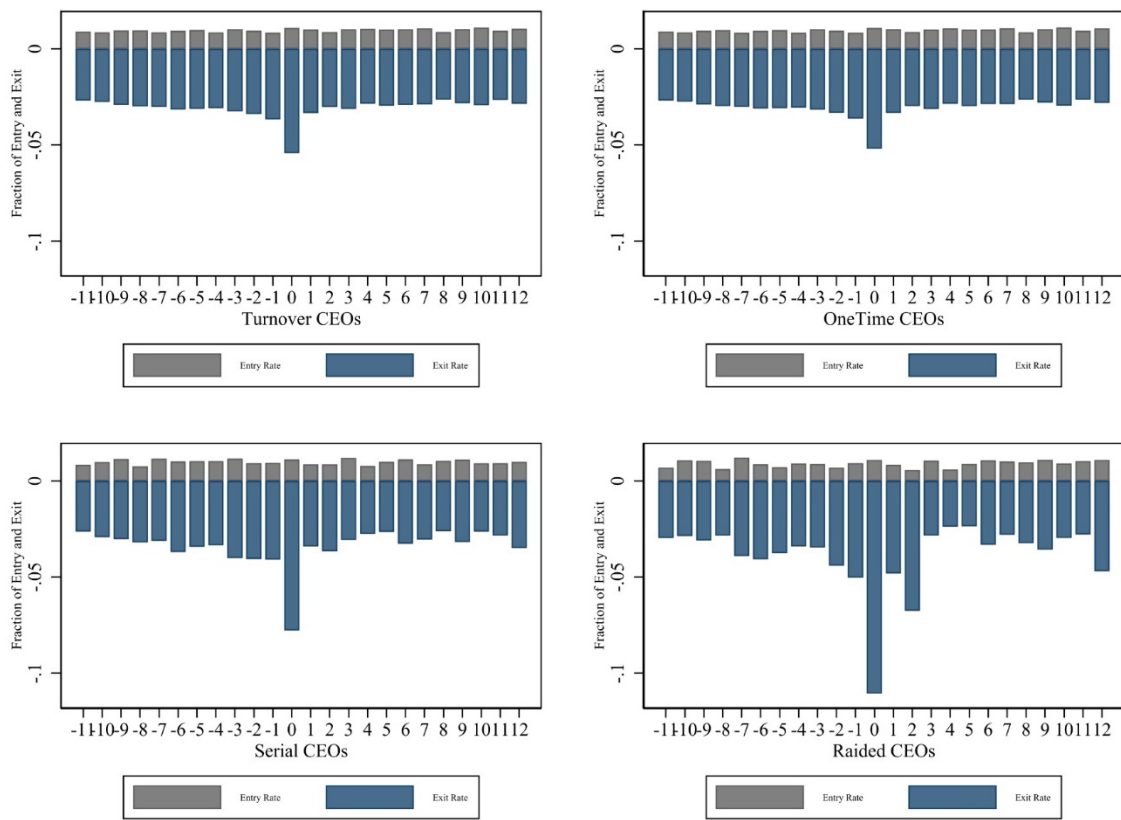
**Panel B. Cross-Section Rank Percentile of the Stock**



**Figure III:**

**Exit and Entry Around CEO Turnovers**

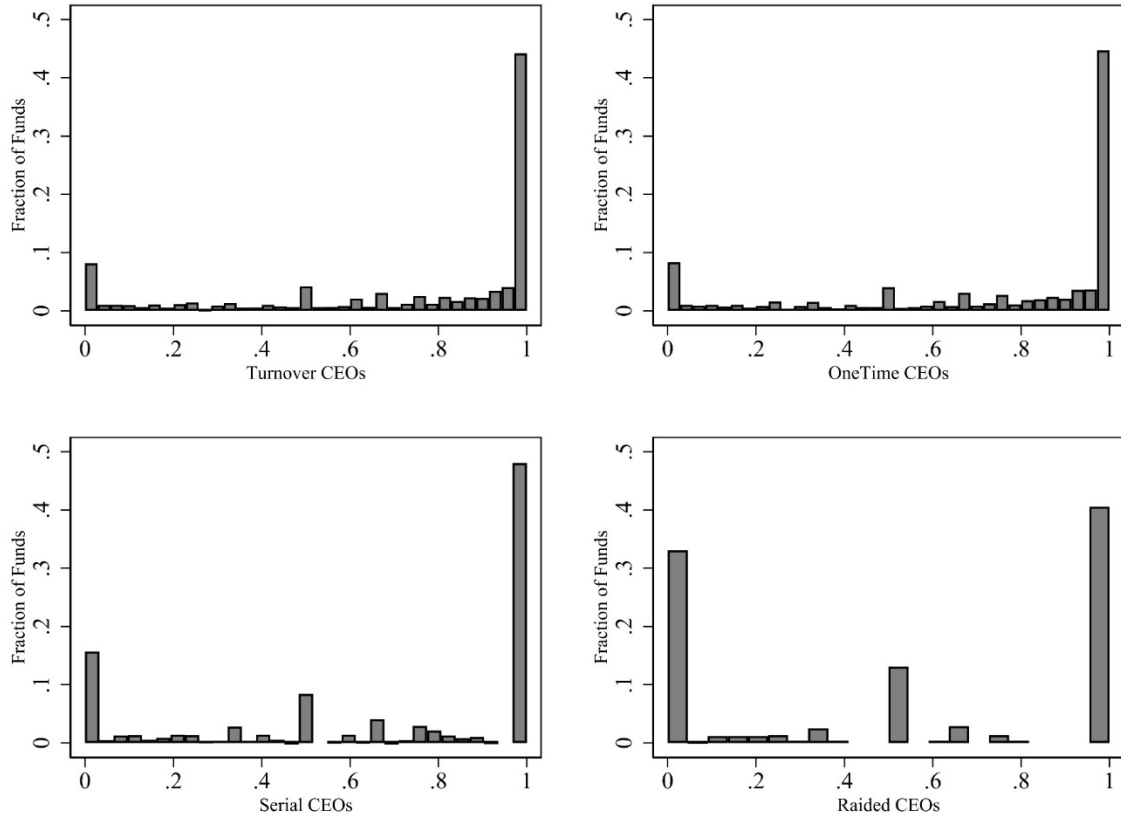
This figure shows the exit and entry rates around CEO turnovers. One-Time CEOs have been CEOs in only one firm; serial CEOs are CEOs who have been the CEO in more than one firm; raided CEOs are serial CEOs who depart as CEO from one firm and become a CEO in another firm in less than 2 years. To compute the exit rate, we require the funds to hold the stock one month prior to the CEO turnover. We then measure the percentage of the funds that completely terminate their holding of the stock – i.e. exit – in the month of the CEO departure. To compute the entry rate, we require the funds not to hold the stock one month prior to the CEO turnovers. We then measure the percentage of the funds establish a holding of the stock – i.e. entry – in the month of the CEO departure.





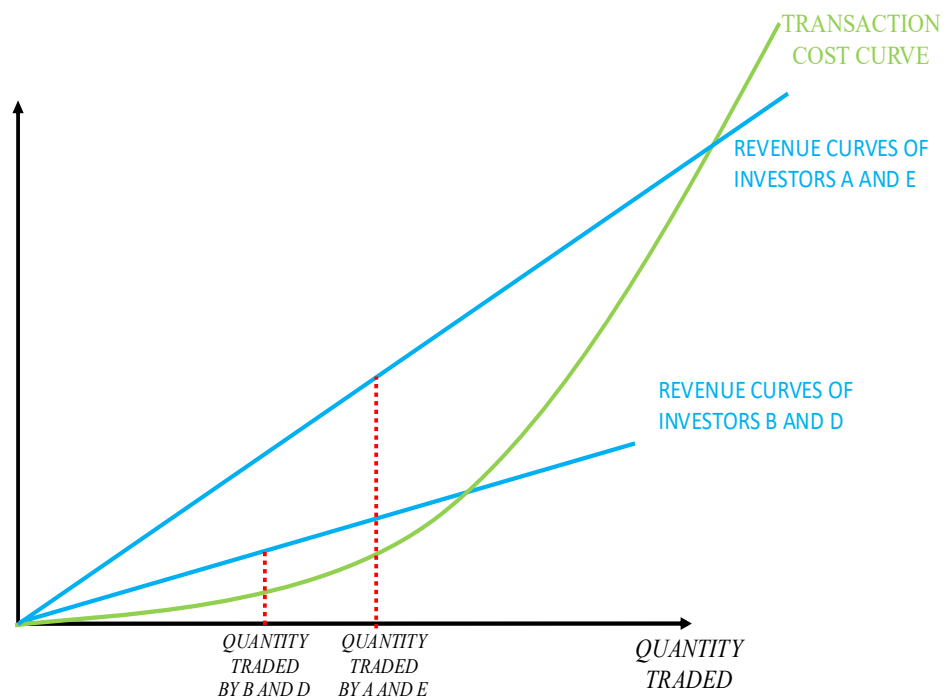
**Figure IV. Persistency of Betting on the CEO**

This figure shows the consistency of the behavior for the mutual funds with regards to betting on the CEO. One-Time CEOs have been CEOs in only one firm; serial CEOs are CEOs who have been the CEO in more than one firm; raided CEOs are serial CEOs who depart as CEO from one firm and become a CEO in another firm in less than 2 years. We define jockey as 1 and horse as 0 in the “JoH” variable. The persistency measure for each fund is (Sum of JoH classifications for each fund) / (Number of classifications for each fund). We left out funds with only one classification as these extreme values might distort the robustness of the result.



### Figure V: Volume of Trade by Investors with Different Beliefs about CEO Importance

This figure shows the volume of trade by investors with different beliefs about CEO importance. Investors A and E hold extreme beliefs, where investor A believes that performance is 100% attributed to the firm (the horse) and 0% to the CEO (the jockey), whereas investor E believes that performance is  $x\%$  attributed to the firm (the horse) and  $(100-x)\%$  attributed to the CEO (the jockey) with  $x > 0$ . Investors B, C and D hold moderate beliefs, where their weights are in between investors A and E. The total cost curve of the transaction cost of trading is depicted by the green curve. The blue curves are the total expected revenue curve of the various types of investors; investors with more extreme beliefs expect their revenues to be more sensitive to trade. The equilibrium trading volume of each type of investor is depicted in the x-axis.



**Table A1. Size of all Mutual Funds**

This table shows the assets under management (AUM) and the number of mutual funds from 2004 to 2020 for all funds, all equity funds, all passive funds, and all active funds.

Year	Funds Universe									
	All		All Equity Funds		All Passive Funds			All Active Funds		
	AUM	No. of Fund	AUM	Count	AUM	Market shares	Count	AUM	Market shares	Count
2004	4,219	27804	3,046	17953	1,173	39%	8840	1,873	61%	9113
2005	5,134	27708	3,591	17866	1,477	41%	8807	2,115	59%	9059
2006	6,458	27569	4,472	17750	2,043	46%	8762	2,429	54%	8988
2007	8,625	27382	5,585	17616	2,662	48%	8690	2,923	52%	8926
2008	10,333	26989	5,110	17443	2,551	50%	8674	2,559	50%	8769
2009	12,264	26040	5,792	17066	2,974	51%	8546	2,818	49%	8520
2010	15,217	23957	8,442	15522	4,149	49%	7806	4,294	51%	7716
2011	11,127	20502	6,884	12966	3,566	52%	6825	3,318	48%	6141
2012	11,949	20254	7,168	12794	3,788	53%	6755	3,380	47%	6039
2013	14,014	20005	8,708	12626	4,645	53%	6619	4,063	47%	6007
2014	16,048	19740	10,237	12414	5,449	53%	6473	4,788	47%	5941
2015	16,813	19522	10,943	12281	6,000	55%	6407	4,943	45%	5874
2016	16,949	19260	10,932	12110	6,132	56%	6307	4,801	44%	5803
2017	19,606	18953	13,016	11932	7,575	58%	6231	5,441	42%	5701
2018	21,308	18488	14,364	11649	8,499	59%	6075	5,865	41%	5574
2019	22,434	16765	15,038	10412	8,976	60%	5545	6,062	40%	4867
2020	23,811	16168	15,796	9957	9,474	60%	5284	6,322	40%	4673

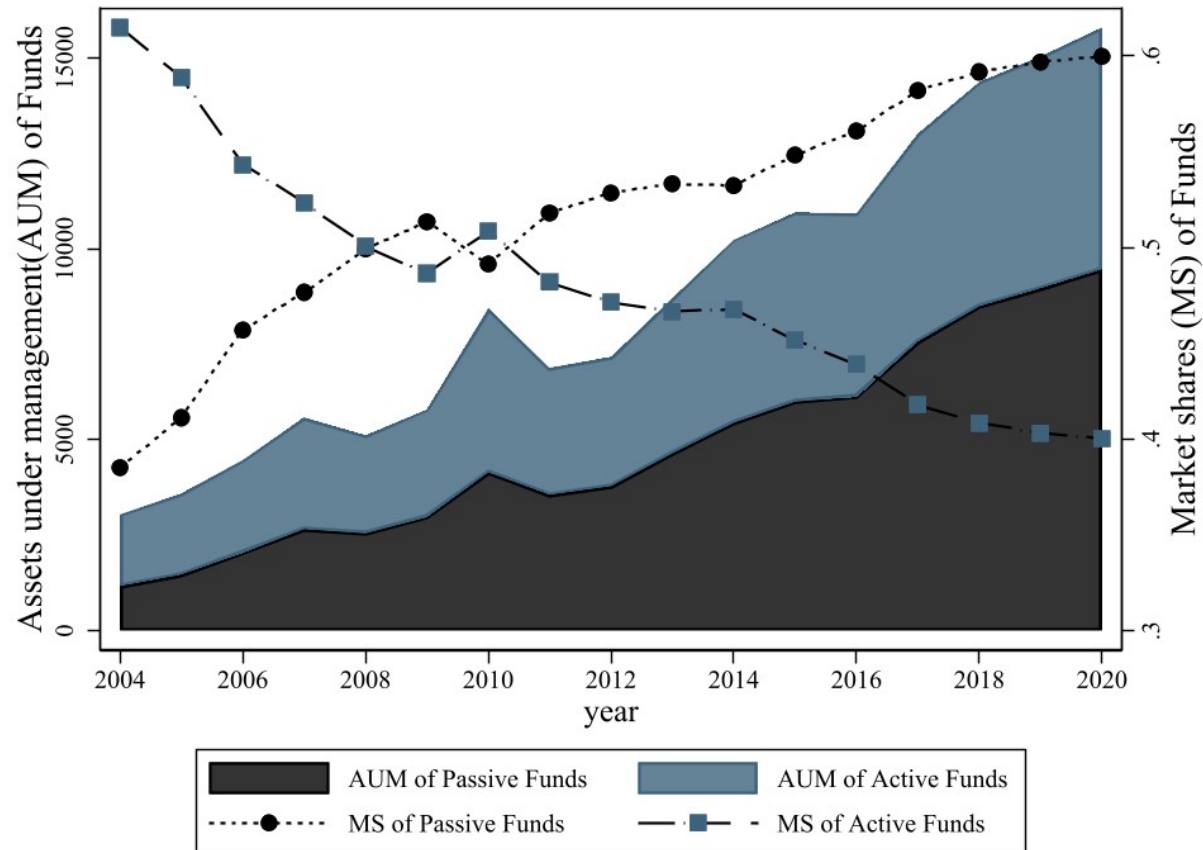
**Table A2. CEO turnovers**

This table shows the number of CEOs with turnovers and the number of active mutual funds holding stocks with turnover events from 2004 to 2020. One-Time CEOs have been CEOs in only one firm; serial CEOs are CEOs who have been the CEO in more than one firm; raided CEOs are serial CEOs who depart as CEO from one firm and become a CEO in another firm in less than 2 years. The percentage of serial CEOs and raided CEOs are also shown.

Year	Turnovers Universe						
	Turnover	One-Time CEOs		Serial CEOs		Raided CEOs	
	N	N	% of Turnover	N	% of Turnover	N	% of Turnover
2004	85	79	93%	6	7%	2	2%
2005	208	192	92%	16	8%	7	3%
2006	170	159	94%	11	6%	6	4%
2007	196	183	93%	13	7%	3	2%
2008	242	225	93%	17	7%	7	3%
2009	207	196	95%	11	5%	3	1%
2010	178	160	90%	18	10%	5	3%
2011	220	199	90%	21	10%	9	4%
2012	224	197	88%	27	12%	10	4%
2013	212	199	94%	13	6%	3	1%
2014	210	192	91%	18	9%	5	2%
2015	249	223	90%	26	10%	7	3%
2016	260	228	88%	32	12%	8	3%
2017	227	209	92%	18	8%	9	4%
2018	257	235	91%	22	9%	2	1%
2019	240	217	90%	23	10%	5	2%
2020	219	206	94%	13	6%	2	1%
Total	3604	3299		305		93	

**Figure A1: Actively vs. passively managed mutual funds**

This figure shows the assets under management (AUM) and market shares (MS) of actively managed and passively managed mutual funds from 2004 to 2020.



## Appendix B. Robustness with delta P

## Appendix C. Robustness using quarterly data

## Appendix D. Variable Definitions

#	Variables	Description	Definition
1	Fund TNA	Total net assets of Funds	The total net assets value as reported in CRSP survivorship bias free mutual fund database, scaled in billions.
2	Positions	Number of holdings of Funds	The number of holdings as reported as reported in CRSP survivorship bias free mutual fund database.
3	Equity (%)	% of equity holdings of Funds	The proportion of equity securities as reported in CRSP survivorship bias free mutual fund database.
4	Fund Age	Age of Funds since inception of the earliest share class.	Number of years since the inception of the earliest share class till the event.
6	Exp Ratio (%)	Monthly expense ratio of Funds	The monthly expense ratio, calculated from yearly expense ratio as reported in CRSP survivorship bias free mutual fund database.
7	Net Ret (%)	Monthly net return of Funds	The monthly net return as reported in CRSP survivorship bias free mutual fund database.
5	Gross Ret (%)	Monthly gross return of Funds	Sum of monthly net return and monthly expense ratio.
8	Flow (%)	Monthly net flow of Funds	The net fund flow of a fund for a given month $t$ is calculated as $[TNA_{\{i, t\}} - TNA_{\{i, t-1\}} * (1+R_{\{i, t\}})] / TNA_{\{i, t-1\}}$ .
9	Turnover (%)	Annual fund turnover ratio	The turnover ratio reported in CRSP survivorship bias free mutual fund database, as defined as the minimum of aggregated sales and aggregated purchases of securities, divided by the average 12-month Total Net Assets of the fund.
10	Family TNA	Total net assets of Fund Family	The aggregated total net assets value of the fund's family.
11	Family Size	Number of funds within Fund family	The number of funds of the fund's family.
12	Alpha_Market	Alpha - Market adjusted	Net fund returns minus the factor premium from the market factor. The market beta of the funds is estimated as the exposure of the fund's excess return to the market factor with a 36 months estimation period.
13	Alpha_FFC4	Alpha - FFC4 adjusted	Net fund returns minus the factor premium from the four-factors models. The four FFC factors include market, size, book-to-market ratio and momentum. The relevant factor betas of the funds is estimated as the exposure of the fund's excess return to the relevant factor with a 36 months estimation period.
14	Alpha_Benchmark	Alpha - Benchmark adjusted	Net fund returns minus the average net fund returns in the same benchmark, defined as the Lipper objective code reported in CRSP survivorship bias free mutual fund database.
15	Alpha_Style	Alpha - Style adjusted	Net fund returns minus the average net fund returns in the same style, defined as the 3 X 3 Style Box reported in MorningStar. The defined style includes combination of size categories (large, mid, small) and investment style (value, blended, growth).

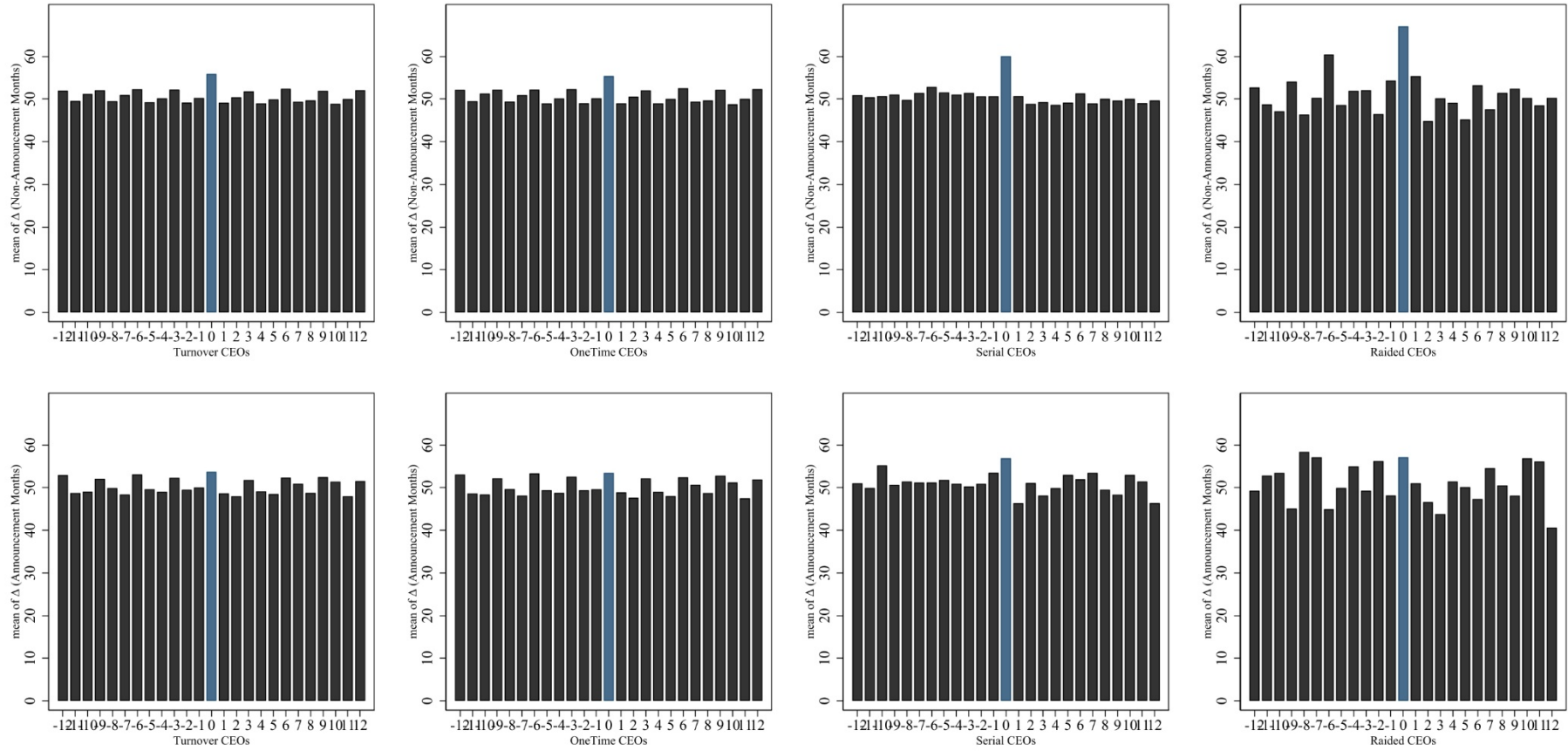


16	Return_CS	Return - Characteristics Selection	Measure of characteristic selection ability by mutual fund, constructed following Daniel et.al. (1997).
17	Return_CT	Return - Characteristics Timing	Measure of characteristic timing ability by mutual fund, constructed following Daniel et.al. (1997).
18	Return_AS	Return - Average Selection	Measure of fund's tendency to hold stocks with certain characteristics, constructed following Daniel et.al. (1997).
19	Nominal Output Growth	Annual growth of nominal outputs by industry	The annual growth rate calculated from the yearly nominal outputs by industry reported by the U.S. Bureau of Economic Analysis.
20	Real Output Growth	Annual growth of real outputs by industry	The annual growth rate calculated from the yearly real outputs by industry reported by the U.S. Bureau of Economic Analysis.
21	Value Added Growth	Annual growth of value added by industry	The annual growth rate calculated from the yearly value added by industry reported by the U.S. Bureau of Economic Analysis.
22	Wages	Total salary & compensation per worker by industry	The total annual salary and compensation by industry reported by the U.S. Bureau of Economic Analysis.
23	Nominal Output Growth Vol	Annual growth of nominal outputs volatility by industry	The standard deviation of annual growth in nominal outputs by industry, calculated from the annual nominal outputs by industry reported by the U.S. Bureau of Economic Analysis.
24	Real Output Growth Vol	Annual growth of real outputs volatility by industry	The standard deviation of annual growth in real outputs by industry, calculated from the annual real outputs by industry reported by the U.S. Bureau of Economic Analysis.
25	Value Added Growth Vol	Annual growth of value-added volatility by industry	The standard deviation of annual growth in value added by industry, calculated from the annual value added by industry reported by the U.S. Bureau of Economic Analysis.
26	Import Penetration	Annual import penetration by industry	The annual import penetration by industry reported by the U.S. Bureau of Economic Analysis.
27	Intellectual Property Investment	Annual intellectual property investments by industry	The annual intellectual property investment by industry reported by the U.S. Bureau of Economic Analysis.

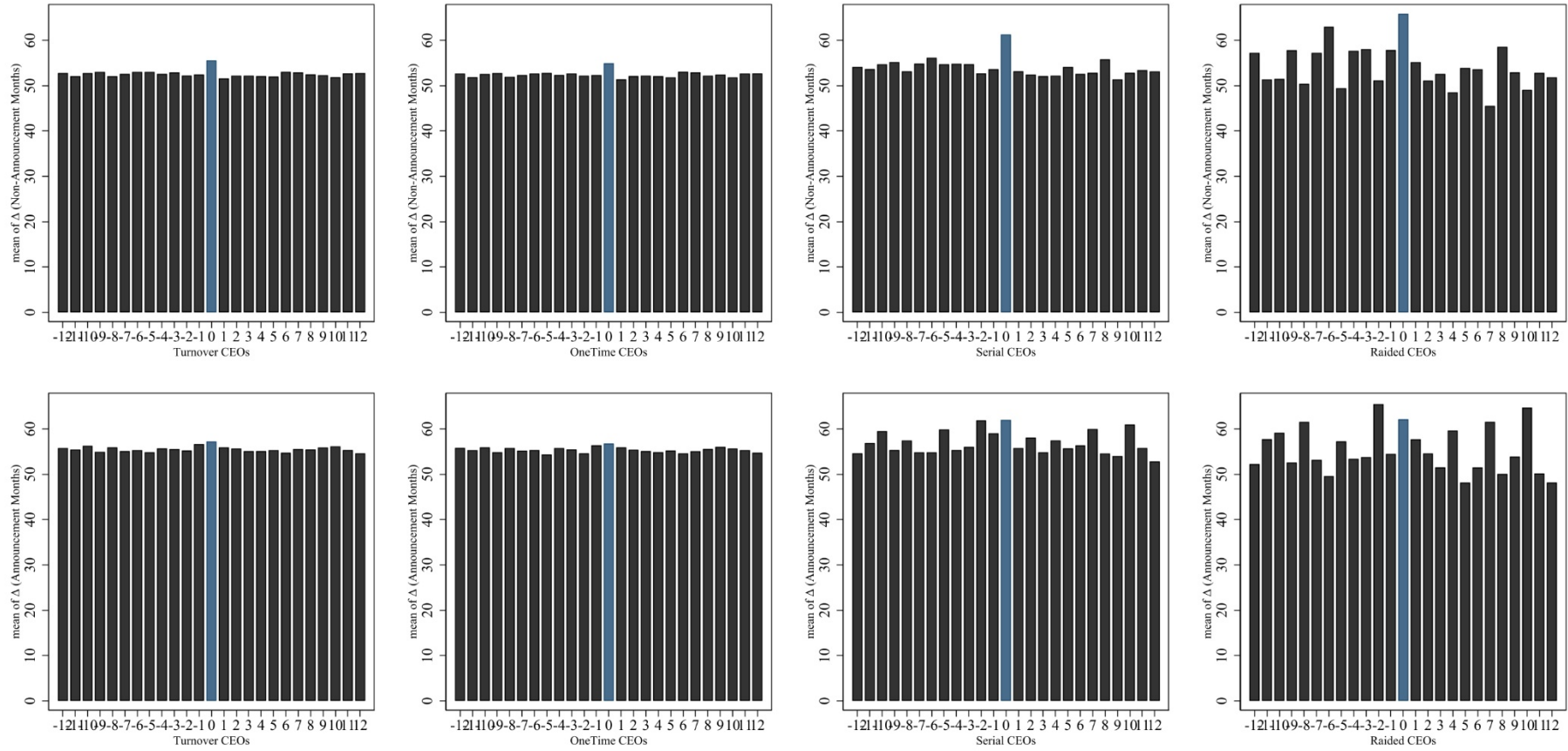
## Appendix E: Trading Activity Around CEO Turnovers and Corporate Earnings Announcement

This figure decomposes the magnitude of trading activity by active mutual funds around a CEO turnover month into months with corporate earnings announcement and months without corporate earnings announcements to address the concern that active mutual funds are responding to periodic information updates coinciding with CEO departure event, rather than to the CEO departure event itself. One-Time CEOs have been CEOs in only one firm; serial CEOs are CEOs who have been the CEO in more than one firm; raided CEOs are serial CEOs who depart as CEO from one firm and become a CEO in another firm in less than 2 years. We require the funds to hold the stock that has the CEO turnover one month prior to the CEO departure month. We compute the change of weight ( $\Delta w$ ) from  $t-1$  to  $t$  for all stocks held by the firm for all  $t$  in the entire sample period. We ranked the absolute  $\Delta w$  for this CEO turnover stock across all the months that the fund has held the stock – Time-Series Rank. We then ranked the absolute  $\Delta w$  for this CEO turnover stock across all stocks held by the fund each month – Cross-Section Rank. Given the CEO departure date at month  $t$ , we constructed a 2-year window, 12 months prior to the departure ( $t-12$ ) to 12 months after the event ( $t+12$ ). The rank percentile is plotted across this window. Panel A shows the Time-Series Ranks whereas Panel B shows the Cross-Section Ranks.

Panel A. Times-Series Rank Percentile of the Month



**Panel B. Cross-Section Rank Percentile of the Stock**



## Appendix F: Trading Activity Around CEO Turnovers between Mutual Funds and Non-Mutual Funds

This figure shows the fraction of trading activity by active mutual funds relative to the total volume of trading activity around a CEO turnover month. We construct the following ratio:  $Fund\ Turnover_{s,t} / Total\ Turnover_{s,t}$ , where “Total Turnover” is the share volume of CEO turnover stock  $s$  at time  $t$  by all investors and “Fund Turnover” is the share volume of CEO turnover stock  $s$  traded by mutual funds at time  $t$ . One-Time CEOs have been CEOs in only one firm; serial CEOs are CEOs who have been the CEO in more than one firm; raided CEOs are serial CEOs who depart as CEO from one firm and become a CEO in another firm in less than 2 years. Given the CEO departure date at month  $t$ , we constructed a 2-year window, 12 months prior to the departure ( $t-12$ ) to 12 months after the event ( $t+12$ ). The ratio is plotted across this window.

