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Does a CEO turnover lead to a CFO turnover? Evidence from voluntary and forced turnover

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ABSTRACT

The role of CFO has become increasingly important since the enactment of SOX 2002. The existing literature suggests that CFOs tend to leave office within 6 to 12 months of a CEO's departure, but studies addressing whether forced and voluntary turnover behave differently are unexplored. There is also no attempt to explore whether financial performance or institutional shareholding play moderating roles in mitigating successive CFO and CEO turnovers. We find that forced (voluntary) CEO turnover has a higher significant marginal effect on forced (voluntary) CFO turnover. We also find that, in general, higher financial performance and institutional ownership play significant moderating roles in the relationship between CEO turnover and CFO turnover. Our study indicates a strong disciplinary mechanism by the board due to its intention to signal that it is concerned about the firm's reputation. The voluntary turnover of a CFO as a result of a voluntary turnover of a CEO also indicates that a CFO considers their position to survive reputational damage.

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KEYWORDS
Corporate governance; CEO turnover; CFO turnover; CEO succession

1. Introduction

The Chief Executive Officer (CEO) is the center of the governance structure of a corporation (e.g. Graham and Harvey 2001; Jiang, Petroni, and Wang 2010; McAnally, Weaver, and Srivastava 2008; Parrino 1997). The existing literature suggests that forced CEO turnover is preceded by weak financial performance (Denis and Denis 1995; Mian 2001; Murphy and Zimmerman 1993; Sudarsanam and Mahate 2006; Warner, Watts, and Wruck 1988), earnings management (Bergstresser and Philippon 2006; Cheng and Warfield 2005), decline in institutional shareholding (Parrino, Sias, and Starks 2003), volatility of stock prices (Bushman, Dai, and Wang 2010; Gibbons and Murphy 1990; Holmstrom 1982; Jenter and Kannan 2015), and tail risk exposure (Srivastav et al. 2017). Due to the growing importance of the Chief Finance Officer (CFO) as second-in-command for financial reporting resulting from the Sarbanes Oxley Act of 2002 (SOX), CFO turnover has drawn considerable scholarly attention in the aftermath of SOX. Numerous studies look into the dynamic relationship between CEOs and CFOs. These studies generally suggest that forced CFO turnover is a matter of course following forced CEO turnover due to the aforementioned factors (e.g. Coyne and Coyne 2007; Fee and Hadlock 2004; Hayes, Oyer, and Schaefer 2002). However, there has been no attempt made in examining whether forced (voluntary) CEO turnovers are followed by forced (voluntary) CFO turnovers and/or higher financial performance and institutional ownership moderate the causal relationship, which this study aims to investigate.

The relationship between top executive turnover evolves around the Upper Echelons Theory (UET) developed by Hambrick and Mason in 1984, along with the Social Capital Theory proposed by Lin, Burt, and Cook

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in 2001, which are foundational frameworks in understanding organizational behavior. Hambrick and Mason (1984) emphasize that members of the top management team not only function as a cohesive unit but also share common professional and personal characteristics. Similarly, Lin, Burt, and Cook (2001) highlight that the decisions made by top management can be significantly influenced by their network connections, both within and outside the organization. This study aims to achieve three objectives that are grounded in both the Upper Echelons Theory (UET) and the Social Capital Theory: First, to examine whether forced CEO turnovers are followed by forced CFO turnovers and voluntary CEO turnovers are followed by voluntary CFO turnovers; Second, to examine whether higher financial performance moderates the causal relationship between CEO and CFO turnover; Third, to examine whether higher institutional ownership moderates the causal relationship between CEO and CFO turnover. By matching the CEO/CFO turnover dataset for US listed companies for the period 2005–2019, we show that CEO turnover$_{t-1}$ (i.e. in the preceding year) significantly increases the chances of CFO turnover at period t. In particular, we show that forced CEO turnover has a significant marginal effect on forced CFO turnover and voluntary CEO turnover has a significant marginal effect on forced CFO turnover. We also find that higher financial performance and institutional ownership play significant moderating roles for the relationship between CEO turnover and CFO turnover, i.e. higher financial performance and institutional ownership of a firm prevent the CFO to follow the CEO turnover.

This study contributes to the literature in three ways. First, it disentangles the effect of forced and voluntary CEO turnover on type of CFO turnover. The existing literature suggests that CFOs tend to leave office within 6 to 12 months of a CEO (Coyne and Coyne 2007; Fee and Hadlock 2004), but it is not clear whether a forced (voluntary) CEO turnover was followed by a forced (voluntary) CFO turnover, which this study addresses. In particular, we disentangle the effects of forced and voluntary CEO turnovers and find that forced CEO turnover has a significant marginal effect on forced CFO turnover and voluntary CEO turnover has a significant marginal effect on forced CFO turnover. On the one hand, we clearly connect CEO forced turnover to CFO forced turnover with strong disciplinary mechanism by the board because company boards signal their concern about their reputation. We also attempt to establish logic for a new career move by the CFO when the CEO voluntarily leaves office due to the CFO's reputational concerns.

Second, we make an important contribution to the effect of firm attributes on the relation between CEO and CFO exit. The existing literature suggests that forced CEO turnover is preceded by weak financial performance (Conyon and He 2014; Denis and Denis 1995; Mian 2001; Murphy and Zimmerman 1993; Sudarsanam and Mahate 2006; Warner, Watts, and Wruck 1988) and consequently; CFOs tend to be forced out of within 6 to 12 months (Coyne and Coyne 2007; Fee and Hadlock 2004). We examine the moderating role of strong financial performance to examine whether it prevents CFO turnover. We show that higher financial performance and institutional ownership play significant moderating roles for the relationship between CEO turnover and CFO turnover, i.e. higher financial performance and institutional ownership of a firm reduce the incidence of CFO exit following CEO turnover. The rest of the article is organized as follows: section 2 discusses the related theory and literature; section 3 presents the data and methodology of the study; and section 4 reports our empirical results. Our concluding remarks are included in section 5.

2. Theoretical framework and hypotheses development

2.1. Theoretical framework

The literature on executive turnover is based on Hambrick and Mason's (1984) upper echelons theory (UET), which posits that a firm reflects its leaders, particularly the top management team, because they are not only a team, but also share common professional and personal traits. Thus, it is a common practice for the CFO to exit following the departure of the CEO. For example, when Boeing's CEO Dennis Muilenburg stepped down in December 2019, its CFO Greg Smith announced his retirement in May 2021, which led to Boeing's share price dropping by 4% in reaction to the news. In the same year (2021), two other large company CFO departures followed CEO departure: Virgin Galactic, where CFO Jon Campagna stepped down just seven months after CEO George Whitesides moved on to the role of chief space officer. Also, in April, British supermarket group Asda announced the departure of its CFO, Rob McWilliam, just a few weeks after the resignation of its CEO,

Roger Burnley. Phil Murphy, a consultant at Spencer Stuart, who leads the firm's financial officer practice in North America commented, 'When there's a CEO change, within two years of that change, there is a CFO change more than 50% of the time,' he says. 'CEO changes often lead to CFO changes within a short time period.[1]'

Social Capital Theory, developed by Lin, Burt, and Cook in 2001, plays a significant role in the literature on executive turnover. This theory posits that executives can influence decisions based on their level of connections within and outside of the organization. It may be the case that CFOs prefer working with specific CEOs for comradery at the workplace. As a leader of the organization, the CEO wants the CFO to be their eyes and ears especially for financial matters. The comradery between the CEO and CFO is evident in the real life. For example, the CEO of the automated document analysis fintech Ocrolus, Sam Bobley, commented 'I deeply value my close-knit partnership with the finance team, with whom I work hand-in-hand to execute critical business activities, such as reporting, investor relations, fundraising, and strategic planning.[2]' Therefore, it can be argued that when the team, the CEO, leaves, it is difficult for the rest of the team to work effectively and the CFO will soon follow the path of the CEO.

The executive turnover can be explained by combining both theories.[3] Because over the years of working together, the CEO-CFO grow a relationship that extends beyond the formal work time. Some formal traits such as sharing the same goals for the growth of the same firm and some informal traits such as playing golf at the same club or children attending the same school create comradery beyond workplace.[4] Although we cannot formally test the theories, we can identify the channels through which we can justify the theories. In the case of forced turnover, the reasons are obvious and public. The most cited reasons are accounting fraud, accounting misstatement, poor performance etc. However, in the case of voluntary turnover, the reasons are less obvious. Most plausible reasons are executive's career growth, difference of opinion with the board, personal-life issues etc.

Both of the above theories justify that CEO turnover will impact CFO turnover. The timing of such impact may be different – it could be as short as a week or as long as a year or more. Also, the type of CEO turnover should have different impacts on the CFO turnover. On the one hand, when CEOs are fired by the board, CFOs are generally fired alongside because CFOs are the closest allies of the CEOs. For accounting fraud, accounting misstatement, and consistently poor performance, the board fires the top management team to showcase its genuine intention to rebound the company. Thus, the firing of CEOs and CFOs may happen at the same time. For a CEO's personal scandal, fraud, or illegal activities, the CEO is fired by the board. However, the CFO is not. In that case, the CFO voluntarily leaves the firm to disassociate herself or himself from the scandal. Thus, when CEOs are fired, CFOs may leave in either way: involuntarily or voluntarily because it depends on the cause of CEOs being fired.

On the other hand, for CEOs leaving voluntarily, CFOs may leave voluntarily or involuntarily. When the CEO leaves for a better opportunity, s/he can invite the CFO follow suite. Because the CEO would like to go the new firm with her/his team s/he created at the current firm. When the CEO leaves voluntarily and the CFO remains, the board may fire the old CFO for accounting fraud. The outgone CEO might have sensed the fraud and left the firm before the fraud was revealed. Alternatively, for personal scandal or wrongdoing of the CFO, the board may request the CEO to leave (because of her/his lack of grave supervision) and fire the CFO after CEO's departure. In both cases, the previous CEO has an indirect influence on departure of the previous CFO.

In order to explain the turnover in light of the theories, we need to give CFO (or the company board) some time to make a decision after the CEO's departure. Based on anecdotal evidence and extant literature (Coyne and Coyne 2007; Fee and Hadlock 2004), only CFO's sequential turnovers can capture the essence of the theories. One-year time-frame after the CEO's departure seems more logical to use in our case. After one year, the effect of CEO turnover on the CFO turnover fades away and/or may be contaminated with other causes.

Moreover, the firm's performance as well as other governance factors, such as institutional ownership, which prior research (e.g. Aghion, Reenen, and Zingales 2013) shows has a substantial impact on top executive hiring and firing, can impact CFO turnover. Mian (2001) shows that CFO replacement is preceded by consistent weak or negative performance, and it is necessary for the board to fire the CFO to earn the trust of the firm's investors. Leone and Liu (2010) show that most often CFOs are made scapegoats for financial fraud or misrepresentation as CFOs are considered responsible for the firm's financial activities and reporting.

2.2. CEO turnover and CFO turnover

An obvious question with regard to top management restructuring is 'What happens to the rest of the management team when the CEO leaves?' Since the CEO plays a central role in evaluating the performance of non-CEO executives, it is expected that non-CEO executive turnover will happen within a certain time frame after the CEO leaves office. In this regard, Fee and Hadlock (2004) demonstrate that non-CEO departures spike significantly within six months after the arrival of a new CEO. They argue that a change in CEOs triggers a significant reshuffling of the old management team at a reasonable speed. Coyne and Coyne (2007) similarly found that one out of four proxy-level executives had to leave the firm within a year of the CEO taking charge following SOX. In cases in which CEOs are ousted, it can be expected that the CFO, as second-in-command of the management team, should be removed quickly.[5] In line with the assumption, we expect that a forced CEO turnover will lead to a forced CFO turnover and vice versa. Based on these assumptions, we propose a general hypothesis for the relationship between CEO and CFO turnover as follows:

H1: CEO turnover triggers CFO turnover

We first test turnover in general, i.e. not separating *forced* from *voluntary* turnover. However, to gain more insight into the nature of CEO-CFO turnover, we classify turnover into *forced* and *voluntary* and test the nature of CFO turnover following the same nature of CEO turnover in the previous year. We use the theoretical framework above to explain the nature of CEO-CFO turnover. If we can show that the CFO leaves (voluntarily or involuntarily) once the CEO leaves (voluntarily or involuntarily), that would justify both the social capital theory and upper echelon theory. It is to be noted, the type of departure is not 'mutually exclusive,' meaning CFOs may be forced out even in the case of CEO's voluntary departure, in addition to CFOs leaving voluntarily. In such cases, the extent of such departure may vary. The CEO's forced departure should generally be associated with the CFO's forced departure and vice versa. However, there are cases, CEO's forced departure is followed by the CFO's voluntary departure. Statistically, we should see a higher coefficient (extent) of CEO's forced departure on CFO's forced departure and lower coefficient (extent) of CEO's voluntary departure on CFO's forced departure. In both cases, the fact remains the same, once the relationship between the CEO and CFO is severed, the CFO also leave. These analogies justify that both social capital theory and upper echelon theory underpin the relationship between CEO and CFO (forced and/or voluntary turnover).

2.3. Role of financial performance on CEO and CFO turnover

The academic literature generally concludes that CEO turnover is preceded by weak financial performance (e.g. Conyon and He 2014; Denis and Denis 1995; Murphy and Zimmerman 1993; Sudarsanam and Mahate 2006; Warner, Watts, and Wruck 1988). Mian (2001) argues that CFO effectiveness is a significant determinant of the financial success or failure of a firm and that vigilant CEOs replace ineffective CFOs in response to weak financial performance. If not, the CEO could be ousted by the board as a disciplinary mechanism. Since weak financial performance leads to CEO turnover followed by CFO turnover, we argue that CEO turnover may not occur because of strong financial performance, especially forced turnover may not happened if a firm makes a strong financial performance. Thus, our conjecture is that strong financial performance moderates the CFO turnover effect. We propose our H2 as follows:

H2: Financial performance has a moderating effect on CEO and CFO turnover

In the above hypothesis we test high versus low financial performance on CFO turnover. We use the joint effect of CEO turnover and poor performance [CEO Turnover * ROA] on the CFO turnover.

2.4. Role of institutional ownership on CEO and CFO turnover

There is also a popular debate on the appropriate role of institutional investors in the governance system of a corporation. While many market observers believe that institutional investors sell their shares if they are dissatisfied with management, Parrino, Sias, and Starks (2003) demonstrate that aggregate institutional ownership and the number of institutional investors decline in the year prior to forced CEO turnover. Similarly, strong institutional

ownership can turn the relationship between CEO and CFO turnover. Thus, our conjecture is that a higher level of institutional shareholding moderates the relationship between CEO and CFO turnover. We propose our H3 as:

H3: Institutional ownership has a moderating effect on CEO and CFO turnover.

In the above hypothesis, we test high versus low institutional ownership on CFO turnover. We use the joint effect of CEO turnover and firm's institutional ownership [CEO Turnover * % of institutional ownership] on the CFO turnover.

3. Data and methodology

3.1. Data and sample selection

We take CEO/CFO turnover and restatement data from AuditAnalytics (AA).[6] Other variables are calculated by using variables from COMPUSTAT. Stock market returns data is collected from CRSP. Insider and institutional holdings are taken from Thompson Reuters of Wharton Database (13f, s34 dataset). The database has three types of holdings: direct institutional holdings, indirect institutional holdings, and total institutional holdings as a percentage of total stock outstanding. We use total holdings by institutions such as mutual funds and other professional investment or money managers. Data on governance and other CEO characteristics is from Institutional Shareholder Services (ISS), formerly known as RiskMetrics. Board-related data is collected from both ISS and BoardEx.

Although AA has data from 1999, there are only a few observations in 1999–2002, with 10 CEO turnovers and 4 CFO turnovers. In 2004, the US Securities and Exchange Commission finalized its ruling regarding 8-K filings, and the effective date of the Final Rule was August 23, 2004.[7] Moreover, although we started this project in 2020, data is still being collected on firms whose fiscal year ended in late 2020. We therefore excluded 2004 and 2020. Our sample period thus covers the period 2005–2019. Following the accounting and finance literature, we exclude firms from regulated and financial industries (SIC 4900-4999 and 6000-6900) because of the unique nature of their operations and financial reporting. We take the following categories from AuditAnalytics, which define them as follows:

Dismissed – indicates a clear forced termination of employment or board service.

Resigned – indicates a voluntary departure.

Employment ceased – is used when the filing is unclear as to whether the departure was voluntary or forced.

We combine 'dismissed' and 'employment ceased,' and label them a forced turnover. The reason we include 'employment ceased' in forced turnover is that sometimes firms do not want to fire an executive and are willing to accept a formal resignation because of the nature of disagreement between the board and the executive. Firing is bad news for the fired executive as well as for the firm. Fired executives have difficulty finding a similar or better position. Gilson (1989) studied the turnover of managers from financially distressed firms. He found that it takes three years for managers who resigned to be employed by similar firms. Also, the board does not want to associate itself with firing to avoid risk to the board members' personal reputations (Taylor 2010). Thus, 'Employment Ceased' is a milder version of 'Dismissed.' 'Resigned' is a voluntary action taken by the executive; we therefore label it a voluntary turnover. Our turnover variable is a combination of two states: voluntary ('resigned') and involuntary ('dismissed' and 'employment ceased') turnovers.[8]

The models have different numbers of observations because (a) we are using a subset of a full sample; (b) we are using more variables in some models than others; and (c) not all variables have data for the same years. We indicate the number of observations used in the models in the results tables.

3.2. Research methodology

The primary objective of this article is to explore whether the acclimatization periods of newly hired CEOs prevent or accelerate the possibility of forced (and voluntary) CFO turnover within a year of CEO turnover. A firm is qualified to be included in the sample if it experiences CFO turnover in any particular year. We create the following empirical models.

Model 1 outlines our general empirical setting for the baseline estimations (**H1**). Model (1) tests whether CFO turnover is a consequence of CEO turnover in the prior year.

$$\begin{aligned} CFO\ Turnover_{i,t} = {} & \alpha_0 + \beta_1{}^{*}CEO\ Turnover_{i,t-1} + \beta_2{}^{*}ROA_{i,t-1} + \beta_3{}^{*}Size_{i,t-1} \\ & + \beta_4{}^{*}HHI_{i,t-1} + \beta_5{}^{*}Restatement_{i,t-1} + \beta_6{}^{*}AuditorConcern_{i,t-1} + \beta_7{}^{*}Leverage_{i,t-1} \\ & + \beta_8{}^{*}InstitOwners_{i,t-1} + Firm_j + Industry_k + Year_l + \varepsilon_t \end{aligned} \tag{1}$$

In the empirical section, we also use Model (1) to test the effect of forced/voluntary CEO-CFO turnover (see 4.1.1, 4.1.2, and 4.1.3). Empirical Model (2) aims to examine whether past year firm performance prevents or accelerate the possibility of forced CFO turnover within a year of forced CEO turnover (**H2**) with the controls specified below:

$$\begin{aligned} & CFO\ Turnover_{i,t} \\ & = \alpha_0 + \beta_1{}^{*}CEO\ Turnover_{i,t-1} + \beta_2{}^{*}Dum\_ROA_{i,t-1} + \beta_3{}^{*}CEO\ Turnover_{i,t-1}{}^{*}Dum\_ROA_{i,t-1} \\ & \quad + \beta_4{}^{*}ROA_{i,t-1} + \beta_5{}^{*}Size_{i,t-1} + \beta_6{}^{*}HHI_{i,t-1} + \beta_7{}^{*}Restatement_{i,t-1} + \beta_8{}^{*}AuditorConcern_{i,t-1} \\ & \quad + \beta_9{}^{*}Leverage_{i,t-1} + \beta_{10}{}^{*}InstitOwners_{i,t-1} + Firm_j + Industry_k + Year_l + \varepsilon_t \end{aligned} \tag{2}$$

Empirical Model (3) examine whether past year institutional holdings prevent or accelerate the possibility of forced CFO turnover (**H3**) within a year of forced CEO turnover with the controls specified below:

$$\begin{aligned} & CFO\ Turnover_{i,t} \\ & = \alpha_0 + \beta_1{}^{*}CEO\ Turnover_{i,t-1} + \beta_2{}^{*}Dum\_Insti_{i,t-1} + \beta_3{}^{*}CEO\ Turnover_{i,t-1}{}^{*}Dum\_Insti_{i,t-1} \\ & \quad + \beta_4{}^{*}ROA_{i,t-1} + \beta_5{}^{*}Size_{i,t-1} + \beta_6{}^{*}HHI_{i,t-1} + \beta_7{}^{*}Restatement_{i,t-1} + \beta_8{}^{*}AuditorConcern_{i,t-1} \\ & \quad + \beta_9{}^{*}Leverage_{i,t-1} + \beta_{10}{}^{*}InstitOwners_{i,t-1} + Firm_j + Industry_k + Year_l + \varepsilon_t \end{aligned} \tag{3}$$

Dum_ROA (IO) is a dummy variable equal to 1 in a given year if a firm's ROA (% of Institutional ownership) lies above the median of the distribution of the ROA (% of institutional ownership) of all firms belonging to the same industry as that firm in that year and zero otherwise.

$CFO\ Turnover_{i,t}$ is CFO turnover for firm i in year t and $CEO\ Turnover_{i,t-1}$ is CEO turnover for firm i in the prior year, respectively. The forced turnover and voluntary turnovers are defined above. $ROA_{i,t-1}$ is the firm's return on assets, which is a proxy for a firm's operating performance and is calculated as EBIT over the firm's average total assets. Firm size is the natural log of sales.[9] $HHI_{i,t-1}$ is the Herfindahl–Hirschman Index of a firm indicating market concentration. $Restatement_{i,t-1}$ is an indicator variable which takes 1 for a firm's restatement in the previous year, and 0 otherwise. Like operating performance, accounting restatement should affect CFO turnover. $AuditorConcern_{i,t-1}$ takes a value of 1 if the firm received an adverse opinion and 0 otherwise. $InstitutionalHoldings_{i,t-1}$ are a firm's shares held by institutional investors. The definition of the variables are included in Table 2.

In determining the likelihood of CFO turnover, we use a random effect logit (and probit) model.[10] A general form of RE logit model is:

$$Y^{*}_{i,t} = \alpha + \beta X_{i,t} + \epsilon_{i,t} + u_i \tag{4}$$

$$Y_{i,t} = \begin{cases} 1 & if\ Y^{*}_{i,t} \geq 0 \\ 0 & if\ Y^{*}_{i,t} < 0 \end{cases} \tag{5}$$

Where, $Y^{*}_{i,t}$ is the unobserved latent variable. $Y_{i,t}$ is the binary dependent variable which takes a value of 1 or 0. β is a Kx1 coefficient vector and $X_{i,t}$ is a 1xK vector of independent variables (characteristics of firm i at time t). For probit, $\epsilon_{i,t}$ follows *iid* standard normal and for logit it follows a logistic distribution and

$u_i \sim iidN(0, \sigma_u^2)$. Then, α, β, and σ_u^2 are jointly estimated using maximum likelihood to determine the following probability:

$$Pr[Y_{i,t} = 1|X_{i,t}] \tag{6}$$

The RE probit prediction probability is:[11]

$$Pr[Y_{i,t} = 1|X_{i,t}] = \Phi\left(\frac{\alpha + X_{i,t}\beta}{\sqrt{1+\sigma_u^2}}\right) \tag{7}$$

We compute marginal effects (= coefficients in OLS) of $X_{i,t}$:

$$\frac{\partial}{\partial X_k} Pr[Y_{i,t} = 1|X_{i,t}] = \frac{\beta_K}{\sqrt{1+\sigma_u^2}}\phi\left(\frac{\alpha + X_{i,t}\beta}{\sqrt{1+\sigma_u^2}}\right) \tag{8}$$

Robust standard errors are computed and reported, and are clustered at the firm-level. We report *rho*, which represents the proportion of the total error variance accounted for by unobserved heterogeneity (similar to R^2 in OLS). Also, we report the *p*-value of the Wald statistic (labeled as Diff) for the equality of the marginal effects associated with the variable of CEO *forced* and CEO *voluntary*. A significant *p*-value indicates a larger marginal effect of the variable with higher coefficient.

3.3. Description of the data

Table 1 reports the distribution of CEO and CFO turnover over the sample period. CFO (CEO) turnover includes both forced and voluntary turnover. The forced column and voluntary column contain the forced and voluntary CFO (CEO) turnover as per the definition provided in data section above. From 2005-2019 there were 5457 (4393) CFO (CEO) turnover. In the same period there were 567 (518) *forced* CFO(CEO) turnover. Also, in the same period, there were 4890 (3875) *voluntary* CFO(CEO) turnover. Table 2 reports the descriptive statistics. It reports the number of observations, mean, standard deviation, minimum, median, and maximum value of the variables used in this study. Approximately 10% of firms restated their earnings. Firm size differs from 0.04 million ($exp(-3.270)$) to 181,680 million. The lowest return on assets (ROA) is −15% and the highest return is 39%; with a mean return of −0.39% and median return of 3%. The average market concentration is 0.25 with a minimum of 1% to a maximum 100%. Ten percent of the firms restated their previous earnings. Moreover, 11% of the firms in the sample received an audit 'concern' from their external auditor. The average insider (institutional) holdings percentages are 39% (10%) with a minimum of 0% (0%) and maximum of 98% (85%). On average, the board consists of 9 members with a minimum of 5 members and a maximum of 16 members. Seventy-eight percent of board members are independent. We report a Pearson correlation matrix in Table 3. We find that the correlation coefficients are positively related to CFO turnover with the exception of HHI, which are in line with the expected relationships.

4. Empirical results

4.1. Baseline estimations

Since we aim to explore the impact of CEO turnover on CFO turnover, the main variable of interest in the baseline estimation is CEO Turnover (t-1). We also include a number of control variables that might affect CFO turnover. All variables are defined in Table 2. Year dummies and industry dummies are included in the estimation but not reported. Our baseline model (Model 1) estimates the marginal effect of CEO turnover (both voluntary – 'resigned' – and forced – 'dismissed' and 'employment ceased') in the preceding year '*t-1*' on CFO turnover (both voluntary and forced) in the year '*t*.' We report the results in Table 4. A positive coefficient means

that the CEO turnover has a positive effect on CFO turnover, while controlling for other factors that affect CFO turnover. We find that CEO turnover$_{t-1}$ (i.e. in the preceding year) significantly increases the chances of CFO turnover at period t, indicating that CEO turnover escalates CFO turnover within a year. This result supports the upper echelon theory (UET) and social capital theory (SCT). Both theories suggest that the CFO follows the CEO. The CFO (in case of voluntary turnover) and the board (in case of forced turnover) had one-year time to decide. The reason we use sequential turnover is to justify the above-mentioned theories. For concurrent turnovers (which happen in the same year), it is not possible to empirically test the theories.

Also, our findings support Fee and Hadlock's (2004) finding that non-CEO departures spike significantly within six months after a CEO turnover. Our finding is also in line with Coyne and Coyne's (2007) conclusion that proxy-level executives have to leave a firm within a year of the new CEO taking charge. Our result is also consistent with that of Hayes, Oyer, and Schaefer (2002), who find that the association between CEO and non-CEO changes persists and non-CEO managers are more likely to leave the company's top management team during the year following a CEO turnover.

The control variables, such as ROA, Size, HHI, Restatement and Audit Concern are included in Model (1). Among the control variables, we find a negative relationship between ROA and CFO Turnover. This finding is quite logical since negative performance fuels the fire, i.e. poor firm performance makes CFO turnover more probable. This result is in line with the existing literature on financial performance and top executive turnover (e.g. Denis and Denis 1995; Murphy and Zimmerman 1993; Sudarsanam and Mahate 2006; Warner, Watts, and Wruck 1988).

We also find that both firm size and market concentration positively (and significantly) relate to CFO turnover. These results demonstrate that boards of large firms pragmatically replace their top executives within a shorter timeframe in signaling to the market that they are cleaning the slate effectively (Mian 2001). As expected, we also find that the previous year's earning *restatement* has a positive effect on CFO turnover. This result indicates that the sole responsibility of the CFO in creating and maintaining quality financial reporting is compromised by restating earnings; consequently, it is no surprise that the CFO has to leave the job for this action. For robustness checks, we run the baseline Model (1) by excluding firms that never experienced CEO turnover and the results are reported in Appendix Table A1. We also employ an OLS estimation of the baseline model for robustness. The results are reported in Appendix Table A3. We find that CEO turnover$_{t-1}$ significantly increases the chances of CFO turnover at period t, indicating that CEO turnover escalates CFO turnover within a year. Thus, the baseline results are robust after employing an alternative estimation method and sample.

Table 1. Distribution of CFO and CFO turnover.

Year	Observations	CFO_Turnover	CFO_Forced	CFO_Voluntary	CEO_Turnover	CEO_Forced	CEO_Voluntary
2005	10,855	206	30	176	161	18	143
2006	10,877	228	28	200	184	42	142
2007	10,871	291	56	235	210	45	165
2008	10,683	279	45	234	239	45	194
2009	10,637	216	43	173	214	48	166
2010	11,039	246	50	196	192	50	142
2011	11,616	258	63	195	233	44	189
2012	11,836	334	83	251	267	57	210
2013	11,830	351	51	300	295	53	242
2014	11,634	367	17	350	293	11	282
2015	11,443	447	27	420	354	21	333
2016	11,284	462	18	444	365	22	343
2017	11,186	494	20	474	412	13	399
2018	11,012	627	14	613	468	26	442
2019	10,601	651	22	629	506	23	483
Total	167,404	5,457	567	4,890	4,393	518	3,875
Percentage	100%	3.26%	0.34%	2.92%	2.62%	0.31%	2.31%

This table reports the time-series distribution of the number of observations. CFO/CEO Turnover denotes firms that experienced either CFO or CEO turnover in a given year. CFO_Forced/CEO_Forced and CFO_Voluntary/CEO_Voluntary distinguish between forced and voluntary turnover for CFOs and CEOs, respectively.

Table 2. Descriptive statistics.

Variable	Definition	Mean	SD	Min	p50	Max	*N*
CFO Turnover	A binary variable taking a value of 1 if the firm experiences *CFO* turnover, otherwise 0.	3.26%	17.76%	0	0	1	167,404
CEO Turnover	A binary variable taking a value of 1 if the firm experiences *CEO* turnover, otherwise 0.	2.62%	15.99%	0	0	1	167,404
CFO_Forced	A binary variable taking a value of 1 if the firm experiences *CFO involuntary* turnover, otherwise 0.	0.34%	5.81%	0	0	1	167,404
CFO_Voluntary	A binary variable taking a value of 1 if the firm experiences *CFO voluntary* turnover, otherwise 0.	2.92%	16.84%	0	0	1	167,404
CEO_Forced	A binary variable taking a value of 1 if the firm experiences *CEO involuntary* turnover, otherwise 0.	0.31%	5.55%	0	0	1	167,404
CEO_Voluntary	A binary variable taking a value of 1 if the firm experiences *CEO voluntary* turnover, otherwise 0.	2.31%	15.04%	0	0	1	167,404
ROA	*ROA* is measured as EBIT over average total assets.	−0.388	1.847	−15.000	0.026	0.393	110,243
Size	*Size* is the natural log of firm's sales.	5.444	3.026	−3.270	5.701	12.107	118,185
HHI	*HHI* is the Herfindahl–Hirschman Index of a firm indicating market concentration.	0.248	0.214	0.010	0.177	1	150,283
Restatement	*Restatement* is an indicator variable, taking a value of 1 if the firm restated its earnings, and 0 otherwise. The restatement data was obtained from AuditAnalytics.	0.099	0.299	0	0	1	99,598
Concern	*Concern* indicates an audit concern, issued by the external auditor. This data was extracted from the Audit Analytic database.	0.111	0.314	0	0	1	97,779
Leverage	*Leverage* is the ratio of total long-term debt to total assets.	0.180	0.251	0	0.076	1.413	122,785
Institutional Ownership (IO)	*Institutional Ownership (IO)* data was extracted from the Thompson Reuters of Wharton Database (13f, s34 dataset). The database has three types of holding: direct institutional, indirect institutional, and total institutional as a percentage of total stock outstanding. We used total holdings by institutions such as mutual funds and other professional investment or money managers.	0.434	0.345	0	0.397	1	78,457

This table presents the descriptive statistics of the variables, including the mean, standard deviation, minimum, median, and maximum values.

4.1.1. CFO turnover – effect of forced and voluntary CEO turnovers

To examine whether there are different marginal effects of forced and voluntary CEO turnovers on CFO turnover, we split our main variable of interest 'CEO turnover' into forced CEO turnover and voluntary CEO turnover. We find that both *forced* and *voluntary* CEO turnover variables accelerate CFO turnover within a year. The *p*-values associated with the test for the equality of the marginal effects between CEO forced and CEO voluntary show that there is no significant difference between their marginal effects. These results indicate that irrespective of the type of CEO turnover, the effect is significantly positive for CFO turnover. The sequential CFO departure again justifies the upper echelon theory and social capital theory. As a recap, both theories suggest that CFOs follow their leader, i.e. CEOs, in their career move. For robustness checks, we run the baseline Model (1) by excluding firms that never experienced CEO turnover. the results are reported in Appendix Table A2, and the results remain consistent with the baseline results. Focusing on the control variables, we find a negative relation between ROA and CFO Turnover. Among other control variables, Size, HHI, Restatement, and Audit Concern are positively associated with CFO Turnover. Overall, there is no significant difference between the marginal effects of forced CEO and voluntary CEO turnovers on CFO turnover, even though the effect of control variables remains the same as the baseline results.

Table 3. Pairwise correlations.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) CFO_Turnover	1.000												
(2) CFO_Forced	0.318***	1.000											
(3) CFO_Voluntary	0.945***	−0.010***	1.000										
(4) CEO_Turnover	0.193***	0.067***	0.180***	1.000									
(5) CEO_Forced	0.046***	0.081***	0.020***	0.345***	1.000								
(6) CEO_Voluntary	0.132***	0.021***	0.132***	0.900***	−0.008***	1.000							
(7) ROA	0.001	0.002	0.001	−0.014***	0.000	−0.015***	1.000						
(8) Size	0.021***	0.011***	0.019***	0.009***	0.008***	0.007**	0.490***	1.000					
(9) HHI	−0.028***	−0.009***	−0.026***	−0.025***	−0.005*	−0.024***	0.005*	−0.108***	1.000				
(10) Restatement	0.021***	0.004	0.020***	0.015***	−0.001	0.015***	−0.003	−0.021***	−0.021***	1.000			
(11) Concern	0.015***	0.008**	0.013***	0.040***	0.002	0.042***	−0.441***	−0.512***	−0.001	0.004	1.000		
(12) Leverage	0.011***	0.002	0.010***	0.013***	0.010***	0.011***	0.011***	0.167***	−0.012***	−0.008**	0.002	1.000	
(13) IO	0.093***	0.021***	0.091***	0.069***	0.020***	0.064***	0.169***	0.334***	−0.037***	0.023***	−0.218***	0.137***	1.000

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

4.1.2. CFO forced turnover – effect of forced and voluntary CEO turnovers

We test whether there are different marginal effects of forced and voluntary CEO turnovers on CFO forced turnover. We employ both forced CEO turnover and voluntary CEO turnover as the main variables of interest in the model. We find that both forced and voluntary CEO turnover accelerate forced CFO turnover within a year, with the former having a greater impact than the latter. The *p*-values associated with the test for the equality of the marginal effects between CEO_Forced and CEO_Voluntary suggest the difference is statistically significant.[12] These results indicate that forced CEO turnover has a greater impact (positive) on forced CFO turnover. Please note that CEO voluntary turnover is also significant and positive; only the coefficient is smaller than forced CEO turnover. Therefore, it is logical that the CFO leaves office involuntarily following a forced CEO turnover due to the disciplinary actions of the board. The finding suggests upper echelon theory, in which the executive team is ousted as a 'team.' Please note that CEO voluntary turnover is positive and significant too, however, with a lower marginal effect. That means the CFO is ousted within a year following the CEO's voluntary turnover. Apparently, this finding can be a bit puzzling. However, there are some plausible explanations. CFOs may be fired for their wrongdoing or fraud. Before that firing, CEOs may be asked to leave voluntarily by the board for their inability to properly guide the team members, including the CFO (a minor offense not worthy of firing). Alternatively, CEOs might have overseen a brewing accounting problem and left the firm voluntarily. The board finds out about the wrongdoing and fires the CFO later.

Focusing on the control variables, we find a negative relation between ROA and forced CFO turnover and a positive relation between Size and forced CFO turnover. The coefficients of other control variables remain the same as the baseline results even though the coefficients are not statistically significant. Overall, the main results clearly show that a forced CEO turnover leads to a forced CFO turnover.

4.1.3. CFO voluntary turnover – effect of forced and voluntary CEO turnovers

We examine whether there are different marginal effects of forced and voluntary CEO turnovers on CFO voluntary turnover. We employ both forced CEO turnover and voluntary CEO turnover as the main variables of interest in the model. We find that both forced and voluntary CEO turnover accelerate voluntary CFO turnover within a year, with the latter having a greater impact than the former. The *p*-values associated with the test for

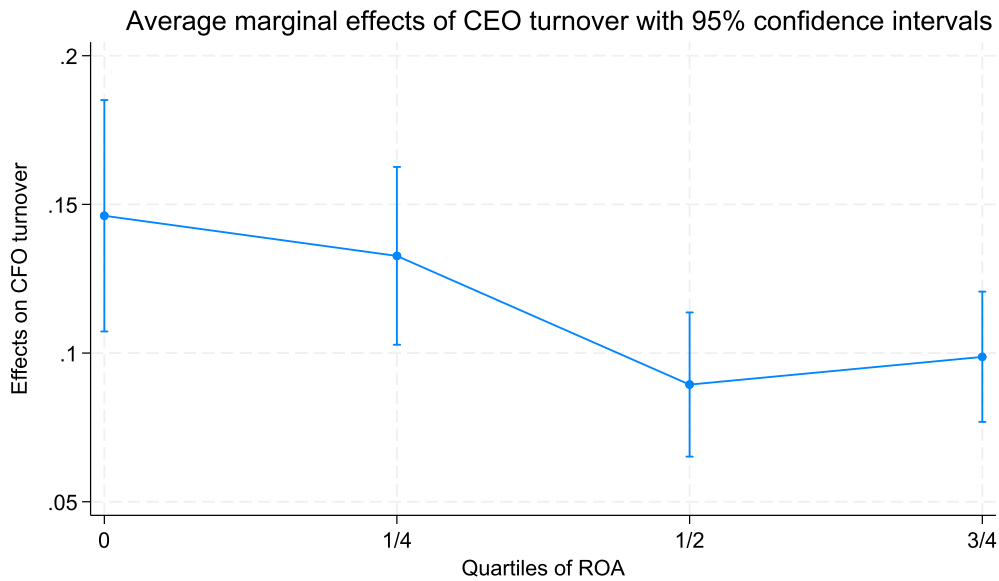


Figure 1. The impact of CEO turnover on CFO turnover across the quartiles of ROA.

the equality of the marginal effects between CEO_Forced and CEO_Voluntary suggest the difference is statistically significant. Thus, the voluntary CEO turnover has a greater impact (positive) on voluntary CFO turnover. These results may suggest that the CFO leaves due to not having the ideal team to work with. The voluntary CFO turnover justifies the fact that the CFO cannot function productively without the team leader (CEO). This finding corroborates the social capital theory. On the other hand, it can be argued that after their former boss is fired, CFOs find the current firm, no longer '*preferred*.' This conjecture supports the upper echelon theory. Therefore, we can posit that both UET and SCT apply in this scenario.

Focusing on the control variables, we find a negative relation between ROA and CFO voluntary turnover and a positive relation between Size, HHI, Restatement, and CFO voluntary turnover. The coefficients of the control variables remain the same and statistically significant as the baseline results. Thus, the main results show that a voluntary CEO turnover is followed by a voluntary CFO turnover. Nevertheless, we include additional governance variables, such as Board Size and Independent Directors, to check whether the results remain robust. The results are reported in Appendix Table A4. The results remain the same after controlling for board level attributes.

The findings on forced and voluntary turnover (see Tables 6 and 7) best support the social capital theory (and upper echelon theory) since CEO turnover of any sort generally leads to CFO turnover. Moreover, they shed light on several important implications for the governance mechanism. First of all, the board of directors take the forced removal of the CEO seriously due to market signaling. The board removes the second-in-command (CFO) to signal the market that the board takes the removal seriously and wants to start cleaning house. Secondly, the interpretation of voluntary CEO turnover is that the CFO leaves the company due to the desire to safeguard their reputation. These phenomena tell us about the camaraderie between the highest two C-suite executives (i.e. CEO and CFO). Finally, these identical movements – forced CEO vs forced CFO turnover – voluntary CEO vs voluntary CFO turnover – justify management's responsibilities with respect to the Sarbanes Oxley Act (SOX 2002). Both the CEO and the CFO are responsible for the accuracy of the financial statements as the regulatory body sees these two executives as a team.

Table 4. CFO turnover.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
CEO Turnover$_{t-1}$	0.049***	0.061***	0.061***	0.078***	0.077***	0.073***	0.071***
	(0.001)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)
ROA$_{t-1}$		−0.001***	−0.001***	−0.000	−0.000	−0.000	−0.000
		(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
Size$_{t-1}$		0.002***	0.002***	0.001***	0.002***	0.002***	0.001
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
HHI$_{t-1}$			0.007**	0.012**	0.011**	0.010*	0.014**
			(0.003)	(0.005)	(0.005)	(0.005)	(0.006)
Restatement$_{t-1}$				0.011***	0.010***	0.011***	0.009***
				(0.003)	(0.003)	(0.003)	(0.003)
Concern$_{t-1}$					0.004	0.002	0.010*
					(0.003)	(0.003)	(0.005)
Leverage$_{t-1}$						−0.001	0.003
						(0.003)	(0.005)
IO$_{t-1}$							0.023***
							(0.004)
Firm REs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
rho	0.24	0.19	0.19	0.11	0.11	0.11	0.08
Observations	167,404	110,243	110,243	75,428	72,533	70,772	50,058

This table reports the estimates from regressions of CEO turnover on CFO turnover using the random-effects logit estimator. Model 1 is the base model. Additional variables of *ROA, Size, HHI, Restatement*, *Concern, Leverage, and IO* are added in Models 2–6. Our specific interest was in determining the impact of CEO replacement on CFO replacement. *CFO Turnover* is the dependent variable, *CEO Turnover* indicates CEO turnover in the year before CFO turnover, and the rest are control variables that could affect CFO turnover. All variables are defined in the Appendix. Year dummies and industry dummies were included in the estimation but not reported. The table reports the marginal effects. The robust standard errors in the parenthesis are clustered at the firm level. *rho* represents the proportion of the total error variance accounted for by unobserved heterogeneity. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 5. CFO turnover.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
CEO_Forced_{t-1}	0.038***	0.046***	0.046***	0.059***	0.059***	0.059***	0.054***
	(0.003)	(0.004)	(0.004)	(0.006)	(0.006)	(0.006)	(0.008)
$CEO\_Voluntary_{t-1}$	0.036***	0.045***	0.045***	0.055***	0.053***	0.047***	0.042***
	(0.001)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)	(0.004)
ROA_{t-1}		−0.001***	−0.001***	−0.001	−0.000	−0.000	−0.000
		(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
$Size_{t-1}$		0.002***	0.002***	0.001***	0.002***	0.002***	0.001
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
HHI_{t-1}			0.007**	0.012**	0.011**	0.010*	0.014**
			(0.003)	(0.005)	(0.005)	(0.005)	(0.006)
$Restatement_{t-1}$				0.011***	0.010***	0.011***	0.009***
				(0.003)	(0.003)	(0.003)	(0.003)
$Concern_{t-1}$					0.006*	0.004	0.012**
					(0.003)	(0.004)	(0.005)
$Leverage_{t-1}$						−0.001	0.003
						(0.004)	(0.005)
IO_{t-1}							0.024***
							(0.004)
Firm REs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Diff	0.72	0.79	0.80	0.56	0.34	0.07*	0.16
rho	0.27	0.21	0.21	0.13	0.13	0.13	0.09
Observations	167,404	110,243	110,243	75,428	72,533	70,772	50,058

This table reports the estimates from regressions of CFO turnover on CEO forced and voluntary turnover using the random-effects logit estimator. Model 1 is the base model. Additional variables of *ROA, Size, HHI, Restatement, Concern, Leverage, and IO* are added in Models 2–6. Our specific interest was in determining the impact of forced and voluntary CEO replacement on CFO replacement. CFO turnover is the dependent variable. CEO_Forced and CEO_Voluntary indicate CEO forced and voluntary turnover in the year before CFO turnover, and the rest (i.e. *ROA, Size, HHI, Restatement, Concern, Leverage, IO*) are control variables that could affect CFO turnover. All variables are defined in the Appendix. Year dummies and industry dummies were included in the estimation but not reported. The table reports marginal effects. The robust standard errors in the parenthesis are clustered at the firm level. *rho* represents the proportion of the total error variance accounted for by unobserved heterogeneity. *Diff* is the *p*-value of the Wald statistic for equality of the marginal effects associated with the variables CEO_Forced and CEO_Voluntary. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

4.2. Firm performance and CFO turnover

Extant literature suggests that firm performance plays a key role in executive turnover.[13] In this section, we examine whether firm's previous performance (ROAt-1) affects CFO turnover. We test the marginal effects from regressions of CEO turnover on CFO *forced* and *voluntary* turnover using the random-effects logit estimator. Our specific interest is to determine whether the relationship between CEO turnover and CFO turnover differs between firms with high and low ROA. The results are reported in Table 8. The dependent variable for Models 1&2 is CFO turnover and the dependent variable for Models 3&4 is *forced* and *voluntary* CFO turnover respectively. We employ forced CEO turnover and voluntary CEO turnover as the main variables of interest in models 2-4. As before, we include ROA, Size, HHI, and Restatement as control variables. We also include a ROA dummy variable (Dum_ROA). Dum_ROA is a dummy variable equal to 1 in a given year if a firm's ROA lies above the median of the distribution of the ROA of all firms belonging to the same industry as that firm in that year and zero otherwise. All variables are defined in Table 2. As usual, the year dummies and industry dummies are included in the estimation but not reported.

The main variable of interest in this analysis is the marginal effect associated with the interaction between CEO Turnover as well as forced CEO and voluntary CEO turnover and Dum_ROA. The coefficients of all of three variables are negative, but the coefficients of CEO Turnover*Dum_ROA and CEO voluntary Turnover*Dum_ROA are statistically significant. Although CFO turnover is lower for high firm performance in general, it is more pronounced in the case of a voluntary CEO turnover. This means that high firm performance plays a significant role in moderating the usual positive relationship between CEO and CFO turnover. In particular, the moderation in relationship is more pronounced in the case of voluntary CEO turnover, i.e.

Table 6. Forced CFO turnover.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
CEO_Forced_{t-1}	0.010***	0.012***	0.012***	0.015***	0.015***	0.015***	0.015***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
$CEO\_Voluntary_{t-1}$	0.004***	0.005***	0.005***	0.006***	0.006***	0.006***	0.006***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
ROA_{t-1}		−0.000	−0.000	0.000	0.000	−0.000	−0.000
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$Size_{t-1}$		0.000***	0.000***	0.000*	0.000*	0.000*	0.000
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
HHI_{t-1}			0.001	0.001	0.001	0.001	0.002
			(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
$Restatement_{t-1}$				0.001	0.001	0.001	0.001
				(0.001)	(0.001)	(0.001)	(0.001)
$Concern_{t-1}$					0.001	0.001	0.003*
					(0.001)	(0.001)	(0.002)
$Leverage_{t-1}$						−0.001	−0.001
						(0.001)	(0.002)
IO_{t-1}							0.003**
							(0.001)
Firm REs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Diff	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***
rho	0.23	0.16	0.16	0.11	0.11	0.11	0.06
Observations	167,404	110,243	110,243	75,428	72,533	70,772	50,058

This table reports the estimates from regressions of forced CFO turnover on forced and voluntary CEO turnover using the random-effects logit estimator. Model 1 is the base model. Additional variables of *ROA, Size, HHI, Restatement, Concern, Leverage, and IO* are added in Models 2–6. Our specific interest was in determining the impact of forced and voluntary CEO replacement on forced CFO replacement. CEO_Forced and CEO_Voluntary indicate CEO forced and voluntary turnover in the year before CFO turnover, and the rest (i.e. *ROA, Size, HHI, Restatement, Concern, Leverage, IO*) are control variables that could affect CFO turnover. All variables are defined in the Appendix. Year dummies and industry dummies were included in the estimation but not reported. The table reports marginal effects. Robust standard errors in the parenthesis are clustered at the firm level. *rho* represents the proportion of the total error variance accounted for by unobserved heterogeneity. *Diff* is the *p*-value of the Wald statistic for equality of the marginal effects associated with the variables of CEO_Forced and CEO_Voluntary. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

CEO voluntary turnover has less association with CFO turnover (either forced or voluntary) in firms with better financial performance. Therefore, the finding supports H2. The quarterly marginal effects of ROA on CFO turnover are presented in Figure 1.

Among other results, the relationship between CEO Turnover and CFO turnover remains the same as the baseline results and the results for forced vs voluntary turnover (see Tables 4–7). The results for the control variables also remain the same as earlier results, as do the interpretations. We also perform alternative performance analysis by using Tobin's Q and the results are qualitatively similar with the correct signs (Table 8).[14]

4.3. Institutional ownership and CFO turnover

As extant literature (see Parrino, Sias, and Starks (2003) and Bratten and Xue (2017)) suggest, institutional owners play a significant role in setting the tone for top management. We examine whether higher institutional ownership accelerates or weakens the usual relationship between CEO turnover and CFO turnover by using the random-effects logit estimator. Our specific interest is to determine whether the relationship between CEO turnover and CFO turnover differs between firms with high and low institutional ownership. The results are reported in Table 9. We include an institutional ownership dummy 'Dum_IO' in the model. Dum_IO is a dummy variable equal to 1 in a given year if a firm's institutional ownership lies above the median of the distribution of institutional ownership of all firms belonging to the same industry as that firm in that year and zero otherwise. All variables are defined in Table 2. As usual, the year dummies and industry dummies are included in the estimation but not reported. The main variable of interest in this analysis is the marginal effect associated

Table 7. Voluntary CFO turnover.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
CEO_Forced_{t-1}	0.019***	0.026***	0.026***	0.030***	0.031***	0.031***	0.026***
	(0.004)	(0.005)	(0.005)	(0.007)	(0.007)	(0.007)	(0.009)
$CEO\_Voluntary_{t-1}$	0.035***	0.042***	0.042***	0.051***	0.048***	0.042***	0.038***
	(0.001)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)	(0.004)
ROA_{t-1}		−0.001***	−0.001***	−0.000	−0.000	−0.000	0.000
		(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
$Size_{t-1}$		0.002***	0.002***	0.001***	0.002***	0.002***	0.001
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
HHI_{t-1}			0.006*	0.011**	0.009*	0.008*	0.013**
			(0.003)	(0.005)	(0.005)	(0.005)	(0.006)
$Restatement_{t-1}$				0.010***	0.010***	0.010***	0.009***
				(0.002)	(0.003)	(0.003)	(0.003)
$Concern_{t-1}$					0.005	0.002	0.008
					(0.003)	(0.003)	(0.005)
$Leverage_{t-1}$						−0.000	0.004
						(0.003)	(0.005)
IO_{t-1}							0.021***
							(0.004)
Firm REs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Diff	0.00***	0.00***	0.00***	0.01***	0.02**	0.13	0.21
rho	0.24	0.20	0.20	0.12	0.12	0.12	0.09
Observations	167,404	110,243	110,243	75,428	72,533	70,772	50,058

This table reports the estimates from regressions of voluntary CFO turnover on CEO forced and voluntary turnover using the random-effects logit estimator. Model 1 is the base model. Additional variables of *ROA, Size, HHI, Restatement*, *Concern, Leverage, and IO* are added in Models 2–6. Our specific interest was in determining the impact of forced and voluntary CEO replacement on forced CFO replacement. CEO_Forced and CEO_Voluntary indicate CEO forced and voluntary turnover in the year before CFO turnover, and the rest (i.e. *ROA, Size, HHI, Restatement, Concern, Leverage, IO*) are control variables that could affect CFO turnover. All variables are defined in the Appendix. Year dummies and industry dummies were included in the estimation but not reported. The table reports marginal effects. The robust standard errors in the parenthesis are clustered at the firm level. *rho* represents the proportion of the total error variance accounted for by unobserved heterogeneity. *Diff* is the *p*-value of the Wald statistic for equality of the marginal effects associated with the variable of CEO_Forced and CEO_Voluntary. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

with the interaction between CEO Turnover as well as forced CEO and voluntary CEO turnover and Dum_IO. Although the coefficients of all of three variables are negative, the coefficients are insignificant or marginally significant, indicating an insignificant effect in the weakening of the relationship between CEO-CFO turnover. Interestingly, the coefficients of IO is significantly positively related to CFO turnover. Overall, higher or lower institutional ownership does not make a significant difference in the CEO-CFO turnover relationship that we show in the baseline analysis. The quarterly marginal effects of Institutional Ownership (IO) on CFO turnover are presented in Figure 2. Focusing on the other regressors, we find that the results for the control variables remain qualitatively similar to the baseline results, so the interpretations remain the same as before.

4.4. Addressing endogeneity – IV estimation

Endogeneity raises serious concerns for the causal relationship between CEO turnover and CFO turnover. An endogenous model often produces biased estimates. In our case, there may be an unobservable (omitted variable) variable that can accelerate or prevent CEO and CFO turnover in addition to the control variables included in our models. We test for endogeneity using an instrumental variable (IV) approach in a two-stage regression model (2SLS). The primary hypothesis is that an effective instrument should not affect the dependent variable, but should affect the main variable of interest. We use a CEO's total network connections[15] as an instrument and estimate our base model (Eq. 1). As the baseline model, our dependent variable is CFO turnover and the independent variable is a lagged CEO turnover with other control variables. Table 10 reports the marginal effects from regressions of CFO turnover and CEO turnover using the instrumental variable (IV) probit estimator. CEO_Turnover is instrumented using the CEO's total network connections.[16]

Table 8. CFO turnover and firm performance (ROA).

	(1)	(2)	(3)	(4)
	CFO_Turnover	CFO_Turnover	CFO_Forced Turnover	CFO_Voluntary Turnover
CEO $Turnover_{t-1}$	0.111***			
	(0.007)			
CEO $Forced_{t-1}$		0.078***	0.049***	0.032**
		(0.015)	(0.012)	(0.013)
CEO $Voluntary_{t-1}$		0.056***	0.009***	0.050***
		(0.006)	(0.003)	(0.006)
Dum_ROA_{t-1}	−0.003	−0.003	−0.001	−0.002
	(0.002)	(0.002)	(0.001)	(0.002)
CEO $Turnover_{t-1} * Dum\_ROA_{t-1}$	−0.041***			
	(0.014)			
CEO $Forced_{t-1} * Dum\_ROA_{t-1}$		−0.024	−0.008	−0.017
		(0.034)	(0.024)	(0.029)
CEO $Voluntary_{t-1} * Dum\_ROA_{t-1}$		−0.027**	−0.014**	−0.018
		(0.014)	(0.007)	(0.013)
ROA_{t-1}	0.000	0.000	−0.000	0.000
	(0.001)	(0.001)	(0.000)	(0.001)
$Size_{t-1}$	0.001	0.001*	0.000	0.001
	(0.001)	(0.001)	(0.000)	(0.001)
HHI_{t-1}	0.014**	0.015**	0.002	0.013**
	(0.006)	(0.006)	(0.002)	(0.006)
$Restatement_{t-1}$	0.009***	0.009***	0.001	0.009***
	(0.003)	(0.003)	(0.001)	(0.003)
$Concern_{t-1}$	0.010*	0.011**	0.003*	0.008
	(0.005)	(0.005)	(0.002)	(0.005)
$Leverage_{t-1}$	0.003	0.003	−0.001	0.004
	(0.005)	(0.005)	(0.002)	(0.005)
IO_{t-1}	0.024***	0.024***	0.003**	0.021***
	(0.004)	(0.004)	(0.001)	(0.004)
Firm REs	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes
Industry FEs	Yes	Yes	Yes	Yes
rho	0.07	0.09	0.05	0.09
Observations	50,058	50,058	50,058	50,058

This table reports the estimates from regressions of CEO turnover on CFO forced and voluntary turnover using the random-effects logit estimator. Our specific interest was in determining whether the relationship between CEO replacement and CFO replacement differs between firms with high and low ROA. The dependent variable for Models 1 and 2 is CFO turnover; and for Models 3 and 4, it is forced and voluntary CFO turnover, respectively. CEO_Forced and CEO_Voluntary indicate CEO forced and voluntary turnover in the year before CFO turnover, and the rest (i.e. *ROA, Size, HHI, Restatement, Concern, Leverage, IO*) are control variables that could affect CFO turnover. Dum_ROA is a dummy variable equal to 1 in a given year if a firm's ROA lies above the median for all firms in the same industry in that year, and 0 otherwise. All variables are defined in the Appendix. Year dummies and industry dummies were included in the estimation but not reported. The table reports marginal effects. The robust standard errors in the parenthesis are clustered at the firm level. *rho* represents the proportion of the total error variance accounted for by unobserved heterogeneity. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Our specific interest is to determine the impact of CEO turnover on CFO turnover. All variables are defined in Table 2. As usual, the year dummies and industry dummies are included in the estimation but not reported. Robust standard errors in parentheses are clustered at the *firm-level*. The Cragg-Donald F-statistic is used to determine if the model is weakly identified. The Anderson canonical correlation statistic is distributed as chi-square.

We find that CEO turnover accelerates CFO turnover within a year, which indicates that the main results remain robust and consistent with the baseline estimations. Again, this result supports Fee and Hadlock (2004) that non-CEO departures spike significantly within six months after the arrival of the new CEO because the new CEO changes the management team soon after taking office. These findings are also in line with Coyne and Coyne (2007), concluding that proxy-level executives leave the firm within a year of CEO exit. The results are also consistent with Hayes, Oyer, and Schaefer (2002), who show that the association between CEO and

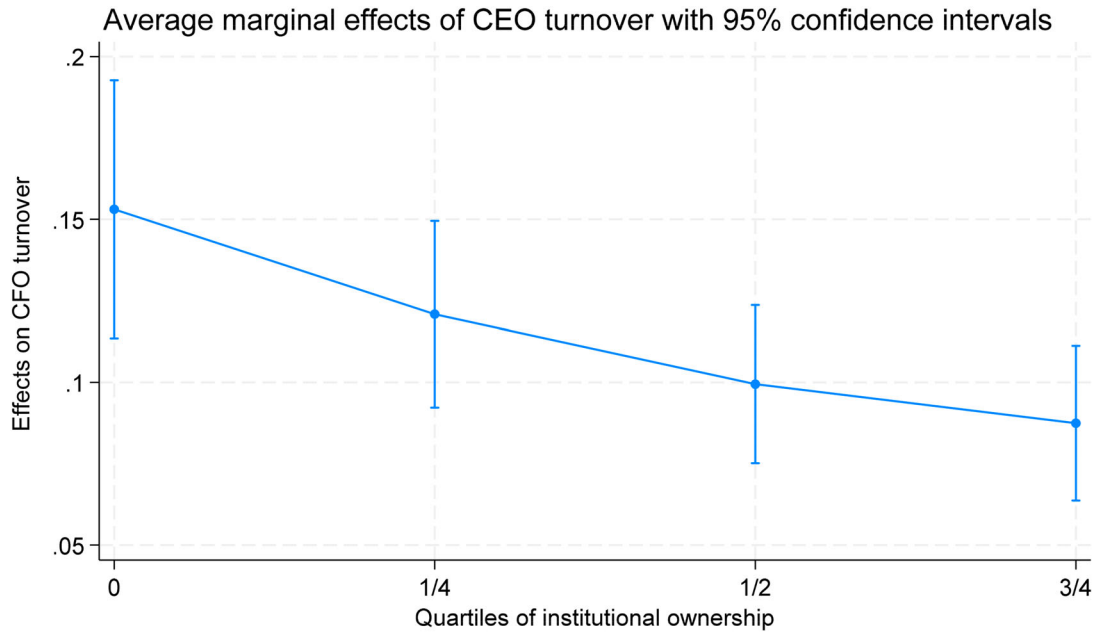


Figure 2. The impact of CEO turnover on CFO turnover across the quartiles of institutional ownership.

non-CEO changes persists. Nevertheless, the results for the control variable remain the same as in the baseline estimations.

4.5. Sample selection bias – PSM

In our study, discrepancies in observed characteristics – such as firms with vs. without CEO turnover – prior to the introduction of the treatment (CEO turnover) can indeed produce selection bias. To address the sample selection bias, we employ Propensity Score Matching (PSM). By matching firms in the treatment group with similar entities in the control group, PSM effectively aligns these groups in terms of observed covariates. This method allows us to create a matched sample where the distribution of these covariates is balanced, thereby facilitating more valid causal inferences about the impact of CEO turnover. We apply Nearest-Neighbour Matching, Kernel Matching, and Radius Matching approaches, and the coefficients for average treatment effect of the Treated (ATT) are significant, indicating that the distribution of these covariates of the matched sample is balanced (Table 11: Panel A). We employ a random effects logit estimator on the matched sample and the results are reported in Table 11 (Panel B).[17] We find that the causal inferences about the impact of CEO turnover on CFO turnover are statistically significant, which indicate that the sample selection is free from bias.

Nonetheless, we attempt to explore market reaction to the turnover events by calculating Cumulative Abnormal Returns (CAR) starting from 0 (the date of the earnings conference call) to 10 days (CAR 0,1; CAR 0,3; CAR 0,5; and CAR 0,10). The results are reported in Appendix Table A7. The graphical results are presented in Figures 3 and 4. In general, there are significant negative effects of CEO turnover on CFO turnover, especially the CAR (0,3) and CAR (0,5) are more significant than other periods.

4.6. CFO's career path

Our dataset includes 5,457 CFO and 4,393 CEO turnover events. Both BoardEx and ExecuComp provide only partial longitudinal coverage of executive movements, and many CFOs and CEOs exiting their roles do not have clearly documented subsequent appointments or compensation information, particularly those moving to

Table 9. CFO turnover and institutional ownership.

	(1)	(2)	(3)	(4)
	CFO_Turnover	CFO_Turnover	CFO_Forced Turnover	CFO_Voluntary Turnover
CEO $Turnover_{t-1}$	0.111***			
	(0.007)			
CEO $Forced_{t-1}$		0.078***	0.053***	0.032**
		(0.015)	(0.012)	(0.013)
CEO $Voluntary_{t-1}$		0.056***	0.009***	0.050***
		(0.006)	(0.003)	(0.006)
Dum_IO_{t-1}	0.004	0.004	0.001	0.003
	(0.004)	(0.004)	(0.002)	(0.004)
CEO $Turnover_{t-1} * Dum\_IO_{t-1}$	−0.044***			
	(0.015)			
CEO $Forced_{t-1} * Dum\_IO_{t-1}$		0.001	−0.059**	0.048*
		(0.033)	(0.029)	(0.028)
CEO $Voluntary_{t-1} * Dum\_IO_{t-1}$		−0.036***	−0.001	−0.035***
		(0.013)	(0.006)	(0.013)
ROA_{t-1}	−0.000	−0.000	−0.000	0.000
	(0.001)	(0.001)	(0.000)	(0.001)
$Size_{t-1}$	0.001	0.001	0.000	0.001
	(0.001)	(0.001)	(0.000)	(0.001)
HHI_{t-1}	0.014**	0.015**	0.002	0.013**
	(0.006)	(0.006)	(0.002)	(0.006)
$Restatement_{t-1}$	0.009***	0.009***	0.001	0.009***
	(0.003)	(0.003)	(0.001)	(0.003)
Concern t-1	0.010*	0.011**	0.003*	0.008
	(0.005)	(0.005)	(0.002)	(0.005)
$Leverage_{t-1}$	0.003	0.003	−0.001	0.004
	(0.005)	(0.005)	(0.002)	(0.005)
IO_{t-1}	0.018***	0.019***	0.002	0.017***
	(0.006)	(0.006)	(0.002)	(0.006)
Firm REs	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes
Industry FEs	Yes	Yes	Yes	Yes
rho	0.07	0.09	0.05	0.09
Observations	50,058	50,058	50,058	50,058

This table reports the estimates from regressions of CFO turnover on CEO forced and voluntary turnover using the random-effects logit estimator. Our specific interest was in determining whether the relationship between CEO replacement and CFO replacement differed between firms with high and low institutional ownership. The dependent variable for Models 1 and 2 is CFO turnover; and for Models 3 and 4, it is forced and voluntary CFO turnover, respectively. CEO_Forced and CEO_Voluntary indicate CEO forced and voluntary turnover in the year before CFO turnover, and the rest i.e. *ROA, Size, HHI, Restatement, Concern, Leverage, IO* are control variables that could affect CFO turnover. Dum_IO is a dummy variable equal to 1 in a given year if a firm's institutional ownership lies above the median for all firms in the same industry in that year, and 0 otherwise. All variables are defined in the Appendix. Year dummies and industry dummies were included in the estimation but not reported. The table reports marginal effects. The robust standard errors in the parenthesis are clustered at the firm level. *rho* represents the proportion of the total error variance accounted for by unobserved heterogeneity. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

private firms, smaller organizations, or into retirement. These constraints made it infeasible to systematically trace full career trajectories across the entire sample.

To overcome these challenges, we turned to two open-source databases focused on S&P 1500 firms, i.e. Gentry et al. (2021) and Zhang, Mount, and Zhang (2025). These sources provide detailed information on CEO and CFO turnovers, including new external job opportunities, internal transitions, and retirements.

The data highlight meaningful differences in career mobility between CFOs and CEOs. Among CFO turnovers, 47.1% involve job transitions (27.1% via internal movements and 20.0% through new job moves). In contrast, CEOs exhibit substantially lower mobility: only 3.3% of CEO turnovers are associated with external moves, and internal transitions are virtually non-existent. Most CEO departures (62.8%) are retirements,

Table 10. CFO turnover: IV estimates.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
CEO Turnover$_{t-1}$	12.729***	10.279***	10.233***	9.116***	9.318***	9.535***	7.600***
	(0.870)	(1.047)	(1.053)	(1.665)	(1.782)	(1.805)	(2.280)
ROA$_{t-1}$		0.009	0.009	0.013*	0.008	0.010	0.016
		(0.007)	(0.007)	(0.007)	(0.008)	(0.009)	(0.017)
Size$_{t-1}$		0.016***	0.016***	0.011**	0.005	0.004	−0.003
		(0.004)	(0.004)	(0.005)	(0.006)	(0.006)	(0.007)
HHI$_{t-1}$			0.050	0.039	0.034	0.030	0.073
			(0.055)	(0.066)	(0.068)	(0.069)	(0.073)
Restatement$_{t-1}$				0.040	0.036	0.035	0.033
				(0.037)	(0.039)	(0.040)	(0.042)
Concern$_{t-1}$					−0.117**	−0.141**	−0.035
					(0.058)	(0.061)	(0.076)
Leverage$_{t-1}$						0.043	0.087
						(0.050)	(0.060)
IO$_{t-1}$							0.136**
							(0.057)
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cragg-Donald Wald	384***	199***	196 ***	66***	50***	50***	26***
Anderson	383***	198***	196***	66***	50***	50***	26***
Observations	134,605	91,587	91,587	62,194	59,740	58,109	43,774

This table reports the estimates from regressions of CEO turnover on CFO turnover using the instrumental variable (IV) probit estimator. CEO_Turnover is instrumented using CEOs' total network connections. Our specific interest was in determining the impact of CEO replacement on CFO replacement. *CFO Turnover* is the dependent variable, *CEO Turnover* indicates CEO turnover in the year before CFO turnover, and the rest are control variables (i.e. *ROA, Size, HHI, Restatement, Concern, Leverage, IO*) that could affect CFO turnover. All variables are defined in the Appendix. Year dummies and industry dummies were included in the estimation but not reported. The table reports marginal effects. The robust standard errors in the parenthesis are clustered at the firm level. The Cragg-Donald Wald F-statistic was used to determine whether the model was weakly identified. Under the null that the equation is unidentified, the Anderson canonical correlation statistic is distributed as chi-square. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

compared to just 21.7% for CFOs. These patterns affirm that CFOs face stronger external labor market incentives and are likely to be more sensitive to leadership transitions within the firm.

Executive Transfer Mechanism (CEO-led migration of CFOs):

As suggested by the reviewer, we also explored whether CFOs follow departing CEOs to new firms (an executive team migration mechanism). While such instances are rare due to the low frequency of external CEO transitions (*only* 3.3%), they do occur. A representative example is as follows:

Executive Transfer Example:

Company (Ticker)	Former CEO (Exit Timeline)	CEO (Destination)	CFO (Exit Timeline)	CFO (Destination)
Bank of New York Mellon (NYSE: BK)	Charles Scharf – Oct 2019	CEO of Wells Fargo (NYSE: WFC)	Mike Santomassimo – September 2020	CEO of Wells Fargo (NYSE: WFC)

This case illustrates a coordinated transition, in which the newly appointed CEO brought a previously affiliated CFO to join the executive team at the new firm.

Job-Jump Mechanism (CFOs anticipating organizational changes)

In line with the 'job-jump' mechanism proposed by the reviewer, we identify several cases in which CFOs resigned shortly after a CEO departure, suggesting anticipatory exits in response to leadership uncertainty or perceived diminished internal opportunities. Examples include:

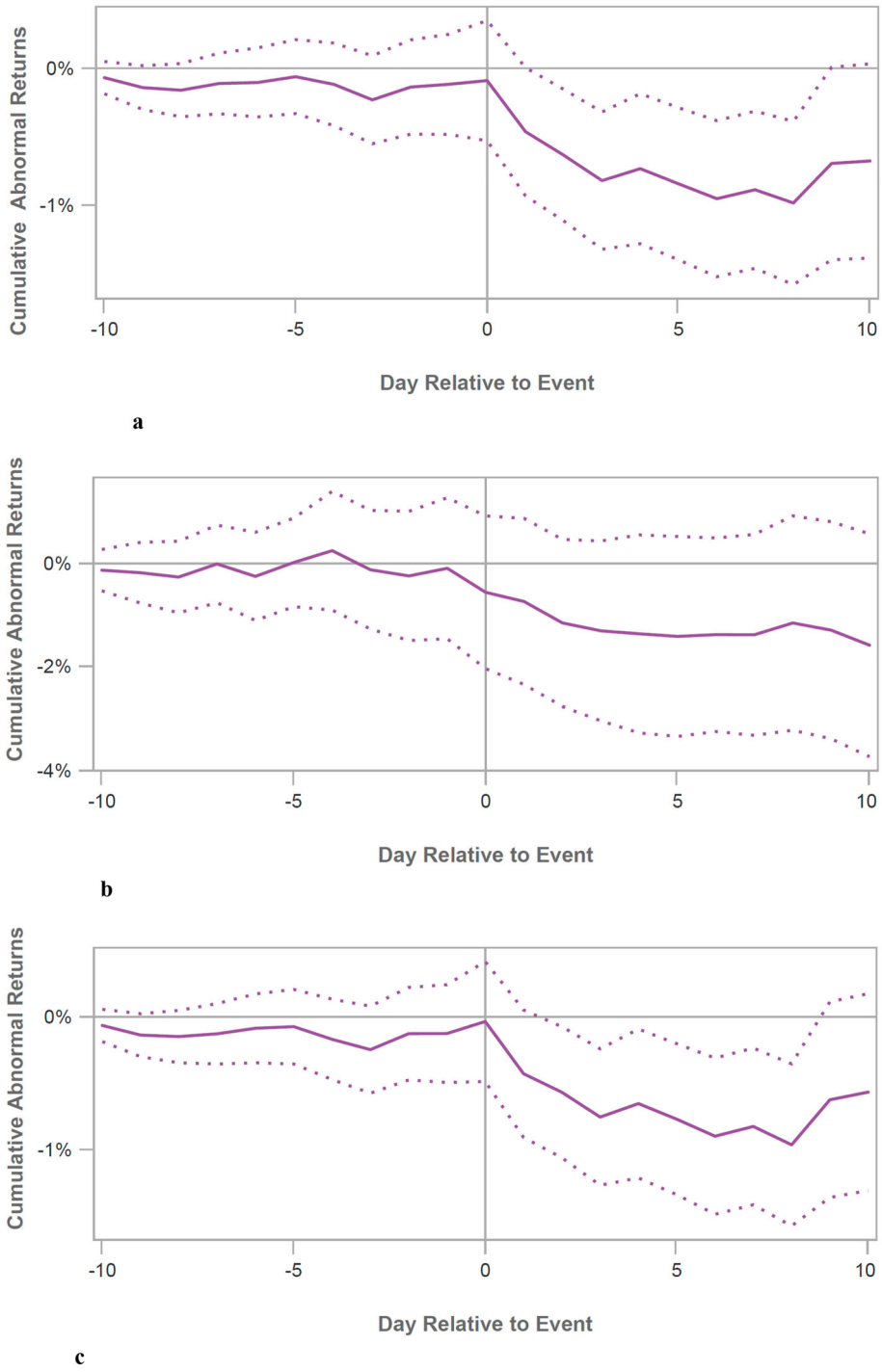
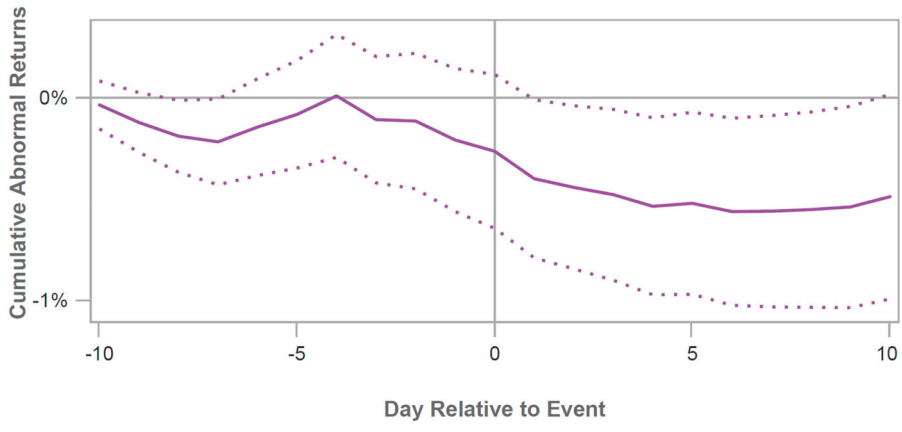


Figure 3. (a) Cumulative abnormal returns (CARs) for CEO turnover ($n = 2962$). (b) Cumulative abnormal returns (CARs) for forced CEO turnover ($n = 340$). (c) Cumulative abnormal returns (CARs) for voluntary CEO turnover ($n = 2624$).
Notes: The solid line represents abnormal returns estimated using the Fama-French Plus Momentum model. The dashed lines indicate the 95% confidence intervals. Abnormal returns are cumulated over a 10 trading day period starting from the issue date of the earnings conference call through 10 trading days after the call. Day 0 is the date of the CEO turnover. The estimation window is 100 trading days and the gap between the end of estimation window and the beginning of the event window is 50 trading days.



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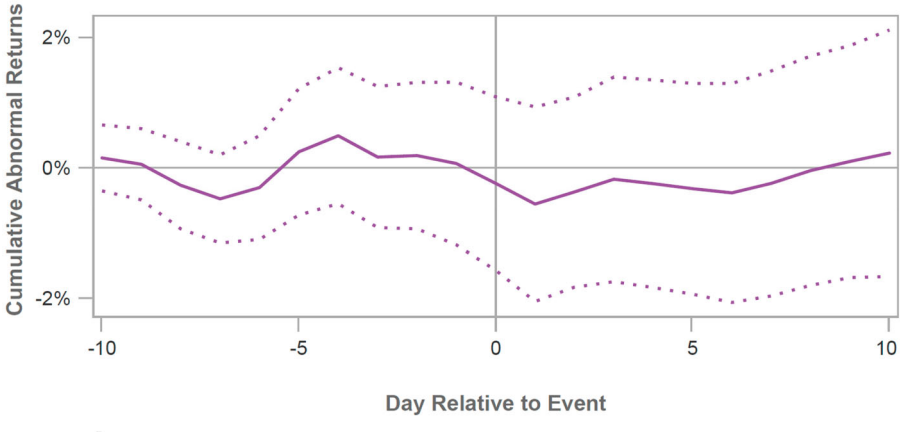

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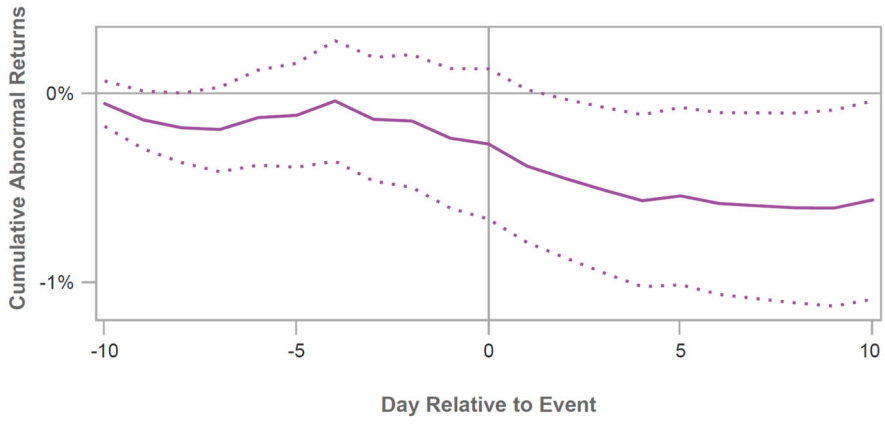

c

Figure 4. (a) Cumulative abnormal returns (CARs) for CFO turnover ($n = 3896$). (b) Cumulative abnormal returns (CARs) for forced CFO turnover ($n = 368$). (c) Cumulative abnormal returns (CARs) for voluntary CFO turnover ($n = 3528$).
Notes: The solid line represents abnormal returns estimated using the Fama-French Plus Momentum model. The dashed lines indicate the 95% confidence intervals. Abnormal returns are cumulated over a 10 trading day period starting from the issue date of the earnings conference call through 10 trading days after the call. Day 0 is the date of the CFO turnover. The estimation window is 100 trading days and the gap between the end of estimation window and the beginning of the event window is 50 trading days.

Table 11. CFO turnover using PSM analysis.

	Nearest-neighbour matching	Kernel matching	Radius matching
Panel A: Average treatment effect on the treated (ATT)			
ATT	0.159***	0.156***	0.156***
	(0.010)	(0.008)	(0.008)
Panel B: Matched sample			
CEO Turnover$_{t-1}$	0.162***	0.071***	0.071***
	(0.012)	(0.003)	(0.003)
Firm REs	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes
Industry FEs	Yes	Yes	Yes
rho	0.00	0.08	0.08
Observations	4869	50,008	50,008

This table reports the results of propensity score matching estimates using three techniques: one-to-one nearest neighborhood matching, kernel matching, and radius matching. Following Yang et al. (2022), we apply a 1% caliper for both nearest neighborhood and radius matching and set the bandwidth at 1% for kernel matching. Panel A reports the average treatment effect on the treated (ATT) based on these PSM techniques. Panel B presents regression estimates (marginal effects) from regressions of CEO turnover on CFO turnover using the random-effects logit estimator based on matched samples. The robust standard errors in the parenthesis are clustered at the firm level. *rho* represents the proportion of the total error variance accounted for by unobserved heterogeneity. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Company (Ticker)	Former CEO (Exit Timeline)	CEO (Destination)	CFO (Exit Timeline)	CFO (Destination)
Dollar Tree (NASDAQ: DLTR)	Rick Dreiling – 2024 (retirement)	Retirement	Jeff Davis – March 2025	Chair of the Audit Committee, Labcorp Holdings Inc
AutoZone (NYSE: AZO)	Steve Odland – 2005	CEO of Office Depot (NASDAQ: ODP)	Mike Archbold – Sept 2005	CFO at Saks Fifth Avenue (NYSE: SKS)
Microsoft (NASDAQ: MSFT)	Steve Ballmer – 2013 (announcement)	Retirement	Peter Klein – 2013	CFO at William Morris Endeavor Entertainment (WME) (NYSE: EDR)

These examples support the notion that CFOs may engage in strategic career moves in anticipation of internal leadership reshuffling.

5. Conclusion

The relationship between CEO turnover and CFO turnover has drawn academic attention in the post–Sarbanes Oxley Act 2002 (SOX) era (see, e.g. Fee and Hadlock 2004; Hayes, Oyer, and Schaefer 2002; Mian 2001). This study aims to investigate whether CEO forced and voluntary turnover affect CFO turnover differently. The study also attempts to examine whether strong financial performance and a higher level of institutional ownership play moderating roles in mitigating CFO turnover following CEO turnover. We find that forced CEO turnover has a higher significant marginal effect (than CEO voluntary turnover) on forced CFO turnover. Voluntary CEO turnover has a higher significant marginal effect (than forced CEO turnover) on voluntary CFO turnover. Whereas forced versus forced and voluntary versus voluntary is self-explanatory, some special cases justify voluntary versus forced and forced versus voluntary turnovers. We find support of social capital theory (executives are connected both inside and outside of the firm) and upper echelon theory (executives share common professional and personal traits).

We also find higher financial performance and institutional ownership play significant moderating roles for the relationship between CEO turnover and CFO turnover. Our results indicate a need for appropriate governance reforms to establish effective executive disciplinary mechanisms in US firms.

Our research has certain limitations. One area that requires further analysis is the career trajectory of CFOs after their turnover, which could provide deeper insights into the outcomes following such transitions. Additionally, while we categorized CEO-CFO turnovers into four distinct groups – forced-forced, voluntary-voluntary, forced-voluntary, and voluntary-forced – a more generalized classification, such as positive, negative, and neutral, may offer a broader perspective. We recognize these as valuable avenues for future research and plan to explore them in subsequent studies.

Notes

1. https://www.forbes.com/sites/samanthatodd/2021/05/05/follow-the-leader-when-a-ceo-resigns-the-cfo-is-likely-to-exit-within-two-years/?sh = 6bc93ec32b32.
2. https://www.cfo.com/news/what-ceos-want-in-replacement-cfos/654563/.
3. The theories are not mutually exclusive to each other, but, complementary, and thus help to explain turnovers. It is practically not possible to test the theories individually, because CEOs and CFOs share common traits to become C-suite members. Also they share common financial responsibilities (the SEC requires both of them to sign financial statements) for the firm.
4. We ran the pair-wise correlation of historical CEO Tenure and CFO Tenure at the *same firm* during our sample period. The coefficient is 0.2815***, which aligns with both UET and SCT. The coefficient indicates that there is a strong possibility that the CEO and the CFO work together for longer at the same firm.
5. The CFO retains the ultimate responsibility for the design and implementation of the policy decisions related to the company's financial performance.
6. Please refer to http://www.auditanalytics.com.
7. Please refer to https://www.sec.gov/rules/final/33-8400.htm.
8. Please note that some resignations may be categorized as involuntary, as when boards ask CEOs/CFOs to resign to avoid bad press. Our data source, however, does not allow us to identify such anecdotal or exceptional cases.
9. Authors in the turnover literature use the market value of the firm, the book value of total assets, the number of total employees, or sales as a proxy for a firm size. We chose to use sales (the natural logarithm of sales) because sales are a more direct measure of a CEO/CFO's performance. Other measures, such as total assets, may be an outcome of executives' empire-building efforts and may thus be a convoluted measure of size. Goyal and Park (2002), Fee and Hadlock (2004), and Karaevli (2007) use sales as a measure of firm size. All of these papers investigate executive turnover and/or succession.
10. The reason to use a random effects logit model include: (a) 'RE probit and logit are econometric techniques useful to economists when … analyzing panel data with a binary dependent variable and individual level heterogeneity orthogonal to our independent variables.' [Bland and Cook (2019)], (b) RE is more efficient/parsimonious compared to fixed effects (FE), (c) RE's ability to estimate variates within and between clusters, while FE cannot estimate the between-cluster effect.
11. We follow a similar setup as Bland and Cook (2019).
12. A significant *p*-value indicates a larger marginal effect of the variable with higher coefficient.
13. See Warner, Watts, and Wruck (1988), Murphy and Zimmerman (1993), Denis and Denis (1995), Mian (2001), Sudarsanam and Mahate (2006), Conyon and He (2014).
14. The results from Tobin's Q are available upon request from the authors.
15. CEO's connections via education, employment, and social networks will influence turnover (see Desai, Hogan, and Wilkins 2006; Hennes, Leone, and Miller 2008). CEO total connection is calculated by adding the CEOs' employment, education, and other social connections, in line with prior literature (see Bhandari et al. 2018; Engelberg, Gao, and Parsons 2013; Faleye, Kovacs, and Venkateswaran 2014; Fracassi 2016; Hong et al. 2016).
16. The First Stage results for the IV estimates are reported in Appendix Table A5.
17. The results for the Balancing Tests for all three approaches are included in Appendix Table A6.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Data availability statement

The data and materials that support the results or analyses presented in the paper are freely available upon request.

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