CEO Tenure, Performance and Turnover in S&P 500 Companies

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Abstract

The centrality of the CEO is reflected in the empirical literature linking CEO turnover to poor firm performance. However, less is known about the institutional and personal correlates of CEO turnover. In this study, we find two CEO characteristics interact with turnover: tenure and ownership. We interpret our results as indicating that CEOs of S&P 500 firms divide into two groups with different tenure patterns – "owners" (who have large personal shareholdings) and "managers" (who have smaller holdings). The tenure of manager-CEOs (as opposed to owner-CEOs) exhibits a term structure loosely similar to the one produced by the tenure process at academic institutions. Turnover significantly depends on firm performance during a CEO's first four years on the job. In particular, external turnover by sale of the firm peaks a year 4 during a CEO tenure. By contrast, external turnover peaks at years 5 – 6, and plateaus at relatively high levels until year 9 of tenure. These term effects are strongest for relatively young CEOs. We also find that forced exit, retirement, and deals covary rather than substitute for one another as modes of CEO turnover. However, forced exits and deals both relate to poor performance by the firm on different metrics. Our evidence suggests that most internal turnover, particularly after a CEO's first five years, is unrelated to firm performance.

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I. INTRODUCTION

Conventional wisdom holds the CEO to be the most important actor in the hierarchical world of the widely-held American company. The CEO manages the company, glorying in its successes and taking the blame for its failures. In contrast, the company's board of directors acts principally in a supportive role by advising and monitoring the CEO, and – inevitably – by replacing her when the time comes. Even shareholders exert influence chiefly through the CEO by, for example, lobbying the board to replace CEOs in whom they have lost confidence. The centrality of the CEO is reflected in the empirical literature on CEO turnover, which links turnover to poor firm performance.[2] Less is known, however, about the institutional and individual correlates of CEO turnover.

In this paper we explore the relationships between CEO tenure and three modes of CEO turnover: (1) "deal," or external turnover triggered by a friendly acquisition of the firm; (2) "fired," or forced internal turnover initiated by the board, and (3) "retire," or all other forms of internal turnover. Since we lack data on forced exits for many subjects, we also explore the relationship between CEO tenure and two modes of turnover: external turnover (deal), and all internal turnover, whether forced or not. Put differently, we develop two-outcome models for the effects of tenure on deal and aggregate internal turnover, and three-outcome models (within a subsample) for the effects of tenure on deal, forced exit, and other forms of internal turnover, which we term "retirement."

Based on anecdotal evidence,[3] our prior expectations were that companies are most likely to be sold shortly before CEOs face turnover for other reasons, such as mandatory retirement or poor health. Thus we expected that deal probability by tenure year would track the probability of internal turnovers, and particularly that of retirements. By contrast, recent literature using non-US data led us to expect that forced exits are most likely during the fourth or fifth year of CEO tenure, well before the median point when tenure ended by retirement in our sample. Gregory-Smith, et al., 2009. We also expected that relationships among tenure,

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2 E.g., Murphy (1999), Jensen et al. (2004), Jenter and Kanaan (2008), and Kaplan and Minton (2008).

3 Among corporate lawyers, probably the most famous anecdote is the case of *Smith v. Van Gorkom*, 488 A.2d 858 (Del. 1985), a divided Delaware Supreme Court held that not only the CEO, Van Gorkom, but the entire board of Trans Union, were liable to Trans Union shareholders for violating their legal duty of care by selling Trans Union to Marmon in a casual and overly-hasty fashion. Although it did not say so explicitly, the Court signaled its suspicion that Van Gorkom had favored a quick deal, even at the cost of a lower price, in order to liquidate his holdings of Trans Union stock before he retired. Owen (1986) provides an interesting if partisan review of this transaction and its legal consequences, which sent shock waves through the entire business community.

modes of turnover, and our control variables would reflect previously reported results in the literature. More particularly, we expected to confirm five results. First, we expected deals and forced exits to increase with poor firm performance and the presence of large outside blockholders. Second, we expected that deals would substitute for internal turnover, i.e., that more deals would be associated with lower internal turnover. Third, we expected that small firms would sell themselves more frequently than large firms, because such deals entail less consideration and risk. Fourth, we expected that lower CEO compensation would correlate with a higher probability of forced exit or deal. Finally, we expected that CEOs recruited from outside the company would make deals more likely and forced exits less likely than insider CEOs, because outsiders would be more thoroughly vetted and would have less attachment to their firms.

Our full sample includes companies listed on the S&P 500 from 1992 to 2004. However we soon discovered that the S&P 500 samples companies from two very distinct populations. S&P 500 companies that have CEO "owners" holding one percent or more of their firms' stock have much longer median tenures and differ in many other ways from S&P companies with CEO "managers" holding a smaller percentage of their companies' stock. Because these two subsamples of S&P 500 firms differ sharply, we focus this paper principally upon the larger sample of CEO managers. For these CEOs (as distinct from owner-CEOs), tenure exhibits an implicit term structure that loosely resembles the tenure cycle at academic institutions, and perhaps more so, the tenure patterns of law school deans and university presidents. A manager-CEO's tenure has four "terms":

- In the first four years on the job (years 0 – 4), turnover of all kinds is moderately high. It is especially high for external "turnover by deal," or acquisition by a third-party acquirer. Deal turnover experiences a sharp spike in year 4.
- In years 5 – 8, turnover by deal rapidly drops, while aggregate internal turnover spikes sharply and remains highly elevated through year 9 of an average CEO's tenure cycle.
- In years 9 – 12, internal turnover slowly drops while external turnover is negligible.
- In the following years, the probability of all modes of turnover slowly declines for the few CEOs who remain on the job

These term effects are robust to a variety of controls and alternative empirical specifications. They are strongest for relatively young CEOs, and appear to be independent of factors such as retirement norms. We also find that while some common factors appear to

influence both deals and retirements, many other factors seem to have opposite effects on these two modes of CEO exit.

II. PREVIOUS LITERATURE

This paper contributes to the literatures on management turnover and merger and acquisitions (M&A). It is kindred in spirit to a recent working paper by Kaplan and Minton (2008), which distinguishes between "internal" CEO turnover that is driven by boards of directors, and "external" turnover that results when firms are sold or delist in the wake of financial distress. Kaplan and Minton find that poor stock performance predicts internal but not external turnover — a relationship that has strengthened since 1998. Our study also investigates rates of "internal" and "external" turnover during the years 1992-2004. Unlike Kaplan and Minton, however, we focus on how CEO tenure, share ownership, and other institutional factors influence turnover, rather than on how turnover rates have changed over time. In addition, we treat only acquisitions — and not delistings — as an external turnover mechanism for reasons we address below. Nevertheless, our results are compatible with theirs.

This paper also relates to Jenter and Kanaan's investigation of the influence of firm performance on the "forced turnover" of CEOs in a large sample of firms, including the S&P 500, between 1993 and 2001 (Jenter and Kanaan, 2008). Like Kaplan and Minton, Jenter and Kanaan find that industry-wide shocks to share returns influence CEO turnover as much as poor performance relative to a firm's industry competitors. This finding is consistent with our results, although it contradicts earlier suggestions (e.g., Gibbons and Murphy, 1990) that boards insulate CEOs from market- and industry-wide shocks. This finding is also important because, as Jenter and Kanaan point out, it is consistent with the behavioral hypothesis that "boards . . . credit or blame CEOs for performance caused by factors beyond their control" as well as with more conventional hypotheses such as the conjectures that CEO ability is better assessed when the industry as a whole is doing poorly (id. at 31).[4]

Also relevant to our study is the larger literature on managerial turnover, which focuses predominantly on internal turnover, i.e., retirements, voluntary or otherwise. The general results of this literature are succinctly summarized by Brickley (2003). Particularly relevant to our paper are investigations by Algood, et al. (2003), Huson, et al. (2001), and Fisman, et al. (2005). Algood, et al., examine CEO turnover through match theory, which assumes that the

[4] Dirk Jenter and Fadi Kanaan were also kind enough to lend us their data on forced turnovers, which we incorporated into our own dataset of S&P 500 firms.

productivity of a CEO depends on the "match" between the CEO and the firm. Unlike prior research relating CEO tenure to turnover, however, Algood, et al., find that turnover increases until the fifth year of a CEO's tenure, consistent with match theory, and then decreases, consistent with the findings we report below. Unlike the present paper, however, Algood, et al., study turnover in the 1980s (when CEO turnover was much lower than in our sample period), do not control for ownership, focus exclusively on non-deal-related turnover, do not contrast deal-related and non-deal-related turnover, and find a consistent interaction between firm performance and the tenure/turnover relationship. Huson, et al., and Fisman, et al., tag samples of CEO departures as "forced" or "voluntary," based on CEO age (departures of CEOs below 60 are presumptively forced) and the authors' interpretations of contemporaneous press reports. Huson, et al., find that chronological age is highly significant, and negatively related to forced departures, as is CEO membership in one of the firm's founding families, while poor performance is positively associated with forced turnover. Fisman, et al., who use a two-stage model to predict CEO firings, find that firms exhibit superior performance when entrenched boards retain CEOs who performed poorly in the past, despite shareholder pressure to dismiss these CEOs.

In addition, Denis, et al., (1997) find that ownership structure mediates the relationship between turnover and performance: among Value Line firms during the late 1980s, turnover was *less* sensitive to performance when directors and officers held 5+% of a firm's shares, and *more* sensitive to performance when an outside blockholder held a stake of 5+%. The broader turnover literature, then, suggests several important control variables for this investigation, including CEO age and firm ownership structure, in addition to standard controls for size, industry, and calendar year.

Finally, because this paper focuses as much on turnover-by-deal as on CEO retirements, it also relates to the literature on the incentives of target managers to participate in deals. Much of this literature dates from the 1980s or early 1990s, and addresses factors salient in that period, such as manager ownership of stock and golden parachutes. For example, Walking and Long (1984) examine the reactions of managers to takeover bids, and a number of investigations attempt to predict takeover bids (Morck, et al., 1988; Mikkelson and Partch, 1989; Shivdasani, 1989; Song and Walking, 1993). There are, however, a few more recent studies. One of these is our own investigation of the role of option compensation in motivating target CEOs to accept acquisition offers (Coates and Kraakman (2006)). A second paper by North (2001) addresses most of the CEO characteristics that are examined here. North analyzes the ability of various managerial and board characteristics to distinguish

between 342 NYSE/AMEX target firms that were acquired in friendly transactions during the 1990s and a matched set of firms that were not acquired. North's principal finding is that share ownership by corporate officers and inside directors is *negatively* associated with acquisitions, while share ownership by non-management shareholders with board representation is *positively* associated with acquisitions (2001: 144-45). North finds managerial entrenchment to be the most plausible explanation of the negative relationship between insider share ownership and acquisitions. In contrast to our results, however, neither CEO age nor CEO tenure is significantly related to acquisitions in North's multivariate analysis (2001: 144). These differences may be due to the fact that the median firm in North's sample is much smaller than median firm in our S&P 500 sample—and, correlatively, that insiders hold a larger percentage of company shares in North's sample than they do in ours.

III. CONSTRUCTION OF THE DATA SET

We construct a composite data set for all companies in the Standard & Poor's (S&P) 500 index from 1992 through 2004, which includes a variety of firm-level and CEO-specific variables extracted from a half-dozen sources.

A. Data on S&P 500 CEOs

We extract compensation data for S&P 500 CEOs from Compustat's Execucomp database. For each year from 1992 to the present, Execucomp maintains data on all firms in the S&P 500 for that year, which exceeds 500 companies because a small number of firms exit the S&P 500 each year, primarily due to acquisitions.[5] We collect data on chief executive officers (meaning the single highest paid officer[6]) for any given firm for all firms in the S&P 500 at any time from 1992 to 2004. Our total sample includes data on 6449 firm-years, with partial data in the Execucomp database for 1992 and 2004. For each firm-year, we gather data on CEO equity ownership and compensation. Thus we record the CEO's total direct compensation (TDC), as well as its discrete components.[7] We also report the top officer's end-of-year total

[5] Execucomp's 1992 data is substantially incomplete; we include it in what we report, but our results are qualitatively unchanged when we drop 1992 observations. Our access to Execucomp was through Wharton's on-line collection of databases. In the Wharton collection, Execucomp does not make publicly available its codes for S&P 500 membership for firms no longer included in the S&P 500 (i.e., historic S&P 500 membership) and commingles those observations with firms that were, but no longer are, in the S&P Midcap and Smallcap indices, so we hand-code historic S&P 500 membership by reference to S&P annual publications.

[6] Although not all top executive officers have the title "Chief Executive Officer," for brevity we refer herein to top executive officers as CEOs.

[7] These include SALARY, BONUS, LTIP (long-term incentive payments), RSTKGRNT (restricted stock grants), and BLKSHVAL (the Black-Scholes value of new option grants).

holdings of shares of stock, vested options, and unvested options. We calculate the value of CEO stock holdings (SHARVAL) by multiplying the total number of CEO shares by the company's end-of-year stock price. Similarly, we calculate CEO percentage shareholdings (SHARPCT) by dividing the number of CEO shares by total shares outstanding. Execucomp maintains data on the intrinsic value of options (i.e., the difference between strike prices and the company's end-of-year stock price). The sum of the intrinsic value of a CEO's vested and unvested options is reported as OPTVAL.

We search proxy statements for missing data on when CEOs first joined their firms in any capacity, which we use to calculate SUBTENURE (the number of years a CEO was employed by her firm before assuming the position of CEO), and when they initially stepped into the top job, which we use to calculate TENURE (the number of years a CEO has been CEO). The TENURE variable, which plays a large role in our analysis, is the difference between the current calendar year and the year in which an executive became CEO. Because available data on CEOs is annual, our count of years on the job is somewhat rough. If, for example, a CEO joins a firm in February of Year 1, and is recorded as CEO in the firm's annual proxy statement, but then departs in April of Year 1, after only three months on the job, we will record him as having a TENURE of zero at the time of his departure. Thus, in effect, TENURE of 0 includes CEOs with up to one year of tenure; TENURE of 1 consists of CEOs with between 1 and 2 years on the job, etc. In addition, if another CEO joins a firm in April of Year 1, but was not reported in the annual proxy statement for that year, and then resigns later that year, we will not observe his tenure at all. In the regression analysis that follows, these data limitations should bias against finding evidence of term structures or relationships between tenure, turnover, and other variables of interest. They also mean, however, that we can only be so precise in reporting and interpreting the evidence of term structure that we report below – we cannot say with any certainty, for example, whether a CEO's first "term" is, on average, four or five years.

In addition, we obtain CEO age and employment data from Execucomp, which lists CEO ages, initial employment dates, and dates on which CEOs acquired their firms' top job.[8] As Execucomp's age data is spotty, we supplement it by direct reference to proxy statements for approximately half the sample, and report the corrected data here as AGE.

[8] Oddly, Execucomp historically maintained data on the current age of a CEO for any given observation year, even if the observation year is historic. That is, the "CEO Age" variable will be, say, 60 for each yearly observation for a given CEO who is 60 at the time the data is downloaded. We adjusted the CEO age data in our database accordingly. Execucomp has modified its data since we initially collected it, to record a CEO's age in the observation year.

B. Firm-Level Data

The Execucomp and Compustat databases also provide most of our firm-level data, including basic firm demographics: yearly market capitalization, book asset value (ASSET), SIC industry code to four digits, year-end share price (PRICE), and a variety of financial variables, including LEVERAGE (the ratio of total liabilities to common share book value). We map SIC codes into Fama-French (1997) 12-industry classifications, which serve as the principal industry control in our analysis, although our qualitative results do not change if we use raw two-digit SIC codes or Fama-French 50-industry classifications. Similarly, we generate a variety of measures of firm performance using financial data from Compustat, including: (1) total one-year return on shares for a company divided by median share returns for all S&P 500 firms in the company's industry for the year in question (REL_TRS1YR), (2) annual change in sales revenue less median change in sales revenue for the company's industry in the appropriate year (ADJ_SALECHG), and (3) the ratio of the firm's Tobin's q to median Tobin's q (RELATIVEQ) for the company's industry in the appropriate year.[9] These are measures, respectively, of a firm's recent stock market performance, growth trajectory, and firm-specific performance (purged of industry and market components of total performance). Execucomp also provides a measure of Black-Scholes volatility (or total risk) associated with company shares, which we record as RISK.

To obtain data on ownership structure, we look to two sources. The Dlugosz, et al. (2004), database supplied highly reliable data on blockholder ownership and identity for the years 1996 through 2001. We turn to the noisier CDA Spectrum database to obtain blockholder data from 1992 though 1995, and from 2002 through 2004. Because we use ownership structure as a control variable, we compress ownership's most important effects on turnover into a single variable. To this end, we construct a composite measure (BLOCKSCORE) based on the intuitive idea that inside shareholders may use their shares to entrench, while outside shareholders may use share blocks to induce turnover, an intuition generally consistent with the reports of Denis, et al. (1997), that outside blockholders increase the sensitivity of turnover to performance while inside blockholders decrease it, and of North (2001) that inside blockholders reduce the probability of a company sale while outside blockholders with board representation increase it. BLOCKSCORE takes the value of "1" if a trust or family foundation holds shares with more than 5% of the company's voting power, a value of "2" if the CEO herself holds shares with more than 5% of the voting power, a value of "4" if two or more institutional

[9] We are grateful to Allen Ferrell for supplying us with the program and parameters used to calculate RELATIVEQ.

shareholders (e.g., mutual funds, pension funds) hold blocks with 5% or more of the voting power, and a value of "5" if an independent entity—most often another operating corporation—holds shares with 5% or more of the voting power. BLOCKSCORE assumes the neutral value of "3" if there are no 5+% blockholders, if there is a single 5+% institutional blockholder, or if there are only outsider individual or issuer-related pension and ESOP 5+% blockholders. All firms in our sample can be assigned a unique block score on the basis of this coding. Figure A1 in the Appendix charts the increasing probability of a deal or the internal turnover of a CEO under the age of 60 as BLOCKSCORE scores increase. While we believe this variable best implements existing theory on how institutional shareholders are likely to affect CEO turnover, none of our results are sensitive to the precise construction of BLOCKSCORE.

C. Data on CEO Turnover

External turnover as defined by Kaplan and Minton (2008) includes both acquisitions in which target company CEOs lose their positions, and delistings in which companies leave the public market in the wake of financial distress. By contrast, we focus in this paper on acquisitions of firms, which are far more common than delistings among S&P 500 firms.[10] We use the terms "external turnover" and "deal" interchangeably to refer to acquisitions of a firm that accompanies CEO turnover. Our rationale for excluding delistings from the analysis is that deals and internal CEO turnover are parallel exit modes for CEOs and, on occasion, possible substitutes. In most cases they both result from discretionary decision-making, either by the board or the CEO. (For example, Boone and Mulherin (2004) report that target firms initiate the bulk of friendly deal transactions.) But delistings are different: they are usually driven by collapse, they involve little short-run discretion on anyone's part, and they are hardly substitutes for CEO resignations. We also expect the determinants of deals to differ from determinants of delistings.

We obtained information on acquisitions of S&P 500 targets from the Thomson Financial Securities Data M&A database for each firm in our sample. We then matched each yearly observation with the subsequent year's data from the M&A database, to produce a variable (DEAL), coded "0" if the company was not acquired in the subsequent year, or "1" if it was.[11]

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[10] In our sample, 53 firms were dropped from the S&P 500, more than half for reasons of financial distress, in the period 1993 – 2004. By contrast, 194 firms were dropped as the result of friendly acquisitions in which target CEOs lost their positions, and during the period from 1993 until 2001, 72 CEO's under 60 years old were visibly dismissed by their boards.

[11] To ensure that the transactions are of the type in which we are primarily interested (sales of control, not acquisitions or partial block sales), we exclude deals unless they involve a merger or an acquisition of at least half a company's voting stock, and we review each deal in the sample to verify that the company in

We supplemented this procedure by deriving a list of all companies that were removed from the S&P 500 before the end of the sample period, searching news reports in Lexis/News for an explanation for the removal, and correcting DEAL where news reports indicated that the company was acquired.

We obtained data on internal turnover in the usual way: by noting when S&P 500 companies reported new CEOs. The internal turnover variable, ALL_INTERNAL, assumes the value of "0" in the current year if, in the succeeding year, there is no deal and the firm remains in the S&P 500 without a turnover of its CEO. ALL_INTERNAL assumes the value of "1" if there is no deal, the firm remains in the S&P 500, but a new CEO takes the helm in the succeeding year. Thus, in each year, the categories of All Internal, DEAL, and continuing CEOs are mutually exclusive.

All_INTERNAL conveys no information about why CEOs leave. Many CEOs retire voluntarily, while others are dismissed, find other employment, or die on the job. To focus more narrowly on dismissals or forced exits, we supplement our dataset with hand-collected data on forced CEO turnovers generously provided to us by Dirk Jenter and Fadi Kanaan (2008). The Jenter-Kanaan data ends in 2001, and flags a coerced turnover (FIRED) only for the turnover of CEOs under 60 for whom press releases or news stories provide evidence of a forced dismissal.[12] The 60-year threshold is the standard cutoff for forced exits in the turnover literature, and we censor all CEOs over the age of 59 in our multivariate analysis of the three-outcome model. Thus, in our three-outcome analyses of RESIGN, FIRED, and DEAL is limited chronologically (because the sample cutoff is 2001) and by CEO age (because we only include CEOs under the age of 60).

Figure 1 below provides an overview of the remarkable volatility in internal and external turnover of CEO during our sample period. In 1993, total CEO turnover was 8.6%, of which only one-seventh (1.3%) took the form of deals. By 2000 and 2001, total turnover had increased to 17.8% and 22.1% (25% if we include delistings), of which between a quarter and a third resulted from deals. By 2003, total turnover had subsided to an annual rate of 12%, of which once again only about a seventh resulted from deals. Clearly, turnover has varied dramatically from one year to next over our sample period. This variation is critical to understanding our results, and in particular the interaction among modes of CEO turnover. However, we also investigate the extent to which on influences on turnover persist, after controlling for factors that correlate with

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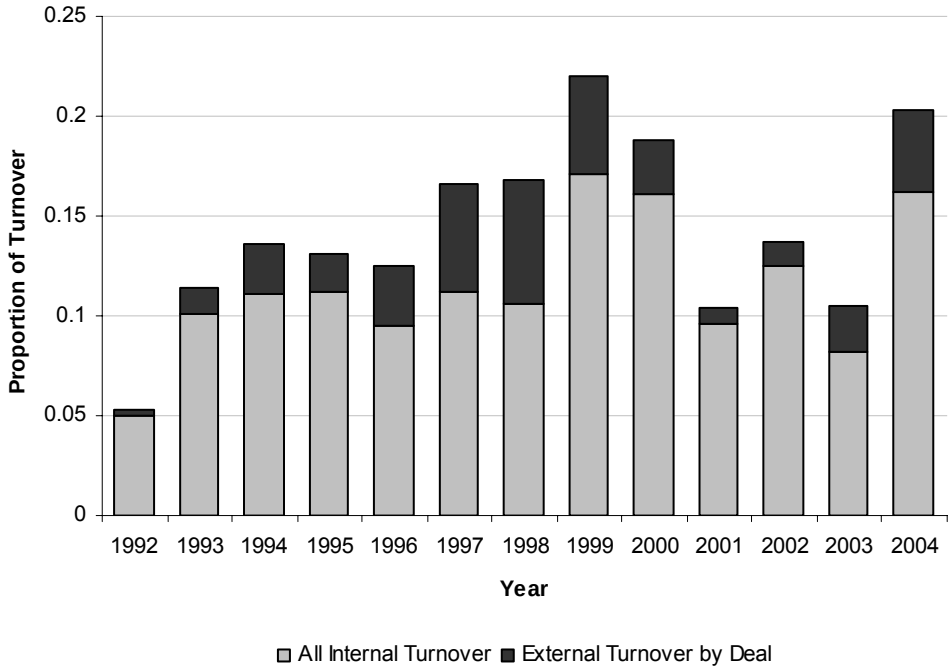
our sample was being acquired and not truly an acquirer (as when NationsBank acquired BankAmerica but maintained BankAmerica's stock listing and renamed the combined company BankAmerica).

[12] For a full description of the collection methodology, see Jenter and Kanaan (2008) at 17.

time, so we control for macroeconomic or other time-varying shocks by employing annual and triennial dummy variables in our multivariate analysis:

Figure 1: Internal and External Turnover in the S&P 500



D. A Note on the Shifting Composition of the S&P 500

The S&P 500 did not remain static over the twelve years covered by our data set. Of the 6,478 firm-year observations in our sample, 21% are of firms that were added to the S&P 500 between 1994 and 2003 to replace incumbent firms that were sold or were dropped, often because of financial distress. Most of the new firms added to the S&P 500 were smaller than incumbent firms, performed significantly better on our three performance metrics (relative Tobin's Q, sales growth, and one-year share returns), and were more likely to enter deals. It follows that, as compared to true panel data, the S&P 500 is subject to a double selection bias: firms that are sold or dropped are often poor performers while added firms are generally top performers that have experienced significant sales growth in the recent past. As a check on these biases, we checked all of our principal results against parallel results obtained from the subsample of firms that comprised the S&P 500 in 1993.[13] We also note parenthetically that initial listing dates should be consulted in evaluating the results of other papers that find a strong

[13] This leaves the selection bias introduced by firms that are dropped from the S&P 500 list and makes the entire list less representative of the changing composition of large American public companies.

positive relationship between firm performance and CEO ownership or founder participation in S&P 500 firms.[14]

IV. UNIVARIATE ANALYSIS

One CEO characteristic correlates exceptionally strongly with all modes of CEO turnover, namely, CEO shareholdings – particularly when CEOs hold more than one percent of their companies' shares. As noted above, because CEOs with large holdings tend to have long tenures and are distinct in other respects, we make a rough analytical division of S&P 500 CEOs into two groups: "*owner-CEOs,*" (or "owners"), who hold more than one percent of their company's common shares, and "*manager-CEOs*" (or "managers") who hold less than one percent.

A. Share Ownership, Tenure, and Turnover

Table 1 below provides summary t-statistics on the differences in means and medians between owner-CEOs and manager-CEOs for several key variables.

[14] See, e.g., Anderson and Reeb (2003). Anderson and Reeb control for the ages of firms, which may proxy for listing dates. Our results suggest, however, that a recent listing date for an S&P 500 company is more strongly correlated with superior performance than the date on which the firm originally went public.

Table 1

Univariate Comparison of CEO-Managers and CEO-Owners, In Observation Year and in Turnover Year

Panel A. CEOs in observation year	**Managers** N=5040		**Owners** N=1143		**t-statistic of means (unequal variance)**
	mean	**median**	**mean**	**median**	
Tenure in year	5.5	4	13.4	12	-26.1***
Subtenure– Years served before becoming CEO	14.4	14	9.5	7	12.9***
Age– CEO age in years	55.5	56	56.3	56	-2.7**
Lnass– Log of firm asset value	22.8	23	21.8	22	17.9***
Relative q– Tobin's q adjusted for year and industry	1.1	1.0	1.4	1.1	-10.2***
Adj_salechg– Adjusted for year and industry	2.9	-0.1	9.8	3.7	-7.6***
Rel_trs1yr– Trs1yr adjusted for year and industry	1.5	1.0	2.0	1.0	n.s
Rel_trs3yr– Trs3yr adjusted for year and industry	0.2	0.0	7.0	7.0	-5.1***
Deal– 1 if deal next year, otherwise 0	0.032		0.017		3.2***
All-Internal– 1 if retire next year, otherwise 0	0.114		0.093		2.2*
Deal (1993-2001 only)[1]					
Fired– 1 if fired next year (1993–2001 only)[1]	0.023		0.007		4.5***
Resign– 1 if retire, not fired (1993–2001 only)[1]	0.099		0.090		n.s.
Panel B. CEOs in turnover year[2]	**Managers** N=753		**Owners** N=125		**t-statistic of means (unequal variance)**
	mean	**median**	**mean**	**median**	
CEO tenure at last year of tenure.	7.3	6	15.5	14	-7.4***
Age– Age at turnover	58.6	59	59.7	61	n.s.
Lnass–Log of firm asset value at turnover	22.9	22.8	21.6	22.0	6.5***
Relativeq–Adjusted Tobin's q at turnover	1.0	1.0	1.2	1.1	-2.8**
Adj_salechg–Adjusted adj_salechg at turnover	-0.1	0.0	4.8	4.8	-2.6**
Rel_trs1yr–Adjusted trs1yr at turnover	1.2	1.1	1.5	1.4	n.s.
Rel_trs3yr—Adjusted trs3yr at turnover	-2.9	-3.0	-3.0	-3.0	n.s.

[1] Jenter-Kanaan forced turnover data, where N = 3710 for managers and N= 903 for owners.

[2] For deals, turnover year is the year before announcement of the deal. For internal turnover, it is the last full year of the CEO's employment. For example, if a deal or a retirement is announced in 2000, the turnover year is 1999. Because of data limitations discussed in the text, a mean retirement tenure of "7" in the turnover year means that an average retirement after of 7 and 8 years on the job.

Significance levels: *** ≤ 0.001, ** ≤ 0.01, * ≤ 0.05.

Panel A of Table 1 documents the means and medians of manager and owner CEOs for all observations in the sample; Panel B documents the same means for CEOs who are replaced within the next year (without differentiating between internal and external turnover). Both panels demonstrate a striking difference of between the average tenure of owner and manager CEOs. At any single point during our sample period, the median owner-CEO averages three times the

tenure years of the median manager-CEO. Moreover, at the point of turnover, the median owner-CEO has accumulated roughly twice as many tenure years as the median manager-CEO. For our sample as a whole, although owners and managers are of roughly the same age on average – and have worked roughly the same number of years at their companies (i.e., TENURE plus SUBTENURE are statistically the same) – owners have longer tenures because they become CEOs at earlier ages. Consistent with this observation, on average, owner-run firms are, relative to other S&P 500 firms, much smaller (in terms of assets), newer to the S&P 500, and – as one might expect from fast-growing firms – better on all of our metrics of economic performance. As an illustration, only 16% of owner-led firms in our sample (which begins in 1993) were listed on the S&P 500 in 1982, and a large majority of these firms first qualified for S&P 500 membership between 1982 and 2003. By contrast, 47% of firms with manager-CEOs in 1993 were already among the S&P 500 in 1982.

At first cut, then, Table 1 suggests an idealized story in which the typical owner-CEO is the founder or major shareholder of fast-growing firm that has recently joined the S&P 500. This owner became a CEO early in life by joining (or founding) a small firm that subsequently prospered. By contrast, the typical manager devoted the larger portion of her career working her way to the top of a big, widely held firm. She spent roughly the same number of years with her firm as the average owner did (18 vs. 19 years for the median manager and owner), but she spent most of this time in subordinate positions.

A second feature of Table 1 is that owner-CEOs are less likely to sell their companies than manager-CEOs, and that they are also much less likely to be subject to forced exit (even though they are equally likely to resign). The import of these results is ambiguous. On the one hand, reluctance to sell may reflect owner entrenchment; on the other may reflect superior performance and potential price of owner-run firms.

B. Tenure, Turnover, and Performance

CEO tenure is more complex than share ownership, but also correlates with turnover. While CEO tenure in our sample ranges up to 45 years, 90% of our CEOs have served less than 14 years, and median tenure is 5 years. Summary statistics for turnover by CEO tenure strongly support the hypothesis that a term structure underlies the tenure and turnover of S&P 500 manager-CEOs. Table 2 below illustrates this point for the subsample of S&P 500 CEOs between 1993 and 2001 the age of 60, and who are therefore exposed to three modes of turnover: RETIRE, FIRED, and DEAL. The FIRED data are the renamed Jenter-Kanaan forced exit data.

Figure 2

Mean Turnover by Deal, Resignation, and Forced Exit for Manager-CEOs in the S&P 500 between 1993 and 2002

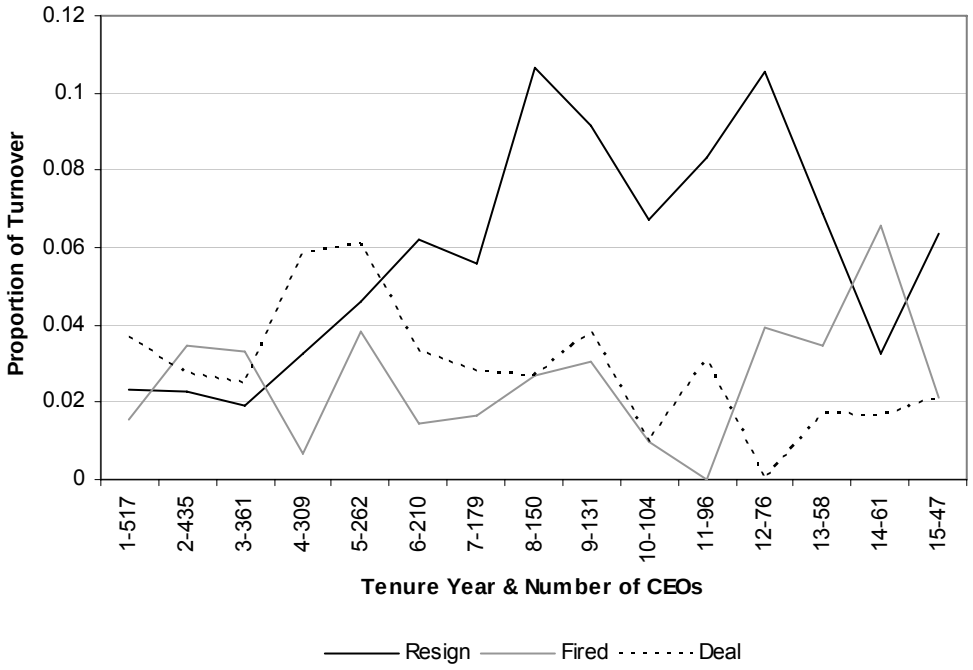


Figure 2 strikingly demonstrates that the incidence of *both* deals and resignations doubles during a CEO's fifth tenure year. For years 1 – 3 of the average CEO's tenure, the percentages of CEOs who depart via through firing, deal, or retirement are low and roughly equal at between 2% and 3.8% per tenure year across all modes of exit. By contrast, the percentage of CEOs who depart through resignation and merger respectively jumps to 9% in the fourth year of tenure, while the percentage that is fired declines to roughly 1%. Indeed, more than one-sixth (17.5%) of all deals in the full sample occur between year 4 and year 5 of a CEO's tenure (year 4 in our coding scheme). After the fifth year, deal incidence sharply declines, but resignations continue to rise until they plateau at between 7% and 10% during years 8 – 12.

These results suggest a term structure underlying CEO tenure. It takes time to appoint, assess, and replace CEOs, especially since large hierarchical organizations cannot afford continuous instability at the top. In addition, both boards and CEOs themselves need time to implement business plans and evaluate their results. A plausible conjecture is that Figure 2 reflects the effects of successive three-, four- or five-year contracts. Turnover is low during the initial 3 years, and all but temporary or CEOs with initial three-year contracts who do not fail

ignominiously can expect their initial contract to be renewed at least once. Depending on the length of their contracts, CEOs can expect tougher evaluation – and possible dismissal – after either one or two contract periods, in year four, five or six. In anticipation of (or to avoid) that evaluation, CEOs may choose to resign or sell the company.[15] A CEO that that survives beyond year five is less likely to sell the company thereafter, either because relevant constituencies (the board, shareholders, research analysts) believe her to be successful, or because her efforts to entrench herself (e.g., by appointing allies to the board) have succeed.

The "fired" data in Figure 2 do not seem to show a clear term structure. The absolute numbers of forced exits occurring in tenure years 1 – 3 are much larger than those occurring in later years, even if the percentages are not. But the data in Figure 2 do not control for many independent variables that may drive forced exits indirectly – CEO age, for example, obviously increases in parallel with CEO tenure, and can also be expected to influence turnover. To confirm the existence of the term structure that seems to be revealed by Figure 2, and to explore its precise shape, we turn to multivariate analysis.

V. METHODOLOGY: MODELLING COMPETING RISKS

Given this study's focus on the relationship CEO tenure and mode of turnover, we utilize the tools of duration analysis. These methods are particularly useful for studying the time to an event in the presence of censored or truncated data (Klein, Melvin, and Moeschberger 2003), as we have in this study.[16] We rely principally on a series of competing risk (CR) regression models to examine the tenure cycle, a methodology commonly employed in epidemiological studies and recently applied to the study of CEO turnover (Gregory-Smith, Thompson and Wright, 2009). In the CR framework, turnover modes "compete" in the sense that individuals face multiple modes of turnover, and the occurrence of one of these modes fundamentally alters

[15] Another possibility is that CEOs, after five years on the job, have track records that permit them to move on to more remunerative CEO positions. However, a Google search of the post-turnover activities of all 28 sample manager-CEOs leaving after their fifth year tenure year reveals that 17 retired as active managers while continuing to serve on corporate or non-profit boards for at least two years. Five continued to serve as a subordinate officer (e.g., COO/president) of the surviving (acquiring) company; three pursed a second, non-managerial career; and two became CEOs of other public companies. Thus, "serial CEOs," who leave one top job to take on another, are rare at the level of the S&P 500. It seems unlikely, then, that the spike in CEO turnover after the fourth year of tenure is due to more attractive offers in the managerial labor market.

[16] Our data suffers from both right censoring—CEOs are not analyzed long enough to actually observe a type of turnover—and left truncation—CEOs are technically at risk of failure before we started analyzing them. Both forms of incomplete data are typical of duration studies in general and period studies in particular.

the likelihood of the others (see Gooley, Leisenring, Crowley, and Storer, 1999 for a formal definition of CR).

When analyzing CR data, researchers can either ignore competing events (in our case, competing modes of turnover) or account for them explicitly. The first of these approaches is described in biostatistics literature as estimating the "cause-specific hazard" of the event of interest, often by using the semi-parametric Cox proportional hazards model (Cox, 1972). Whether one estimates cause-specific hazards for each event (Kalbfleisch and Prentice, 1980) or in a common framework for multiple events (Lunn and McNeil, 1995), all events of interest are assumed to occur in an "ideal world" undisturbed by competing events. Thus, as Pintilie (2006) points out, cause-specific hazards do not reflect the actual incidence of competing events in the real world.[17] For the latter task, Fine and Gray (1999) have proposed a method that reestablishes a one-to-one correspondence between covariates and the cumulative probability (or incidence) of failure from a specific type of event.[18]

Given that our interest lies in examining the probability of competing modes of turnover across the tenure cycle, we rely largely on the methodology proposed by Fine and Grey, which is referred to as modeling the "hazard of the subdistribution." Fine and Gray posited a proportional hazards model of the cumulative incidence function ("CIF"):

$\gamma(t,x) = \gamma_0(t)e^{\beta x}$, where γ is the hazard of the subdistribution, γ_0 is the baseline hazard of the subdistribution, x is a vector of covariates, and β is a vector of coefficients. A heuristic interpretation of the hazard of the subdistribution is "the probability of observing an event of interest in the next time interval while knowing that either the event of interest did not happen until then or that [a] competing risk event was observed" (Pintilie, 2006, pg. 71). In the analysis below, we present regression results for the proportional subhazards model, as well as figures illustrating discrete changes in the cumulative incidence function over years of CEO tenure.

In some cases, however, we also employ multinomial logistic regression models, which are frequently used in the turnover literature (c.f., Kaplan et al. 2008), to confirm our results. Logistic and multinomial logistic models are less appropriate when data is incomplete or truncated, or when covariates are time dependent. Nevertheless, Jenkins (2005) demonstrates

[17] Past studies have often incorrectly estimated the cumulative probability of a failure event using the complement of the Kaplan-Meier estimator. Because this quantity fails to account for failures from competing events, it overestimates the event-specific cumulative probability (Pintilie 2006).

[18] Building on the earlier work of Gray (1988), the Fine and Gray (1999) achieves this objective by redefining the cause-specific hazard to not only be conditioned on analysis time, but also on whether the individual experienced a competing event.

that when data is appropriately "re-organized" and the data generating process is "intrinsically discrete," multinomial logistic regression models can also serve as discrete competing risk models. The catch is, however, that multinomial logistic regression models assumes that the risks of competing events are independent—a strong condition that our data do not meet.[19]

VI. MULTIVARIATE RESULTS

We employ two multivariate models[20] to examine modes of CEO turnover across the tenure cycle. The first is the CR regression, described the preceding section,[21] which is well suited to comparing the effects of two or more "subhazards" or risks for a given outcome such as CEO turnover. The second is the more familiar multinomial logistic model, which is commonly employed in the finance and management literatures on turnover. Moreover, as discussed above, we also model turnover in two samples: external turnover by deal and internal turnover in our full sample, and three modes of turnover--deal, fired, and retire—in our subsample that includes the Jentner-Kaanan data on forced exit. We refer to models that contrast external and internal turnover as "two outcome" models, and those that contrast deal, fired, and retire as "three outcome" models.

In general, our CR regressions and multinomial logistic regressions yield similar results throughout our investigation. To give one illustration, we give a side-by-side comparison of our basic two-outcome CR regression (Table 3 below) with the analogous multinomial logistic regression as Table A1 in the Appendix.

First, however, Table 2 reviews the independent variables used in our multivariate models.

[19] It turns out that the independence assumption in the multinomial competing risk model is equivalent to the common assumption of the independence of irrelevant alternatives (IIA) in multinomial logistic regression. Despite the series deficiencies associated with tests of the IIA assumption in the literature (see Long and Freese 2006 for lucid discussion), we examine the appropriateness of independence using Hausman and Small-Hsiao tests. In the two outcomes competing risk case, there was mixed evidence of a violation and in the three outcomes case there was clear evidence.

[20] These models are available in STATA.

[21] A similar model is used in Gregory-Smith et al. 2009, who study non-deal-related CEO turnover in UK firms.

Table 2

Definitions, Means, and Medians of the
Right-Hand Variables Included in Multiple Regression Models

Variable	Definition	Mean	Median
LEVERAGE	Book value debt/book value equity	23.6	72.1
RISK	Black-Scholes volatility of the firm	.339	.301
RELATIVEQ	Tobin's q /Industry median q, adjusted for year and Fama-French industries	1.17	1.00
REL_TRS1YR	One-year total share returns/industry median share returns, calculated by year	1.62	1.00
REL_TRS3YR	Three-year total share returns/industry median share returns, calculated by year		
ADJ_SALECHG	Difference between firm & industry median change in sales, calculated by year	4.20	0.00
LNASS	Log of book value of assets	22.7	22.6
FAMA12	Fama-French 12 industry dummies		
FAMA49	Fama-French 49 industry dummiers		
BLOCKSCORE	Balance of inside/outside blocks: 1 – most insider through 5 – most outsider. BLOCKSCORE = "1" if a trust or family foundation holds 5+% of a firm's voting power, "2" if the CEO holds shares with 5+% voting power, "4" if two or more institutional shareholders hold 5+% voting power, and "5" if another business corporation or other independent entity holds 5+% voting power. BLOCKSCORE = "3" if there are no blockholders with 5%+ shares, or if there is only a single institutional blockholder. See Appendix Figure A1.	3.27	3
YEAR	Chronological Year		
3CYEAR1 - 4	Dummies for four chronological periods: 1992-1994, 1995-1997, 1998-2000, and 2001-2004		
DEALYEAR	Dummy for high deal activity years 1997-2000.		
LOGSHARVAL	Log of value of CEO shares	16.2	16.1
LOGOPTVAL	Log of exercise value of CEO options	13.5	15.4
LOGTDC	Log of CEO's total annual compensation	15.2	15.2
AGE	CEO age in years	55.6	56.0
TENURE	CEO's years as CEO	6.91	5
SUBYEAR	CEO's years at the firm prior to becoming CEO	13.5	12
TERM1 –TERM3	Dummies for 0-3, 4-7, 8- 42 years of tenure respectively.		
OLD	Dummy for CEO AGE > 57, manager-CEO's median age in years		

A. Two Risk Models: RETIRE and DEAL

1. Manager-CEOS

Figures 3 and 4 graph the estimated changes in the cumulative incidence rates for all internal turnover and turnover by deal, respectively, across years of CEO tenure for manager CEOs. The change in the cumulative incidence rate measures the change in the probability of

a given mode of turnover by year, in a regression that includes the left-hand variables in Table 3 below.

Two Outcome CR Models

Figure 3: All Internal Turnover

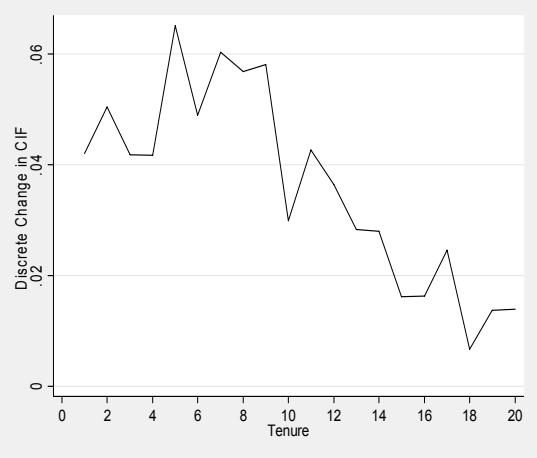
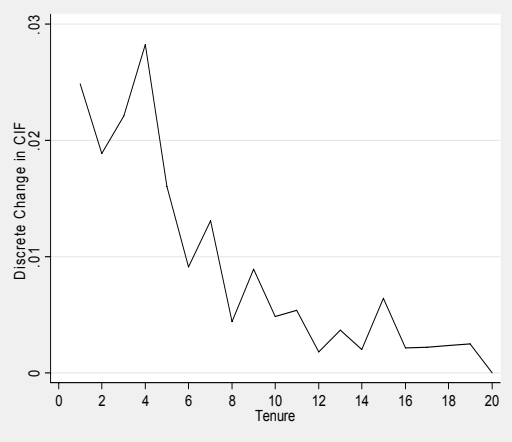


Figure 4: External Turnover from Deals



The discrete probabilities for DEAL and internal turnover depicted in Figures 3 and 4 should be compared with corresponding graph of the raw means tenure year depicted in Figure 2.[22] The spike in DEAL at year 4, already apparent the raw data, is even more striking in the CR model.[23] Controlling for covariates (listed below in Table 3), the probability of selling the company in year 4 is strikingly and significantly higher than in all other tenure years. It seems, then, that CEOs might be said to have a first four-year term, from years 1 through 4, when the probability of deal accelerates and that of internal turnover is moderately high. This is followed by a second term initiated by a rapid decline in the probability of a deal, and a corresponding increase in that of internal turnover. In a third period, from tenure years 9 – 12, internal turnover moderates while still remaining substantial. By year 13 all turnover declines and turnover by deal is negligible. But by this point, only 11% of CEOs remain, and there is reason to suspect that some of these survivors are more than managers.

[22] The subsample in Figure 2 distinguishes between FIRED and RETIRE. while both are lumped into the category of internal turnover in the two-outcome model. Nevertheless, RETIRE can proxy for internal turnover because forced turnover is a small fraction of all internal turnover

[23] The graphs should be read to reveal the probability – the change in the cumulative incidence factor (CIF) – that a firm might be sold, assuming that all the independent variables in competing risks regression are fixed at their mean.

Thus, years 4 and 5 are the crucial inflection points of the manager-CEO's tenure. For deals, the fourth year has a now-or-never quality (to overstate our findings for effect), as the probability of deals rapidly decreases after year 4. For internal turnover, by contrast, year 5 initiates a four year second term of continuously high CEO internal turnover. These results carry mixed implications for our first hypothesis, i.e., the suspicion that some CEOs sell their firms to avoid internal displacement, most likely by way of mandatory retirement. The finding that deals peak immediately before internal turnover peaks supports the hypothesis. But the persistence of continually high probabilities during the second and third terms of CEO tenure suggests that the relationship between deal and internal turnover, if it exists, is short lived/

Table 3 reports the results of CR models regressing internal turnover and deals, respectively, against a set of standard controls and variables of interest reported on elsewhere in the literature. (Table A1 in the Appendix provides a parallel multinomial logistic model for turnover by deal, to demonstrate the similarity between CR and ML models as applied to our data set.)

Table 3, **Two Outcome CR Models of CEO Turnover**

INTERNAL TURNOVER DEAL TURNOVER

COVARIATE	**SHR**	**Robust SE**	**SHR**	**Robust SE**
Age	1.144***	0.012	1.045*	0.018
ln(Option Value)	0.978*	0.010	0.999	0.022
ln(Share Value)	0.990	0.042	0.992	0.070
ln(Total Compensation)	0.809**	0.062	1.336**	0.143
ln(Assets)	1.238**	0.070	0.632***	0.070
Risk	1.858	0.797	5.028*	3.430
Leverage	0.999	0.001	1.001**	0.000
Relative Tobin's Q	1.150	0.115	0.478*	0.151
Adjusted Sales Growth	0.998	0.003	0.990*	0.004
One Year Share Return	1.006	0.011	1.012	0.015
Block Score	0.928	0.060	1.386*	0.193
Time Fixed Effects	Yes	Yes	Yes	Yes
Fama-French Dummies	Yes	Yes	Yes	Yes
N	4150		4150	
Subjects	985		985	
Failures	441		119	

$p < .05$; $p < .01$; $p < .001$

The coefficients in Table 3 are probabilities akin to relative risk ratios reported in multinomial logistic regressions. They compare the increase (decrease) in the subhazards of Internal turnover and deal turnover to their baseline risks as one covariate changes and all others are set at their mean values. The results confirm our own expectations and are consistent with the M&A and turnover literatures generally (e.g., Palepu 1986; Brickley 2003). Within the S&P 500, CEO age and company size covary significantly with the risk of internal turnover, while total compensation and option value are negatively associated with internal turnover. By contrast, age, total compensation, leverage, and the presence of outside blockholders are positively and significantly associated with DEAL, while size, a low Tobin's Q and low growth rate are significantly and negatively associated with DEAL. As other researchers have found, low market returns do not affect deal probabilities (Kaplan and Minton 2008). Further, aggregate internal turnover of CEOs does not vary significantly with other common metrics of firm performance. Finally, CEO age is much more closely associated with

internal turnover than is external turnover by DEAL. (In unreported results find that a dummy variable proxying for the peak retirement years of 60 through 65 has a strong association with internal turnover but none at all with deal-induced turnover.)

2. Owner-CEOs

Consistent with our initial examination of the differences in means between owner- and manager-CEOs in Table 1, hazard rates for RETIRE and DEAL among owners (see Appendix Table A2) are strikingly different from those among managers. Owners enjoy a much longer average tenure than managers, as can be seen by comparing their turnover probabilities with those of managers. Moreover, the structure of turnover probabilities differs for owners. For owners, the DEAL "spike" at tenure year 4 is visible but muted, and the "risk" of internal turnover is gentler and occurs much later than it does for managers. Not surprisingly, DEAL and internal turnover also have different significant covariates in the tenure cycle for owners than for managers. Table A2 demonstrates the only significant correlate of deals for owners is relative Tobin's Q, and the only significant correlate of internal turnover is age. These results are strikingly different from those obtained from the two-risk manager model presented in Table 3, but they are consistent with our conjecture that owner CEOs and manager CEOs are distinct populations. Accordingly, we drop owner CEOs from our sample, and focus exclusively on managers in the remainder of this paper.

B. Three Risk Models: RETIRE, FIRED, and DEAL

Recall that our three-outcome models operate only in the subsample of observations of CEOs below the age of 60, and between years 1992 and 2001. Clearly comparisons between this subsample and our full sample are risky at best. Nevertheless, the subsample distinguishes between forced exits and other forms of internal turnover, which allows us to extend CR models to three subhazards rather than two. Figures 5, 6, and 7 below graph the three "hazards" at play: RESIGN, FIRED, and DEAL.

Figure 5, Three Outcome DEAL Model

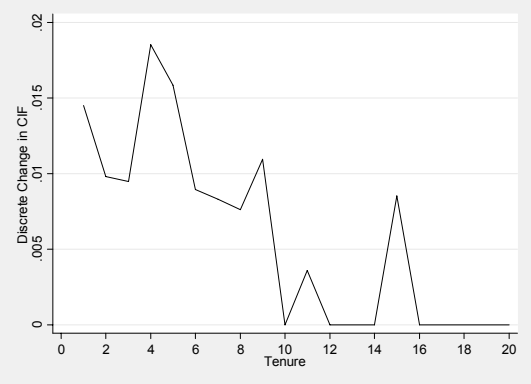


Figure 6, Three Risk FIRED Model

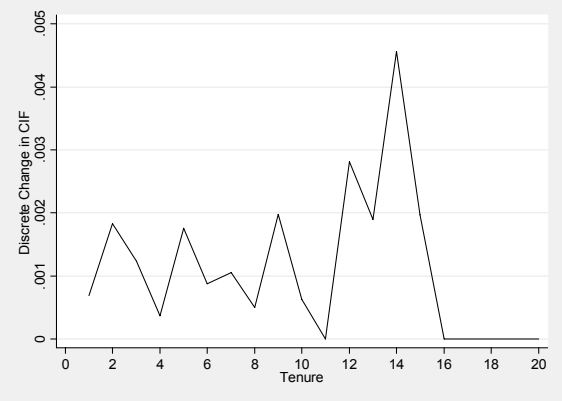
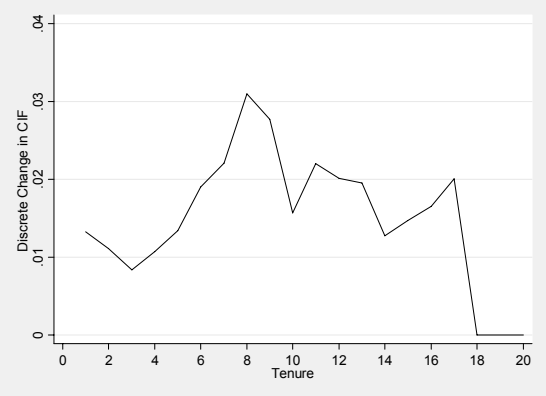


Figure 7, Three Outcome RETIRE MODEL



Not surprisingly, the hazard rate for DEAL over years of tenure in Figure 5 resembles the two-outcome graph in Figure 4. Both graphs have a primary spike at year 4, display a declining probability of deal thereafter, and record virtually no deals after year ten, when the number of CEOs is particularly small in this subsample. Contrary to our second hypothesis, however, the JK subsample of forced exits (FIRED) seems unrelated to CEO tenure after excluding the dubious spike that begins at year 12. Because the number of CEOs is low in this tenure region and the number of forced exits is extremely low, the second half of the FIRED graph should be disregarded. Perhaps the most interesting graph is Figure 7, which charts RETIRE—that is, internal turnover that is not accompanied by evidence of forced exit. Figure 7 peaks at year 8 rather than at year 5, the year at which all-internal turnover peaks (see Figure 3 above). It seems as though the graph for all internal turnover had been shifted three years to the right, and the plateau of relatively high levels of retirement had been stretched from five to eight or nine years. One explanation for this shift in peak between Figures 3 and 7 is that that many CEOs who left their companies for internal reasons between tenure years 5 and 7 were in fact forced

out. Separating fired CEOs from others forms of internal turnover makes this interpretation plausible. An alternative explanation may be that the relative youthfulness of the subjects in the JK sample naturally implies an elongated graph of retirement probabilities, especially when fired CEO are excluded from the model.

We now turn to the independent variables in the three-outcome models in Table 4 below.

Table 4, Covariates in the Three Outcome CR Model

CONTROL VARIABLES	Deal SHR	Deal Robust Std. Err.	Deal z		Fired SHR	Fired Robust Std. Err.	Fired z		Retire SHR	Retire Robust Std. Err.	Retire z	
age	1.060	0.035	1.76		1.013	0.033	0.39		**1.165**	**0.033**	**5.33**	***
logsharval	0.972	0.067	-0.41		0.921	0.077	-0.99		1.066	0.067	1.02	
logoptval	0.992	0.021	-0.38		**0.922**	**0.019**	**-3.85**	***	1.011	0.016	0.69	
logtdc	**1.413**	**0.163**	**3.00**	***	0.831	0.167	-0.92		**0.776**	**0.081**	**-2.44**	*
lnass	**0.635**	**0.087**	**-3.31**	***	1.360	0.253	1.65		1.114	0.095	1.27	
risk	1.734	1.981	0.48		2.411	2.759	0.77		1.333	0.989	0.39	
leverage	**1.001**	**0.000**	**3.01**	**	0.996	0.004	-1.08		1.000	0.001	-0.07	
relativeq	**0.338**	**0.113**	**-3.24**	***	0.603	0.294	-1.04		**1.191**	**0.082**	**2.55**	*
adj_salechg	**0.988**	**0.003**	**-3.70**	***	0.993	0.006	-1.20		1.000	0.003	-0.01	
rel_trs1yr	0.999	0.004	-0.39		1.001	0.003	0.45		1.002	0.001	1.86	
blockscore	1.184	0.160	1.25		1.284	0.276	1.16		**0.775**	**0.063**	**-3.11**	**

No. observations = 3008, No. subjects (CEOs)=803, No. deals = 106, No. resigns = 407

Significance levels: * < 0.05, ** < 0.01, * < 0.001.**

FAMA12 industry classifications and 3YEARC1-4 dummies are not shown.

The DEAL results in Table 4 are consistent with the DEAL results in our two-outcome CR regression. As in the two-outcome model, deal probabilities significantly increase with CEO pay and leverage, while they significantly decrease with firm size and strong performance, as measured by RELATIVEQ and ADJ_SALECHG. By contrast, dividing internal turnover into the categories of FIRED and RESIGN leads to new results.

Retirement increases with age, although not as strongly as in the full sample because the median age in the subsample is much lower, and the probability of retirement increases with relatively low pay as all turnover did in the two outcome model. The two new results are that presumptively voluntary retirement increases with firm performance as measured by sales

growth and decreases with the presence of outside blockholders. Since outside blockholders do not affect aggregate internal turnover strongly, we are unsure why they seem to encourage early retirement in this subsample. A plausible reason may be that all CEOs in the subsample are below 60, and therefore many retirements may be force exits even if there is insufficient evidence to classify them as such.

The covariate results for FIRED present another puzzle. Only one covariate is significantly and negatively related to forced exit: the value of CEO stock options. This finding is tracks a similar but weaker result in the two-outcome CR model for internal turnover. But note that there is no similar result for RETIRE. Indeed the sign on the option value covariant for RETIRE is positive. Separating forced exits from other internal turnover decouples option value from internal turnover generally. The question, then, is what links low-value options to fired CEOs? The most plausible explanation is that CEO option value proxies for medium-term (three year) market returns. When returns decline over, say, a three year period, CEOs are fired. To test this hypothesis, we added three-year total market returns to the three-outcome model, and found that it increased the risk of FIRED even more than low option values did. while it also stripped the latter of statistical significance (results not shown here). This result strongly suggests that (consistent with Jenter and Kanaan) poor market performance over several years is the best predictor of FIRED, and also explains why low LOGOPTVAL is negatively associated with RETIRE but not with RESIGN.

C. Robustness

Our findings are generally robust to the inclusion of other control variables in our dataset, and to the inclusion of squared or polynomial terms for the various controls that are included, produce stronger statistical relationships if we use Newey-West standard errors to allow for the possibility of autocorrelation in error terms, and produce qualitatively similar results if we use different specifications (e.g., separate Cox or binomial logits for DEAL and RETIRE (or DEAL, RESIGN and FIRED)). They are also robust to partitions of the data that test for the possibility that our results are driven by CEO age, particular subsets of firms, particular time-periods, or types of CEOs, to which we turn next.

VI. EXTENSIONS

In this section, we explore the sources and implications of the CEO tenure cycle described above. In particular, we examine four distinctions that might, intuitively, seem likely to dampen or distort the effects of CEO tenure. These distinctions are tenure structure in (1) hot

vs. cold M&A markets, (2) high and low performance firms, (3) young and old CEOs, and (4) inside and outside CEOs.

A. Hot and Cold M&A Markets

The volatility of M&A activity over our sample period poses the question whether deals are substitutes for internal CEO turnover during hot deal years (1997-2000), or conversely, whether internal turnover increases during cold deal years (1993-1996, and 2001-2004). We graph below the results of including a dummy variable representing "high deal year" in our three risk model (figures 8, 9, and 10). Subsequently, we address how the covariates of RESIGN, FIRED, and DEAL differ after running the three risk CR model on high- and low-deal subsamples respectively.

Figure 8, Three Outcome CR Model for DEAL

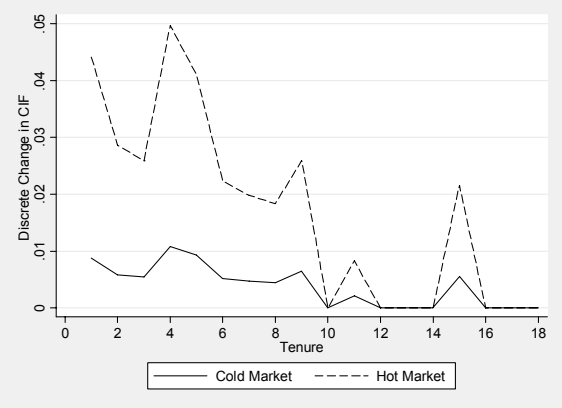


Figure 9, Three Outcome CR Model for for Fired

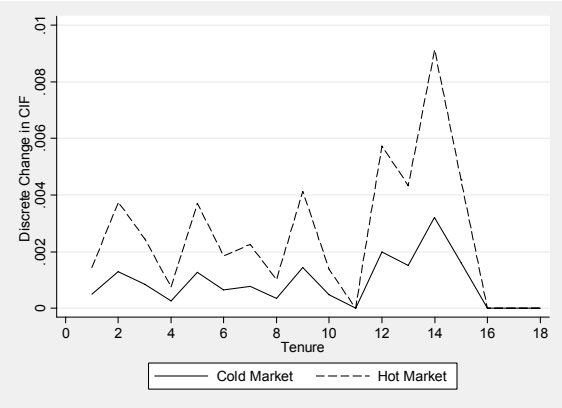
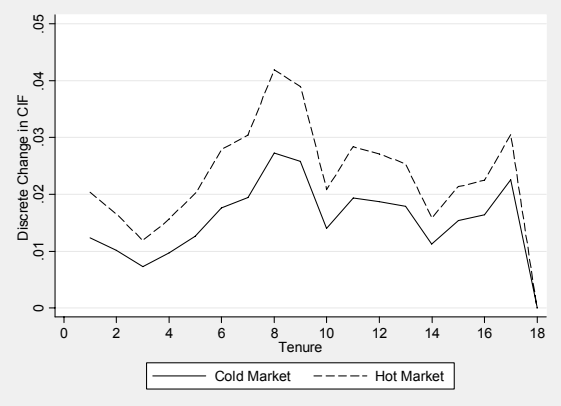


Figure 10, Three Outcome CR Model for Retire



Figures 8 – 10 convey no new information about the general relationship between tenure and our three modes of turnover. They do, however, disconfirm the substitution hypothesis that

we proposed at the outset of this paper: namely, that internal and external modes of turnover might substitute for one another. The probabilities of forced exit, deal, and retire all increase in hot deal years and decline in low deal years. The most plausible explanation for this result is that an unobserved third variable—perhaps a heated stock market or a booming economy more generally—accelerates all CEO turnover during high deal years, but acts mosr strongly on firings and deals.

To better understand the effects of the deal market on CEO turnover, we apply the three risk models to high-deal and low-deal subsamples. Although the absolute risks of DEAL and FIRED—and to some extent even RESIGN--are lower in low-deal years, many covariates of these risks retain their significance across the low-deal and high-deal environments.

Appendix Table A3 introduces the distinction between hot and cold deal years in the three outcome model. As one might expect from Figures 8, 9, and 10, above, the hot deal dummy variable is positive and significant for all three modes of turnover, although by design it most strongly affects the probability of DEAL. Finally, we performed a last check running two and three outcome CR regressions in the high deal and low deal subsamples separately. The results (not reported here) confirmed that the general shape of the probability graphs for alternative modes of turnover over CEO tenure cycle--and strongest correlates of deal, fired, and retired--remained the same across hot and cold dear years, although the probabilities and correlates were systematically higher during hot deal years. The same result is confirmed by the two outcome CR models. Thus, the relationship of modes of turnover to the tenure cycle—and the correlates of turnover—are not an artifact of activity in the deals market

B. Term Structure and Mode of Turnover

In previous discussion of our base models (Tables A2 and A3), we emphasized the relationship between modes of turnover the structure of the tenure cycle. Here we return to the issue with additional support for the heuristic division of the tenure cycle into the four "terms" that we identified earlier: (1) tenure years 0 – 4, (2) years 5 – 8, (3) years 9 – 12, and (4) years from 13 onward.[24]

Table A4 reports on the results of two-outcome multinomial logistic model which includes dummy variables for each of the three four-year terms that we described earlier, as well as a

[24] Among manager CEOs, tenure periods of 20 years or more were often associated with large block institutional holders such as trusts whose beneficiaries were difficult to determine. It seems likely that there is often a family trust in the background when a manager CEO exhibits tenure of 15 or more years. If so, 20% of our managers may be more akin to owner CEOs, insofar as their position rests in part on a durable shareholder base and familial or personal loyalty. This is a topic for another paper, however.

fourth term: all observations of CEOs with terms longer than 12 years. As we would expect from our basic models, the probability of internal turnover is significantly lower during a CEO's first term and significantly higher during her third term, from years 9 through 12 (the "normal tenure" prior to retirement of manager CEOs). By contrast, the turnover by deal is just the reverse. It is significantly positive during the CEO's first term, and insignificant thereafter. In additional, an unreported multinomial logistic model that includes individual years as dependent variables confirms that a CEO's tenure year 4 as a positive and statistically significant covariate of deal.[25]

C. The Interaction of Age and Turnover

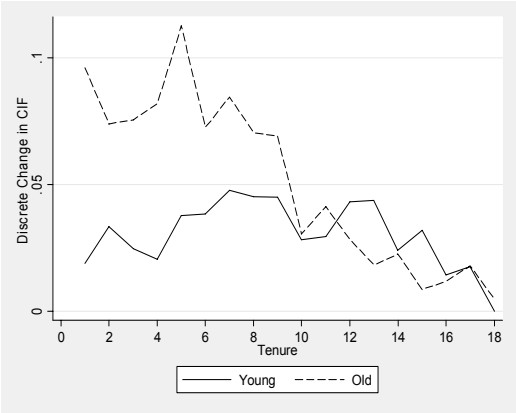
Since CEO age and tenure move in lockstep, there is always a risk of confounding the effects of age with those of tenure. For example, since many CEOs become CEOs at roughly similar ages, they are likely to reach normal retirement age after roughly the same number of years on the job. This might be explained as a "tenure" effect – i.e., age norms for hiring and retiring fix the modal length of tenure – but it is more naturally described as an age effect. Although our base models control for age and retirement norms, a separate examination of the tenure cycle of young and old CEOs supports the proposition that term structure makes a large and independent contribution to our results. Indeed, were age the only driver of our tenure cycles results, we would expect these results to be more pronounced among older CEOs than younger CEOs. In fact, they are far more pronounced among younger CEOs.

Because of the close relationship between age and tenure, we examine the effects of age on turnover by constructing two outcome CR models separately for subsamples of CEOs below 58 years old and CEOs above 57 years old. Figure 11, below, charts the hazard rates of DEAL and RETIRE for these subsamples, which derive from the two-outcome CR models in Table A5.

[25] The ML models described in this paragraph met Hausman IIA tests.

Figure 11, Two Outcome CR Models for Young and Old CEOs

Internal Turnover



Deal Induced Turnover

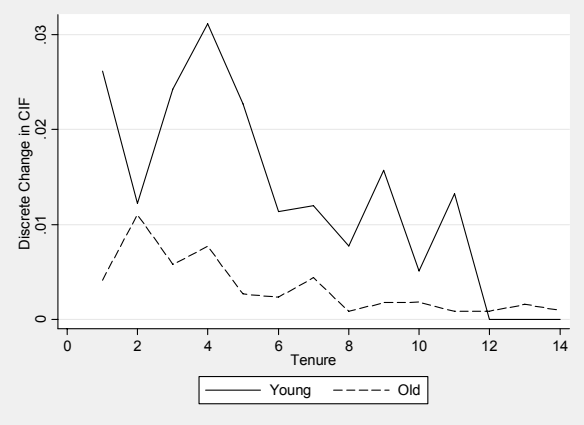


Figure 11 suggests that tenure cycles for old and young CEOs are similar in shape if not in magnitude: (1) young CEOs are the principal contributors to the spike in the risk of DEAL at tenure year 4 and account for by far the larger share of deals; and (2) old CEOs account for the spike at year 5 in all internal turnover. While there is a parallel increase in the probability of internal turnover at year 5, it is not nearly so sharp. AGE undoubtedly modifies the results of the tenure cycle. For example, older CEOs face mandatory retirement sooner, which might account for their early spike in retirements. In addition, the prospect of retirement in the relatively near future might also explain the absence of a sharp spike in deals for older CEOs insofar as, for example, stock options were to vest upon retirement as well as upon a change in the firm's control.

Nevertheless, it seems likely to us that differences between old and young CEOs are more powerfully shaped by CEO term structure than by CEO age. Consider Table A5. Its most striking finding is that low LOGOPTVAL – i.e., a proxy for poor medium-term market performance – dominates the risk of RETIRE for younger CEOS but is an insignificant influence on RETIRE among older CEOs. A plausible explanation this finding is that the internal turnover of young CEOs consists largely of dismissal for poor performance, while the retirement of older CEOs is likely to be just that, i.e., retirement for reasons unrelated to firm performance. A similar finding in Table A5 is that RELATIVEQ and ADJ_SALECHG correlate negatively with the risk of DEAL among young CEOs as they do in our base models, but that no performance metric correlates with DEAL among older CEOs. Indeed, young and old CEOs share only one significant covariate of DEAL in common. For young and old alike, higher pay makes deals

more common. As stated above, we do not hazard a guess as to whether high pay motivates CEOs to seek deals, or whether high pay is more likely when and where deals are common.

The main result in Table A5, however, is that firm performance metrics are only associated with deals and early retirement among young CEOs, not among old CEOs. A likely explanation is a kind of selection effect, reflected in the fact that older CEOs have a longer median tenure than the younger CEOs (7 versus 4 years respectively). If performance monitoring is most active in tenure years 1 through 4 and all but lacking by tenure year 9, we would expect older CEOs to have little performance related turnover—not because of their age but because of their position in the tenure cycle. Thus, apparently age-related turnover phenomena seem better explained by tenure, and fit nicely with the term structure analysis developed in the previous subsection.

Thus, our analyses produce consistent results. Age helps to predict retirement of both new and relatively long-serving CEOs. But term structure has an independent effect on RETIRE, even after controlling for age. In summary, term structure seems to be as important as age in influencing internal turnover, and term structure seems to be more important than age in influencing deals.

D. Outside CEOs Versus Insiders

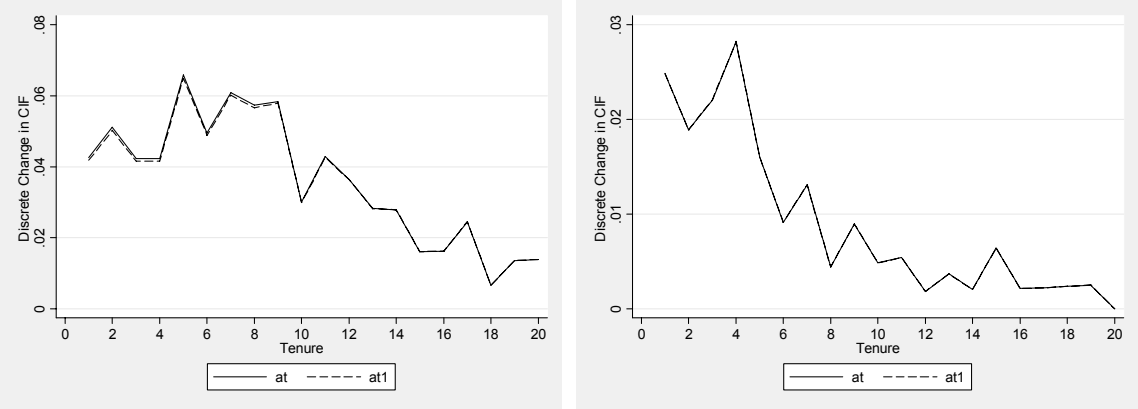
Our last variable of interest is SUBTENURE, the number of years a CEO was employed by her firm before assuming the position of CEO. We define an "outside CEOs" as those who have worked for their firms no more than two years before becoming CEOs, while "inside CEOs" are those who have worked longer than one year in subordinate positions with their firms. The outside-inside distinction is peculiarly sharp. The median outsider serves zero years before becoming CEO, while the median insider serves 21 years—even though their median ages are 55 years and 56 years respectively. Twenty percent of CEOs serve less than one year before becoming CEOs, while 28% served less than two years. In this respect, inside and outside CEOs are very different.

The tenure cycles of outsiders and insiders *as CEOs*, however, is not so different. Figure 12 illustrates the CR models for internal turnover and deal derived from our two-outcome model. The graphs are so similar that it is impossible to distinguished between them. Insiders and outsiders are identical for purposes for purposes of internal and external turnover in our larger sample. While this result may not be illuminating, it is counter to common intuition. It is, however, confirmed by employing different cutoff dates to define "outsider," e.g. working three, four, or five years with the firm before becoming its CEO. This result is also confirmed by the

lack of significance of a dummy variable denoting outside CEO in the two- and three-outcome CR regressions.

Figure 12: Two Outcome CR Models for Inside vs. Outside CEO

All Internal Turnover **Deal Induced Turnover**



Despite the lack of direct effect of the outsider vs. insider distinction, there are differences below the surface. In unreported multinomial logistic regressions, we find that adding SUBTENURE to our base models does not directly have a significant relationship with either RETIRE or DEAL. However, the interaction of SUBTENURE and AGE does significantly correlate with these risks. Like many interaction terms, however, this term is difficult to interpret straightforwardly.[26] In Appendix Table A9 and Figure A3, we present a boot-strapped analysis of this interactive effect on RETIRE and DEAL of age crossed with the number of years in which a S&P 500 CEO served in a subordinate position with her company. This analysis suggests that age matters relatively little to when an outside CEO *retires,* but that it makes older outsiders significantly more likely to *sell* their companies than younger outsiders. Although this result runs counter to the general tendency in our sample that older CEOs are less likely to enter deals than younger CEOs, it nonetheless has an intuitive explanation. We believe that older outside CEOs are often placeholders brought in shortly before the firm's sale.

In contrast to the import of age for outsiders, age matters a great deal to the retirement decisions of insiders who have worked many years to become CEOs. Older insiders are more likely to retire than younger insiders. This finding is what one would expect if conventional retirement norms and the infirmities of age were the major drivers of retirement decisions. The fact that younger insider-CEOs know their companies – and are well-known to their companies'

[26] See Powers (2005) for a discussion of the difficulty of interpreting interaction terms in logit models.

boards -- plausibly explains why they are much less likely to "retire" early than equally young outsiders. Again, nasty surprises are less likely with insiders than with outsiders.

E. A Note on the Economic Significance of our Models of DEAL

While we have concentrated our discussion on CR and ML models, we also considered (but do not report) separate logit models for our turnover variables, which have the practical advantage of being simpler to interpret and use to predict turnover activity of a given sort. Our logit model of DEAL using a term structure variable (e.g., TENURE4, i.e., whether the CEO is in the fourth year of his tenure) and our other CEO-related variables (AGE, etc.) has an economically significant advantage in predicting transactions over models that use only firm performance, industry, and year -- the standard controls for predicting deals in the existing literature (e.g., Palepu 1986). In fact, the standard model has no ability to predict deals using a 50% cutoff value for determining when the estimated probability of a deal should be translated into a predicted deal. By comparison, adding our CEO variables to the model improves the sensitivity of the model with a cutoff of 50% from 0% to 3%.

Moreover, this understates the potential economic significance of the new CEO variables that we include in our model. The potential benefits of correctly predicting deals (i.e., avoiding type 2 errors) are likely to outweigh the costs of falsely predicting deals (i.e., making type 1 errors). An investor stands to reap a 30% premium on average by correctly predicting a deal. Given that the average deal in our sample has a value of over $10 billion, an investor might earn significant returns by capturing such a premium in a reliable way. By contrast, over-predicting deals (and thus overinvesting in sample firms in anticipation of those deals) does not produce an equivalent "negative premium." The direct costs of mis-predicting a deal are the transaction costs associated with investing in the putative target company, which are likely to be an order of magnitude smaller than the deal premium from correctly predicting a deal. As a result, a cutoff value of, say, 20%, might be more appropriate for purposes of predicting deals. At such a cutoff value, a standard model of deals without CEO variables predicts roughly 8% of the sample deals, whereas our model with CEO variables included nearly doubles that predictive power to roughly 14%, representing a benefit of additional 8 correctly predicted deals, at a cost of over-predicting the same number of additional incorrectly-predicted deals.[27]

[27] Likewise, adding tenure, subtenure, ownership and compensation variables to a more conventional logit model of CEO retirements improves the sensitivity (i.e., the correct classification rate) (at a 50% cutoff) from roughly 12% to nearly 16%, with only a marginal increase in false predictions (1.33% to 1.63%).

VII. Conclusions

Our investigation of turnover mechanisms and corporate performance leads to four concluding observations. The first is that there is a term structure implicit in the tenure of CEOs who own less than one percent of S&P 500 firms. This term structure is evident in the internal turnover data driven by retirements as well as the external turnover data driven by friendly deals. Deals are particularly likely during a manager-CEO's initial four-year "term." During the fourth year of CEO tenure, the probability of deals peaks, and then rapidly falls to nearly negligible levels by year 8. During the fifth year of tenure probability of internal turnover rapidly increases, and then remains at a generally high rate for and additional four or five years. A reasonable conjecture is that boards (and CEOs themselves) require several years to evaluate CEO performance in large, publicly held firms and to decide upon alternative plans. Multivariate models confirm that term structure influences deals and retirements in its own right rather than solely as a proxy for other observable variables that also influence turnover.

Second, we find that some CEOs are not subject to this term structure. Specifically, the minority of CEOs who hold one percent or more of their firms' shares are no more likely to retire or sell their firms in the fifth year than in any other year of their tenure. These "owner" CEOs have an average tenure that is more than twice as long as manager-CEOs, and their firms differ from manager-led firms in numerous other respects as well.

Third, we find in our base CR models that a number of factors are characteristically associated with different modes of turnover. Some of these factors are intuitive, consistent throughout our models, and consistent with prior literature. For example, age-related variable were strong predictors of internal turnover--i.e., retirement and resignation—as were large firm size and relatively poor CEO compensation. Other factors are less stable, including strong relationships between metrics of firm performance and modes of CEO turnover. External turnover in which firms are sold to acquirers are predicted by low Tobin's Q and low year-to-year changes in sales, both adjusted for chronological year and industry sector. Using a data set from Jentner and Kaanan (2006), we also find a strong negative connection between instances in which boards dismiss CEOs and the value of CEO stock options, which, on close inspection, appear to proxy for total market returns on firm shares over several years.

Fourth, we report on the stability of a CEO term structure and of the factors associated with CEO turnover within four sets of subsamples drawn from our full sample. We find that chronological years in which deals are common are also years in which rates of internal turnover—especially public board action to dismiss CEOs—are high. Conversely, we find no support for the hypothesis that internal and external turnover are substitutes for one another.

However, we find that the effects of term structure are stable across high and low deal environments, and that the same firm performance metrics are significantly associated with deals and firings in the two deal environments.

Term structure's effects are also stable across subsamples of inside and outside CEOs, although there appear to be some interactions among turnover mode, age, and outsider status: namely, older outsiders have a higher risk of deal than older insiders or younger outsides—contrary to our findings in the sample as a whole, where we find no direct association between CEO age and deal activity.

Dividing our sample into subsamples by term highlights the unique characteristics of the first term of a CEO's tenure cycle, from tenure years 0 – 4. After this initial period, deals decline and internal turnover (including forced exits, we believe) is the principal force behind turnover in general. We find that firm performance metrics vary in the apparent influence they that they exercise over risks of RETIRE, FIRED, and DEAL. Performance matters during a CEO's first term. But performance metrics no longer seem to matter in a robust way during later terms.

Lastly, dividing our sample into subsamples by CEO age, leads to complementary results. Although the turnover of young and old CEOs differs in many respects--including the importance of firm performance variables to RETIRE/RESIGN, FIRED, and DEAL—the data indicate that tenure rather than age dominates turnover outcomes in our sample. This is especially true of turnover by deal, and the role of tenure year 4, which inspires much of the analysis in this paper. No matter how it is functionally transformed, CEO age does not produce a similar one-year spike in the risk of DEAL.

We cannot claim to have answered the question whether the association of poor performance metrics with the incidence of firings and "retirement" during a CEO's first term, or the incidence of DEAL at tenure year 4, results from CEO entrenchment or a shakeout of poorly performing CEOs during the initial years of tenure. We can report, however, that the first of these hypotheses seems the more plausible to us given the following casual observation. The means of three-year share returns and growth of sales increase significantly from first-term to second-term CEOs. Likewise, the mean of RELATIVEQ increases significantly from first-and second-term CEOs (which includes tenure year 4) to third- and fourth term CEOs. However, there are no further increases in these metrics of performance during the tenure cycle, although the standard deviations of these metrics remain virtually identical from one term to the next.

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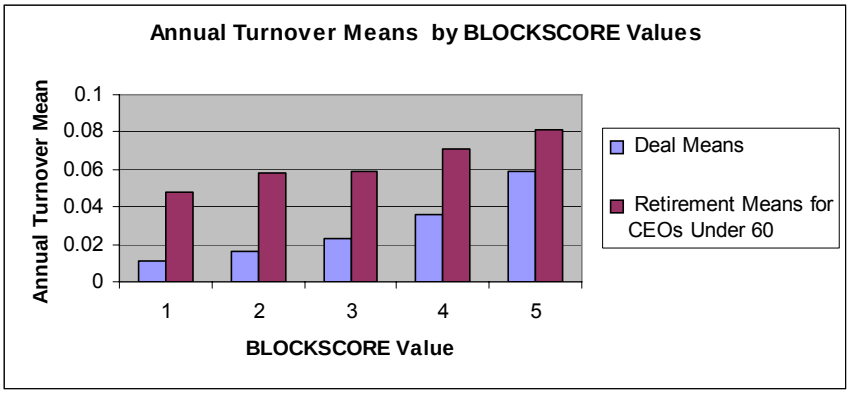
Appendix

Figure A1



BLOCKSCORE takes the value of "1" if a trust or family foundation holds shares with more than 5% of the company's voting power, a value of "2" if the CEO herself holds shares with more than 5% of the voting power, a value of "4" if two or more institutional shareholders hold blocks with 5% or more of the voting power, and a value of "5" if an independent entity—most often a corporate parent—holds shares with 5% or more of the voting power. BLOCKHOLDER assumes the neutral value of "3" if there are no 5% plus blockholders, if there is a single 5% plus institutional blockholder, or if there are only outsider individual or issuer-related pension and ESOP 5% plus blockholders.

Figure A2

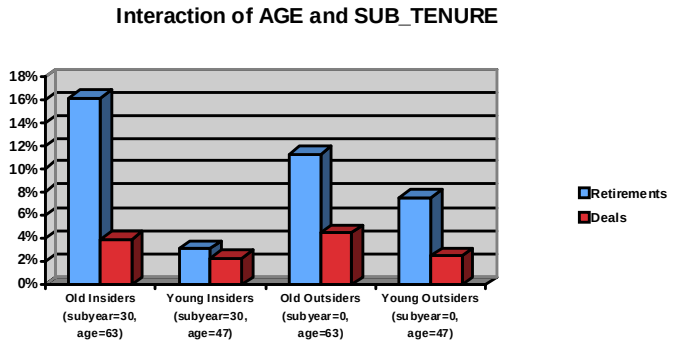


Figure A2 portrays graphically the interactive effect of CEO and pre-CEO tenure at the firm. While "outsiders" (those with no prior experience at the firm of which they are CEOs) are more likely to retire when old than when young, "insiders" (here, those with 30 years experience at the firm, which is the 90th percentile of the sample for SUB_TENURE) have a much greater difference between the predicted probability of retirement for older CEOs compared to younger CEOs.

Table A1, CR and ML Deal Models Compared

	Two Outcome CR Regression			Two Outcome ML Regression		
CONTROL VARIABLE	**SHR**	**Robust SE**		**RRR**	**Robust SE**	
age	1.041	0.029	*	1.051	0.032	
logsharval	0.916	0.075		0.923	0.075	
logoptval	0.998	0.004		0.976	0.021	
logtdc	**1.470**	**0.154**	**	**1.529**	**0.194**	***
lnass	**0.636**	**0.078**	***	**0.562**	**0.086**	***
risk	2.115	1.584		1.624	1.337	
leverage	**1.001**	**0**	**	**1.002**	**0.001**	***
relativeq	**0.447**	**0.136**	*	**0.529**	**0.170**	*
adj_salechg	**0.987**	**0.003**	*	**0.981**	**0.005**	***
rel_trs1yr	0.998	0.003		1.009	0.014	
blockscore	1.172	0.140	*	1.312	0.197	
Time Fixed Effects	Yes	Yes		Yes	Yes	
Fama-French Dummies	Yes	Yes		Yes	Yes	
N	4150			4150		
Subjects	985			985		
Failures	441			119		

Table A2, Two-Outcome CR Regression Models for Owners

	DEAL				**RETIRE**			
CONTROL VARIABLE	**SHR**	**Robust Std. Err.**	**z**		**SHR**	**Robust Std. Err.**	**z**	
age	0.86	0.07	-1.93		**1.11**	**0.04**	**3.3**	***
retirezone	0.97	0.21	-0.14		1.11	0.09	1.2	
logsharval	1.55	0.49	1.37		1.02	0.13	0.14	
logoptval	1.00	0.07	-0.03		0.97	0.02	-1.64	
logtdc	1.68	0.56	1.57		0.85	0.09	-1.6	
lnass	0.68	0.37	-0.71		1.11	0.19	0.62	
risk	15.3	35.9	1.16		0.15	0.15	-1.87	
leverage	0.99	0.01	-0.54		1.00	0	-0.69	
relativeq	**0.02**	**0.00**	**-2.81**	**	1.15	0.14	1.21	
adj_salechg	0.98	0.01	-1.48		1.00	0.01	-0.5	
rel_trs1yr	1.00	0	0.37		1.00	0	-0.15	
blockscore	2.10	0.99	1.56		1.10	0.15	0.65	

Table A3, Three Outcome Model CR Regressions Across Hot and Cold Deal Years.

	Resign		**Fired**		**Deal**	
	SHR	Robust SE	SHR	Robust SE	SHR	Robust SE
Hot Deal Year Dummy	1.650*	0.340	2.919***	0.853	5.138***	1.315
Age	1.152***	0.038	1.012	0.025	1.035	0.028
ln(Option Value)	0.963	0.019	0.933***	0.019	0.997	0.025
ln(Share Value)	1.216*	0.112	0.843*	0.061	0.896	0.062
ln(Total Compensation)	0.705**	0.088	0.790	0.140	1.253	0.154
ln(Assets)	1.111	0.129	1.360	0.244	0.712**	0.088
Risk	4.659*	3.094	1.973	1.684	0.316	0.341
Leverage	1.001	0.001	0.988*	0.005	1.002***	0.000
Relative Tobin's Q	1.050	0.223	0.619	0.261	0.455*	0.151
Adjusted Sales Growth	1.000	0.006	0.998	0.010	0.993	0.005
Relative Share Return	1.011	0.019	1.024	0.023	1.015	0.026
Block Score	0.994	0.143	1.014	0.195	1.268	0.208
Time Fixed Effects *Fama-French Dummies*	No Yes	No Yes	No Yes	No Yes	No Yes	No Yes
N *Subjects* *Failures*	3271 887 102		3271 887 59		3271 887 80	

Table A4, Two Outcome ML Models for Internal Turnover and Deal

	Resign		**Deal**	
	RRR	Robust SE	RRR	Robust SE
Age	1.153***	0.017	1.059**	0.019
ln(Option Value)	0.963***	0.011	0.998	0.020
ln(Share Value)	0.904**	0.041	0.940	0.064
ln(Total Compensation)	0.837	0.073	1.29*	0.130
ln(Assets)	1.215**	0.076	0.688***	0.069
Risk	3.499**	1.550	3.443	2.471
Leverage	0.999	0.001	1.001**	0.000
Relative Tobin's Q	1.086	0.132	0.519*	0.142
Adjusted Sales Growth	0.994	0.004	0.986***	0.004
Relative Share Return	1.007	0.011	1.009	0.016
Block Score	0.961	0.073	1.340*	0.176
Term 1	0.530***	0.097	2.390*	0.969
Term 2	1.221	0.208	1.780	0.726
Term 3	1.548*	0.299	1.530	0.702
Time Fixed Effects	Yes	Yes	Yes	Yes
Fama-French Dummies	Yes	Yes	Yes	Yes
N	4425			
Subjects	1072			
Chi^2 Probability	0.000			

Table A5, Turnover across Older and Younger Populations

	All Internal Turnover				**Turnover by Deal**			
	Younger		*Older*		*Younger*		*Older*	
	SHR	Robust SE	SHR	Robust SE	SHR	Robust SE	SHR	Robust SE
Age	1.079***	0.023	1.171***	0.020	1.064*	0.034	1.079	0.048
ln(Option Value)	0.927***	0.013	1.006	0.012	1.000	0.027	0.994	0.029
ln(Share Value)	1.033	0.066	0.930	0.044	0.954	0.069	1.201	0.151
ln(Total Compensation)	0.802	0.096	0.805*	0.068	1.307*	0.151	1.333**	0.243
ln(Assets)	1.215	0.124	1.312***	0.087	0.754**	0.082	0.564*	0.110
Risk	3.896**	1.983	0.710	0.385	2.799	1.928	18.398	26.628
Leverage	0.998	0.002	0.999	0.001	1.001**	0.000	1.001	0.001
Relative Tobin's Q	1.014	0.181	1.141	0.120	0.507*	0.160	0.550	0.302
Adjusted Sales Growth	0.997	0.006	0.998	0.004	0.990*	0.005	0.992	0.008
Relative Share Return	1.007	0.012	1.004	0.013	1.007	0.015	1.007	0.042
Block Score	1.028	0.123	0.879	0.062	1.184	0.166	1.951**	0.461
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fama-French Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	2709		1716		2709		1716	
Subjects	785		531		785		531	
Failures	147		333		90		49	

$p < .05$; $p < .01$; $p < .001$

Table A6, Predicted Turnover by Age and Company Employment Prior to Becoming CEO (SUB_TENURE)

Predicated annual probabilities of CEO turnover (retire and deal), by CEO age and pre-CEO tenure, for two-outcome model, with bootstrapped standard errors in parentheses, based on 500 randomly drawn samples with replacement.

			CEO AGE		
			10th percentile	average	90th percentile
			47	56	63
				RETIRE	
	10th percentile	0	7.5% (1.3%)	9.9% (0.8%)	11.3% (1.3%)
SUB_TENURE	average	13	5.3% (1.0%)	10.5% (0.5%)	13.6% (1.0%)
	90th percentile	30	3.1% (1.0%)	10.9% (0.8%)	16.2% (1.6%)
				DEAL	
	10th percentile	0	2.5% (0.7%)	3.5% (0.5%)	4.5% (1.0%)
SUB_TENURE	average	13	2.3% (0.6%)	3.1% (0.3%)	4.2% (0.7%)
	90th percentile	30	2.3% (1.1%)	2.9% (0.0%)	3.9% (1.0%)