

CEO-Firm Matches and Industry Conditions*

Andrea Eisfeldt[†]

Camelia M. Kuhnen[‡]

April 2009

Abstract

We study the CEO labor market and CEO turnover events in the context of a matching environment where both the CEO and the firm optimize over the relative value of preserving the match vs. pursuing their outside option. Industry and market conditions can change the value of CEO-firm matches as well as the outside options of the two parties. Thus, in contrast to a principal-agent framework where relative performance drives turnover and variables outside the CEO's control do not, in a matching environment industry and market conditions also naturally drive turnover events. We document several new stylized facts about CEO turnover over time, across industries, and during different industry and aggregate conditions using a large data set we construct that describes turnover events during the period 1992-2006. Our empirical results highlight the importance of variation in the outside options of the firm and the manager for CEO turnover.

*We thank Maggie Tsai, Nicholas Stancu and Kathy Ptouchkina for providing excellent research assistance. We thank Michael Fishman, Arvind Krishnamurthy, Dimitris Papanikolaou, and Adriano Rampini for helpful discussions, and Robert Parrino and participants in the AFA 2009 Annual Meeting for helpful comments. All remaining errors are ours. The paper was previously circulated as "Aggregate Business Conditions and the CEO Labor Market".

[†]Department of Finance, Kellogg School of Management, Northwestern University, 2001 Sheridan Rd., Evanston, IL 60208-2001, a-eisfeldt@northwestern.edu

[‡]Department of Finance, Kellogg School of Management, Northwestern University, 2001 Sheridan Rd., Evanston, IL 60208-2001, c-kuhnen@kellogg.northwestern.edu.

1 Introduction

CEO's are some of the most highly compensated professionals in the world. They are also responsible for investment and financial decisions that can shape our economic environment. This paper aims to enhance our understanding of the CEO labor market by studying the determinants and types of CEO turnover events, as well as the characteristics of the subsequent replacement manager. Our main focus is on documenting the industry and market conditions that determine CEO turnover and the choice of the replacement manager.

That decisions about CEO replacement can be driven by industry conditions and observable managerial characteristics can be seen clearly in current events. The future of the CEOs in the beleaguered US auto and financial services industries is being debated by the media and decided by government task forces. However, not all CEOs face the same termination risk. For example, the US government forced GM's Rick Wagoner out by threatening to withhold further bailout money, but allowed Chrysler's Robert Nardelli to stay on. In an article about the replacement, the Wall Street Journal¹ noted that, "Unlike Mr. Wagoner, who had been at the helm of GM since 2000, Mr. Nardelli is considered an auto-industry outsider". Similarly, there is speculation that CEOs in the financial services industry, such as Vikram Pandit of Citigroup and Ken Lewis of Bank of America may also be ousted. However, given the complexity of the assets of financial institutions, firm specific and industry specific knowledge may be critical to weathering the financial crisis and this may make outsider replacements untenable.

In this paper, we pay particular attention to understanding why industry and aggregate conditions matter for the likelihood of CEO turnover, even after controlling for firm performance. Our hypothesis is that such aggregate conditions affect the outside options of both the CEO and the firm, as well as change the total value of the match between the two directly.

We develop a matching model where both the CEO and the firm optimize over the relative value of preserving the match vs. pursuing their outside option. In this environment, both individual firm and CEO characteristics, as well as broader industry and market conditions naturally drive turnover events. For example, as industry conditions change, the type of manager which can best lead the firm may also change and the firm might find it optimal to dissolve the current match in order to find a new manager

¹March 30 2009 issue, written by Neil King Jr. and John D. Stoll.

with the appropriate skills. The deterioration in the match between the firm's desired skill bundle and the manager's abilities will change the firm's outside option, and also the overall value of the match. Industry and aggregate business conditions can also affect the value to the firm of replacing the manager by changing the potential replacement pool. Similarly, the outside career and retirement options of the manager depend on what is happening in the broader industry and market. Thus, it is not necessarily surprising that although CEO performance relative to their peer group is an important predictor of turnover events, broad industry and market conditions also play a role. Note also that even without asymmetric information about managerial ability, our matching model with replacement costs would imply that only managers with the poorest relative performance will be fired. Thus, observing that poor relative performance predicts turnover does not necessarily imply that it is used to learn about managerial ability.

Our empirical work contributes to the existing literature by studying a large dataset of CEO replacements that we construct to describe turnover events which occur during the period 1992-2006. We collect information regarding both the reason for the incumbent CEO's departure and the identity and background of the new CEO. We show in the context of our model that the characteristics of, pay to, and firm performance with the new CEO are useful in classifying turnover events as fires or quits. Empirically, we believe that this information allows us to ascertain the reason behind turnover events with greater precision. We study the effect of firm, industry, and market conditions on the likelihood of turnovers classified as forced departures, retirements, or unclassified departures (possible quits). We similarly document the determinants of the choice of whether the replacement CEO will be a firm insider, industry insider, or firm and industry outsider. Empirically, a large fraction of turnover events cannot be classified as either firings or quits. Interestingly, in the context of a matching model where separations occur when total surplus becomes negative, this is also the case. Under most reasonable theoretical definitions of fires vs. quits, a large fraction of separations in data generated by the model would remain unclassified.

First, we show that our dataset confirms earlier findings that poor industry stock returns increase the likelihood of forced turnover even after controlling for relative firm performance.² Controlling for firm relative to industry stock returns, we find that low firm relative to industry return on assets (ROA) and low relative sales growth also increase the

²For two recent studies which document this fact, see Jenter & Kanaan (2006) and Kaplan & Minton (2006).

likelihood of forced turnovers. Thus, these real variables contain additional information about CEO performance.

Not surprisingly, retirements and unclassified departures appear to be much less affected by relative firm performance than are forced turnovers. Poor firm performance still significantly increases the likelihood of these types of turnovers too, but the magnitude of the effect is less than a quarter of the effect of poor performance on the likelihood of forced turnovers.

Our empirical work supports the idea that the independent effects of industry conditions on turnover may be driven by the fact that industry shocks can change what type of manager is optimal. For example, industries which experience a decline in the long term trend of return on assets, have lower stock returns, and have lower average ROA also experience more forced turnovers. Importantly, firms that force departures are more likely to choose a replacement CEO from outside the industry, consistent with the idea that the firm desires to match with a new manager with a different skill set.

We also show that industry conditions affect the CEO's decision to depart the firm voluntarily, or retire because of age or health reasons. Quits are more frequent in industries with down-trending ROA, and with lower average stock returns and ROA, suggesting that in those industries the outside option of the CEO of leisure or perhaps joining private firms is more valuable than the expected payments received by staying with the firm during the industry downturn. Retirements are less frequent in industries with higher employment growth, possibly indicating that part of the rent captured by active CEOs comes from empire building (e.g. managing organizations with many employees).

Market conditions also matter for the frequency of various types of turnover. Retirements are significantly more likely in the year after high stock market returns. This could be the effect of such bull markets on the value of the retirement assets of the CEO. Quits are more likely when the market returns are low, possibly because in those times the rents captured by the CEO are low relative to the outside option of leisure or working for private entities. We also find that firings are more frequent in years after those with high market returns.

Finally, we document the broad determinants of the source of the replacement CEO. Replacement CEOs are significantly more likely to come from outside the firm and outside the industry when the firm does poorly in terms of stock returns and return on assets, or when the industry has low ROA, which are instances where typically the incumbent CEO is fired. Replacement CEOs are more likely to come from inside the firm if the turnover

event was due to retirement or voluntary departure rather than forced turnover.

Our paper builds on the results of a large literature³ on CEO turnover. One of the most documented facts is that relative performance evaluation (RPE) matters for CEO replacement: the probability of CEO turnover is negatively related to the performance of the firm relative to the industry (Barro & Barro (1990), Gibbons & Murphy (1990)) or to the market (Warner, Watts, & Wruck (1988)).

However, RPE does not seem to be the only driver of managerial changes. Jenter & Kanaan (2006) document that CEOs are more likely to be dismissed from their job after bad industry and bad market performance, and in light of these findings argue that RPE cannot be the sole determinant of CEO turnover. They suggest two hypotheses consistent with the empirical results. First, corporate boards may commit systematic attribution errors and credit or blame the CEO for performance cause by factors outside their control. Second, firm performance in bad times may be more revealing about CEO skill than performance in good times. In our model, the relevance of industry and market conditions for whether or not a CEO is forced out comes from considering the firm and CEO as parties in a match whose actions depend on their respective outside options. The data seem to support this idea since the type of turnover event helps to predict the type of replacement chosen. In particular, forced turnovers are associated with replacement by outsiders.

Several papers have focused on the relationship between corporate governance, compensation and CEO turnover. Huson, Parrino, & Starks (2001) find that the frequency of forced turnover and of outside succession increased over time during 1971 to 1994, and that board characteristics influence the likelihood of these events. Kaplan & Minton (2006) argue that the CEO turnover rate during 1992-2005 is higher than previously found for the prior two decades (11.8% versus 10%) and attribute this to boards becoming increasingly more sensitive to the CEO's performance.⁴ Peters & Wagner (2007) suggest that this recent increase in turnover has lead to a significant increase in CEO pay, as executives face a higher risk of losing their jobs.

The role of industry and business conditions on CEO turnover has not received much attention in the literature. This may be because historically the literature on CEO turnover has focused on the role of boards as monitors of the firm and has attempted

³See Murphy (1999) for a review of the literature on CEO compensation and turnover.

⁴Kaplan & Minton (2006) also document that CEO turnover is related to industry performance relative to the stock market, and performance of the overall stock market, but do not provide an interpretation for these results, as they are not the focus of the paper.

to ascertain their effectiveness in this role.⁵ Notable exceptions are Parrino (1997) and Eisfeldt & Rampini (2008). Parrino (1997) argues that intra-industry CEO appointments are less costly and performance measures are more precise in homogeneous industries, and, consistent with this argument, finds that the likelihood of forced turnover and of an intra-industry appointment increase with industry homogeneity. Eisfeldt & Rampini (2008) show how aggregate business cycle conditions can drive CEO turnover and compensation in a principal agent environment where managers have private information about their skill. Their focus, however, is on external turnover due to mergers and acquisitions.

2 Model

We consider the decision problems of a manager and a firm who are currently matched in a simple matching market framework. Neither the firm, nor the manager can commit to honoring long term contracts, so each must earn at least the value of their outside option in each period in order for the match to continue. The dynamics of optimal managerial compensation induced by agency problems when long term contracts are feasible is the focus of many recent theoretical papers.⁶ Although some of these papers do contain results about contract termination, their main focus is on compensation dynamics rather than CEO turnover. For the most part termination in these models is rare, and is largely used as a stick to provide incentives with rather than treated as an object of interest in and of itself. The limited focus on CEO turnover in the theoretical literature is in contrast to the large empirical literature on turnover discussed above.

We consider a firm i which produces output using capital k and the managerial input from manager j according to:

$$a_i(m_j)k^\alpha, \tag{1}$$

⁵We thank Robert Parrino for this helpful historical perspective on the literature.

⁶See for example, DeMarzo & Fishman (2007a), DeMarzo & Fishman (2007b), He (2007), DeMarzo, Fishman, He, & Wang (2009), He (2009), Sannikov (forthcoming), and Lustig, Syverson, & Van Nieuwerburgh (2009). Sannikov (forthcoming) considers the effects of variation in firm and managerial outside options on the agency costs of providing incentives. DeMarzo et al. (2009) consider how exogenous variables affect the degree of agency costs and hence the dynamics of managerial compensation. Lustig et al. (2009) study how managerial outside options affect the division of rents between managers and firm owners over time and study the induced distributions of managerial compensation. He (2007) focuses on the effects of hidden savings on compensation dynamics. Edmans & Gabaix (forthcoming) provide a survey of how these and other recent theories can explain “pay-for-luck”.

where $a_i(m_j)$ is the productivity of capital when firm i employs manager j . This productivity is given by (slightly abusing notation):

$$a_i(m_j) = \sum_{s=1}^S \theta_{i,s} a_{j,s} \quad (2)$$

where $\theta_{i,s}$ is a weight which describes the importance of skill s in determining the productivity of capital deployed in firm i and $a_{j,s}$ is the level of ability of manager j in skill s .

These weights can vary over time and across firms. For example, growing firms may have high weights on skills such as building and motivating a sales force, and firms in mature industries may place higher weights on cost cutting. Firms which can fund growth internally may not have a high weight on the ability to raise external finance, whereas firms needing to access capital markets might. Similarly, the importance of firm specific vs. general skills may vary in the spirit of the evidence documented by Frydman (2005).⁷ The abilities of managers may also vary over time. In particular, managers may gain firm specific abilities through learning by doing during their tenure with the firm. Although it is interesting to consider the decision by the manager to invest in accumulating different skills, for simplicity here we will assume that abilities are fixed and leave a study of that investment decision for future work.⁸ Bertrand & Schoar (2003) document managerial fixed effects in management style, consistent with abilities being somewhat rigid. For it to be optimal to replace a manager with a suboptimal skill set, we need to have that there are at least investment costs, adjustment costs, or time to build for managerial skills, which seems reasonable.

For our purposes, we take capital k and labor l as given, and assume that there are competitive markets for capital and labor with constant per period prices r_k and r_l . After the firm has made its payments to capital and labor the value created by firm i matched with manager j is

$$V \equiv a_i(m_j)k^\alpha - r_k k - r_l l. \quad (3)$$

Since we assume that there is no commitment on the part of the manager, the manager

⁷Frydman (2005) presents evidence from CEO turnovers consistent with general skills gaining in importance over time and links this rise in importance to the observed growth in the level and variation in managerial pay. Also, Kaplan, Klebanov, & Sorensen (2008) show that individuals with greater general abilities are more likely to be hired as CEOs of companies taken over by private equity firms.

⁸In a recent paper Giannetti (2009) presents a model where compensation is designed to incentivize managers to invest in firm specific skills.

will always need to earn a value inside the match equal to the value of their outside option. The manager can quit and search for an alternative position, or they can retire. We assume that there is a market for managers in which the per period “price” of a manager is given by the sum of the market value of that manager’s abilities.⁹

In other words, a manager can command market payments of (again with a slight abuse of notation):

$$p_j \equiv \sum_{s=1}^S p_s a_{j,s} \quad (4)$$

for their skill bundle where p_s is the market price of skill s which managers who depart to work in another firm will earn.¹⁰ The manager’s outside option is then:

$$V^{m_j} \equiv \max \{p_j - c^m, R\} \quad (5)$$

where c^m is the cost of finding a new position, and R is the value of retiring.¹¹

The firm’s owners will also need to be paid their outside option. The firm can fire the manager and search for a better match, or it can liquidate. The firm’s outside option is given by:

$$V^{f_i} \equiv \max \left\{ \max_h \{a_i(m_h)k^\alpha - r_k k - r_l l - (V^{m_h} + c^f)\}, L \right\}. \quad (6)$$

The left hand argument is the value the firm receives with the optimal replacement manager, where $a_i(m_h)$ and V^{m_h} are defined analogously to the productivity of manager j at firm i and the outside option of manager j defined above as a function of the market prices of manager h ’s skills, and c^f is the cost to the firm of finding and installing the new manager. The right hand argument, L , is the liquidation value of the firm.

The current match will dissolve if total surplus from the match is negative, in other words if the value created by the current match after payments to capital and labor,

⁹This market is in the spirit of that formalized in Rosen (1974). See that paper for a description of the technical assumptions which determine the properties of the price function. We assume that this price function is linear, but this is not necessary.

¹⁰If there are no search or replacement costs then managers will always earn market prices for their skills. Positive costs imply that managers may earn a different payment at their current firm.

¹¹With search and replacement costs, in order to be able to consider the dynamic problem as a series of static decision problems, we need to assume that these costs are only paid once (for example, there is a fee to hire a head hunter for the life of the manager or firm). If the current match involves an agent who has already experienced a separation, the search or replacement costs for that agent are zero. If such costs must be paid to end future matches, then agents must take into account the evolutionary dynamics of the variables that determine match values and outside options and consider how long matches will be sustained.

minus the manager's outside option, minus the firm's outside option, is negative, i.e. if:

$$\begin{aligned} & (a_i(m_j)k^\alpha - r_k k - r_l l) - (\max\{p_j - c^m, R\}) \\ - & (\max\{\max_h\{a_i(m_h)k^\alpha - r_k k - r_l l - (V^{m_h} + c^f)\}, L\}) < 0 \end{aligned} \quad (7)$$

or,

$$V - V^{m_j} - V^{f_i} < 0. \quad (8)$$

From these inequalities, one can see several channels through which changes in exogenous variables such as industry conditions might drive total surplus below zero and thereby drive CEO turnover. Throughout the description of the model thus far we have used simple notation and have suppressed the dependence of skill weights, skill prices, replacement and search costs, the pool of replacement managers, the value of retirement and liquidation and the productivity of capital on industry conditions, however we think that such conditions likely affect all of these variables. Consider first the potential effects of a deterioration in industry conditions on the outside option of the firm. As the industry declines, the optimal managerial skill bundle may change, for example to more heavily weight cost cutting or the ability to access capital markets. Managers with better skill bundles for that industry may also become cheaper as the industry declines and some firms choose to liquidate. Finally, a cyclical downturn in demand for the firm's goods might lower the cost of replacing the manager if that cost is given by foregone output or disruption costs. Thus, a model like the one described can generate more forced turnover or firings when industry conditions are poor under what seem to be reasonable assumptions about the relationship between the firm's outside option and what is going on in the industry. Next, consider how industry conditions might change the outside option of the manager and lead to managers quitting for better jobs or retiring. Industry conditions may change the opportunity costs of searching for a new job. Likewise, changes in industry conditions can change skill prices and lead the manager to leave for greener pastures. Finally, industry conditions can change the relative value of retirement through affecting the disutility of work and the value of retirement compensation packages.

In the context of this model, it might seem more surprising that relative performance evaluation empirically accounts for such a large fraction of the variation in CEO turnover, than it is that exogenous variables play a role. In fact, firm relative to industry performance seems to be the most important predictor of observing an instance of forced turnover, both in our data and in that of previous studies. The finding that RPE ap-

parently has such a large empirical contribution to turnover seems to suggest that there is quite a bit of private information and/or learning about CEO ability. However, note that even without private information one might observe what would appear to be RPE driven turnover in data generated by a model like the one described. For example, the firm’s cost of replacing the manager can generate a decision rule whereby managers are only replaced once they become sufficiently suboptimal.¹² This along with firm heterogeneity would imply that only the worst managers in an industry get fired in our model. Large weights on firm specific knowledge in the managerial input to the productivity of capital could also generate decision rules with these properties. Our purpose is not to “test” whether RPE drives turnover, or even to measure its contribution. Nesting RPE in the matching framework and attempting to identify the independent contributions of each to observed turnover events is an interesting, albeit ambitious project, which we leave to future research. Instead, we have the more modest aim of showing that the empirical properties of CEO turnover are consistent with a matching market like the one described playing a role and perhaps driving the observed relationships between turnover and exogenous variables.

Explicitly considering the outside options of both managers and firms in a matching framework illustrates another, perhaps surprising feature of such a model which is also consistent with the data. In the model, as in the data, it is actually quite difficult to label a separation as a “quit” or “fire”. Since empirically separations are typically labeled as quits or fires by utilizing news stories as we do here, one might think that the large fraction of turnovers which can neither be labeled as quits or fires are simply misclassified due to lack of information. One might think that if one had perfect data, that all separations should be able to be labeled one way or the other. However, even in data generated by the model, quite reasonable theoretical definitions of quits and firings would imply that for a large fraction of separations, the agent who initiated the match dissolution is ambiguous. Matches dissolve when the total surplus from the current match is negative. As discussed, this can occur for many reasons on the part of the firm and the manager, both of whose outside options vary over time, or it can be that the total value of the match declines. Furthermore, the outside options of the firm and the manager, as well as the value created by the match depend on the same variables, namely, skill weights and prices, and search and replacement costs.

¹²See also Kuhnen & Zwiebel (2007) for a model in which entrenchment costs imply that only managers with ability below a certain threshold are fired.

We discuss this ambiguity in the context of one specific definition of “quits” vs. “fires” but note that the model permits others. We introduce time subscripts and suppress individual agent subscripts to define a separation as follows:

Definition 1 *A separation occurs in the current period when a match satisfies the following two conditions:*

Condition 1 $V_t - V_t^m - V_t^f < 0$

and

Condition 2 $V_{t-1} - V_{t-1}^m - V_{t-1}^f > 0$.

Now, consider defining a separation as initiated by one agent (either the manager or the firm) if that agent would choose to remain in the match with the current match value and the current outside option of the other agent, but with their own lagged outside option. This separation must satisfy conditions 1 and 2 as well as either

Condition 3 (Q) $V_t - V_{t-1}^m - V_t^f > 0$

if the separation is a quit, or

Condition 4 (F) $V_t - V_t^m - V_{t-1}^f > 0$

if the separation is a fire.

Note that conditions 1 and Q together simply say that $V_t^m > V_{t-1}^m$, while conditions 1 and F together simply say that $V_t^f > V_{t-1}^f$. These two inequalities are not mutually exclusive, so clearly many separations would be unclassified under this definition. We can, however, refine this definition further.

Add to the definition above that the initiating agent would not want to remain in the match even given the current match value, that agent’s current outside option, and the other agent’s lagged outside option. If conditions Q and F are associated with quits and fires, these new conditions basically state that quits must also not be firings, and likewise firings must also not be quits. In other words, they require that the separation also satisfy

Condition 5 (\neg F) $V_t - V_t^m - V_{t-1}^f < 0$

if the separation is a quit, and

Condition 6 ($\neg Q$) $V_t - V_{t-1}^m - V_t^f < 0$

if the separation is a fire.

Then, a quit can be defined as a separation which satisfies Q and $\neg F$. Combining these two conditions, and condition 1 with condition Q yields the following definition of a quit:

Definition 2 *A separation is a **quit** if $V_t^m > V_{t-1}^m$ and $V_t^m - V_{t-1}^m > V_t^f - V_{t-1}^f$.*

Similarly, a fire can be defined as a separation which satisfies F and $\neg Q$. Combining these two conditions, and condition 1 with condition F yields the following definition of a firing:

Definition 3 *A separation is a **fire** if $V_t^f > V_{t-1}^f$ and $V_t^f - V_{t-1}^f > V_t^m - V_{t-1}^m$.*

Even these very loose definitions permit separations that cannot be classified in cases in which the total value of the match drives the surplus negative and outside options remain unchanged. More strict definitions of quits and fires, such as the one given by conditions Q and F only, or requiring a quit to satisfy $V_t^m > V_{t-1}^m$ and $V_t^f \leq V_{t-1}^f$ and requiring a fire to satisfy $V_t^f > V_{t-1}^f$ and $V_t^m \leq V_{t-1}^m$, would lead to even more ambiguous separations.

However, note that in the model, as in the data, the type of replacement manager, and the compensation of that manager, would yield additional information about the type of separation observed. For example, from equation 7 it is clear from looking at the description of the firm's outside option that if a manager with different abilities than the incumbent is chosen and the firm performs better under that new manager while he is paid more, then the incumbent was likely fired.

3 Data

We use four main sources of data: Execucomp for the name and compensation of the CEOs of 2779 publicly traded companies during 1992-2006, CRSP/Compustat for stock returns and accounting data for these firms, the industries they belong to, and the market in general, the Bureau of Economic Analysis for industry and aggregate data (referring to both the public and private firms), and Factiva for news stories published in a three-year

window around CEO departures. The information in Factiva allows us to determine the reason why a CEO left and to identify where the replacement CEO came from.¹³

We identify 2068 instances where a CEO was replaced, and for which we know both the reason for the incumbent’s departure, as well as where the new CEO came from. Of all replacements, 613 (29.7%) are the result of a planned retirement decision, announced at least six months prior to the actual departure date, or of a health-related reason. Another 323 (15.6%) replacements are instances where the incumbent CEO was forced out, according to newspaper stories related to the departure. The remaining 1132 (54.7%) cases are those that do not fit in any of these two categories – retirements or firings – and thus we will label them unclassified departures. These events are likely to be those where the incumbent voluntarily left the firm, and therefore we will also refer to them as possible quits. Since these unclassified departures are the residual category, one might expect them to behave like a weighted average of retirements and forced turnovers. This is true for some empirical relationships (for example the relationship between relative firm performance and the likelihood of turnover), but these unclassified departures have some distinct characteristics. We discuss this more in section 4, but, for example, they have the strongest negative relationship of all turnover types with contemporaneous market returns.

Our definition of departure type is different from the algorithm described in Parrino (1997) and followed by several other papers, in two significant ways. First, and most important, the extant literature on turnover identifies just two types of departures: forced and unforced (the latter including retirements). However, since an employment relationship is the result of a two-sided matching process that depends on the conditions in the executive labor market, we allow for turnover to happen for three reasons: the firm chooses to terminate the match, the CEO chooses to terminate the match but is still active in the executive labor market, or the CEO leaves the executive labor market for exogenous reasons such as age and health. These three types of departure have different theoretical reasons and will be predicted by different variables in the empirical analysis.

Second, unlike Parrino (1997), we do not condition on the incumbent CEO’s age to define a departure as forced or not. Parrino (1997) classifies as forced departures all cases where the CEO is younger than 60, and (1) related news stories do not report

¹³We are grateful to Dirk Jenter for providing us with the data in Jenter & Kanaan (2006) regarding whether or not a CEO was fired or chose to retire. We used those data to fill in some of the missing observations for which our Factiva search was not fruitful.

the reason for departure as involving death, poor health or the acceptance of another job, or (2) the firm reports the departure as a retirement, but does so less than six months before succession. We believe that it is possible that in some of these instances managers voluntarily quit the job – they were not fired, nor did they choose to leave the executive labor market (i.e. retire.) Hence, while in papers using the Parrino (1997) algorithm the age of the departing CEO is a significant and negative predictor of forced turnover because of the way forced turnovers are defined, in our analysis this mechanical relationship does not exist.

4 Empirical Results

We seek to understand the effects of firm, industry and aggregate economy conditions, in terms of both real and financial market variables, on two important outcomes for a firm: the dissolution of the match with the incumbent CEO, and the formation of a match with a new CEO. The evidence we find supports our theoretical argument. The type of CEO departure, as well as the type of CEO hired as a replacement depend strongly on the firm’s need for strategy change and on the outside option of both the firm and the CEO, as determined by real and stock market conditions.

The novel empirical results we document are two-fold. First, we show that real variables (as opposed to stock returns) at the firm and industry level influence the type of CEO departures (retirements, quits or firings), as well as the type of replacement brought in (company insider, company outsider from the same industry, industry outsider, or an individual from the private firms). Second, we show that financial and real variables have different effects on different types of departures and replacements.

To get to these new results, we build on the findings of a large empirical literature on CEO turnover. Typically in this literature, either the firm’s stock return or the firm’s return on assets (ROA), adjusted for industry performance, have been used to predict CEO turnover, and forced turnover in particular. For instance, Gibbons & Murphy (1990), Murphy (1999), Jenter & Kanaan (2006) and Kaplan & Minton (2006) use stock returns, while ROA (typically by itself and not in addition to the stock return) is used in Barro & Barro (1990), Parrino (1997), Huson et al. (2001), and Huson, Malatesta, & Parrino (2004). The evidence in these papers suggests that relative performance evaluation (Holmstrom (1982)) is used to determine whether a CEO is fired¹⁴ or not: if the

¹⁴In some of the extant literature, data limitations did not allow for turnovers to be classified as forced

firm’s performance (measured as stock return or ROA) relative to the industry is higher, the probability of the CEO being forced out is lower. As discussed in Section 2, in a matching environment the existence of replacement costs can also lead to the firing of the lowest types only, even when managerial ability is common knowledge.

We replicate this empirical result throughout our analysis, and strengthen it by showing that a combination of multiple performance benchmarks determine the likelihood of a CEO being fired. A firm’s stock return and its return on assets – measured relative to the industry – together contribute to the firing outcome. Since these RPE measures are noisy and not perfectly correlated signals of the quality of the CEO-firm match, they all should be inputs in the firing decision. In Table 1 we replicate the results of Kaplan & Minton (2006) and Jenter & Kanaan (2006) regarding the role of relative stock return performance on the likelihood of a CEO being fired. Lagged relative stock return performance (i.e. firm minus average industry return) is a significant and negative predictor of a CEO being fired.¹⁵

The second important result we replicate is also documented in Jenter & Kanaan (2006) and Kaplan & Minton (2006): firings seem to be more likely after bad industry and bad market performance, measured by stock returns. This effect is illustrated by the multinomial logit models of departure type in Table 1. Controlling for firm relative to industry returns, industry relative to market returns ($Industry - MarketReturn_t$) and market returns ($VWMarketReturn_t$) during year t (Panel A) and industry returns ($VWFFIndustryReturn_t$) (Panel B) are significant negative predictors of the relative likelihood of the CEO being forced out versus there being no turnover during year $t + 1$.¹⁶

Although these results have been documented previously, we provide a unique interpretation here. We posit that industry and market returns affect the CEO-firm match surplus and thus drive turnovers.

We will now turn to the novel empirical findings we document, in light of the predictions of our model of CEO-firm match formation and dissolution.

or not forced, but the RPE hypothesis refers to firings, and not to other types of CEO departures.

¹⁵We also perform a robustness check by measuring annual returns over July-June instead of January-December, and the results are similar.

¹⁶The negative relationship between the likelihood of forced turnover and either industry returns or industry relative to market returns is robust to defining lagged returns using July-June windows.

4.1 Match dissolution

Our evidence indicates that industry and aggregate conditions are important determinants of whether or not a CEO-firm match will terminate. We first observe that turnover of all types, and forced turnover in particular, are relatively concentrated. Using the Fama French 48 industry classification system, we find that 50% of all instances of forced turnover occur in just seven industries: Business Services, Computers, Retail, Utilities, Chips, Machinery and Drugs. Overall turnover is also concentrated in several industries, although less so than forced turnover. The top 5% of 608 industry-year bins that our observations belong to account for 22% of all turnover events, and for 35% of forced turnover. Since these CEO-firm match dissolution events are not uniformly distributed across industries and over time, we investigate what specific industry characteristics and aggregate market conditions may drive turnover.

Figures 1 through 4 show the relationships between the frequency of firings, quits, retirements and overall turnover and various industry characteristics measured over 1993-2005.¹⁷ We use the Fama French 48 industry classification throughout this analysis. During this time period, the average industry-level rates of forced turnover, quits, retirements and overall turnover are 1.69%, 6.21%, 3.32% and 11.98%, respectively.

For each industry and each year, we classify the industry as having below-trend ROA if the industry ROA that year is lower than its three-year average. We then count the number of below-trend years for each industry during 1993-2005. As shown in Figure 1, the frequency of firings is significantly higher in industries with below-trend ROA during more years in the period of 1993-2005 ($\beta=0.002$, $t\text{-stat}=2.53$). One additional year of down-trending ROA increases the frequency of forced turnover by 0.2% (from 1.69% to 1.89% in the average industry).

We also find that industries with lower average ROA have significantly higher firing rates during 1993-2005 ($\beta=-0.12$, $t\text{-stat}=-3.81$). A one-standard deviation decrease in the ROA from 0% (for the average industry) to -5% increases the firing rate by 0.6%. Industries with lower annual value-weighted stock returns are characterized by higher firing rates ($\beta=-0.05$, $t\text{-stat}=-1.92$), whereas those with higher employment growth have more forced turnover ($\beta=0.12$, $t\text{-stat}=2.54$). The latter result is explained by the fact that in our sample there is a strong negative correlation between average employment

¹⁷Since our dataset ends in 2006, the last year for which we can compute turnover rates is 2005. Also, a large number of firms do not appear in Execucomp in 1992, and due to this incomplete coverage we drop data from 1992 in our analysis of industry conditions and time trends.

growth in the industry and industry ROA during 1993-2005 ($\beta=-0.57$, $t\text{-stat}=-3.03$).¹⁸

Figure 2 shows that the frequency of unclassified departures (possible quits) is significantly higher in industries with more years of below-trend ROA ($\beta=0.01$, $t\text{-stat}=4.33$), with lower ROA on average ($\beta=-0.11$, $t\text{-stat}=-1.70$), and with lower value-weighted stock returns ($\beta = -0.13$, $t\text{-stat}=-2.52$). All these effects are economically significant. For instance, decreasing the annual industry-level stock return by one standard deviation (6.09%) from the sample mean of 12.9% increases the frequency of quits by 0.79%, a significant effect given that the average quits frequency is 6.21% in our data. We do not find a strong correlation between quits and industry employment growth.

The effects of industry characteristics on retirements (which we also refer to as “exogenous” CEO departures, since they are defined as caused by age or health considerations), are shown in Figure 3. Most effects are not statistically significant. We do find, however, that the frequency of retirements is higher in industries with lower employment growth ($\beta=-0.12$, $t\text{-stat}=-1.76$). This is the first piece of evidence to indicate that retirement decisions may not be exogenous to the firm or aggregate conditions. CEOs have some leeway in when they choose to retire, and may do so when their outside option is better than the rents captured by staying with the firm. It is possible that these rents are relatively less attractive in industries with lower employment growth, if empire-building is part of these rents.

The relationship between industry characteristics and overall turnover rates (i.e. firings, unclassified departures and retirements altogether) is shown in Figure 4. We find that overall turnover is significantly higher in industries characterized by more years of below-trend ROA ($\beta = 0.01$, $t\text{-stat}=4.30$), and those with lower average annual stock returns ($\beta=-0.21$, $t\text{-stat}=-2.55$). For instance, one additional year of down-trending ROA increases the frequency of turnover by 1% (from 11.98% to 12.98% in the average industry).

To illustrate these results using simple statistics, we split observations based on quar-

¹⁸An interesting question is whether there is a significant positive relationship between firing rates and the industry homogeneity index, as found by Parrino (1997) for the period 1969-1989. His result implied that it is easier to replace a CEO if there is a larger pool of suitable candidates to pick from. We do not find this positive correlation in our data. As suggested by Frydman (2005), however, the importance of firm (or industry-specific) skill has diminished over time, and nowadays general management skills are most desirable. This would explain why in the recent time period that we study, we no longer find that industry homogeneity (and thus, the availability of candidates with firm or industry-specific skills) is a determinant of forced turnover. We thank Robert Parrino for sharing with us the industry-level homogeneity index values calculated for the time period 1990-2006.

tiles of industry conditions. Figure 5 shows the frequency of turnover types (retirements, possible quits and firings) as a function of industry conditions during 1993-2005. The firing rate is 0.5% in the top industry ROA quartile and 2.4% in the bottom quartile. The rate of possible quits is 4.8% in industries belonging to the quartile with the lowest number of ROA down-trending years, and 6.7% in those with the most prolonged ROA down-trend. The firing rate is also higher in industries in the lowest quartile of stock returns (1.7%) than in those in the highest quartile (1.4%), and in industries with higher employment growth. Retirement frequency is highest (3.7%) in industries in the highest ROA quartile and lowest (2.4%) in those in the lowest ROA quartile.

Given the observation that turnover, and forced turnover in particular, are not uniformly distributed across industry-year bins, it is natural to inquire whether market conditions in particular years may drive turnover events. The relationships between frequencies of various types of turnover and current or lagged stock market returns are illustrated in Figure 6. We find that in years following good stock market performance firings are more common ($\beta = 0.02$, t-stat=2.84), retirements are also more common ($\beta=0.03$, t-stat=2.91) and the overall turnover rate is also higher ($\beta=0.04$, t-stat=1.90). Unclassified departures are less frequent during years with good stock market returns ($\beta=-0.05$, t-stat=-1.83). The results regarding retirements and possible quits once again suggest that the outside option of the CEO is important for the timing of his departure. After good market performance in the prior year, a CEO close to the retirement age is more likely to actually retire, since his nest-egg is worth more. CEOs who are not close to retirement seem to be more likely to decide to quit when the stock market is doing poorly, perhaps because at those times the value of the promised payments for staying with the firm may not be attractive enough compared to the outside option of leisure or even working for private firms.¹⁹ The positive correlation between lagged market returns and the firing rate in a given year is less straight-forward to interpret. It is possible that after good market returns the promised payments to the incumbent CEO may be too high relative to the rents left to the firm, and thus firing the manager may be optimal.

While these univariate results confirm the hypothesis that CEO-firm match dissolution depends on industry and market conditions, we further test this hypothesis in a multivariate setting using firm-year level data to control for potential confounds. This

¹⁹In our dataset it is extremely rare for a CEO to quit only to join another publicly traded firm covered in Execucomp. Allgood & Farrell (2003) also document and discuss the rarity of such transitions. In our sample quitters tend to join private companies instead of continuing to work as executives of other publicly traded firms.

analysis reveals the effects of firm, industry and market conditions on CEO departures, which we document in the multinomial logit model in Table 2. The dependent variable is categorical and can have four values, indicating whether in a particular firm (a) there was no CEO change between years t and $t + 1$, (b) the CEO in place in year t was fired and a new CEO took over in year $t + 1$, (c) the CEO in place in year t retired and a new CEO took over in year $t + 1$ and (d) the CEO in place in year t left for unknown reasons (possibly quit) and a new CEO took over in year $t + 1$.

The results show that firings are more likely relative to there being no turnover, if the firm's stock return or ROA relative to the industry ($Firm - IndustryReturn_t$ and $Firm - IndustryROA_t$) are lower, and if the industry has experienced low stock returns relative to the market ($Industry - MarketReturn_t$) or a downturn in profitability as measured by the variable $IndustryROABelowTrend_t$. This variable is an indicator equal to 1 if the average ROA in the industry during the preceding three years is below its value during the preceding ten years. We interpret such an event as indicating a structural break in the profitability of the industry and as signal that the industry is experiencing bad times. These results are consistent with our hypothesis that when the firm and the industry experience a downturn, a change in strategy may be optimal – hence the firm should dissolve the match with the current CEO by forcing him out.

We replicate two other univariate results documented above, that a higher stock market return in year $t - 1$ and a higher employment growth in the industry in year t correspond to a higher firing likelihood at time t . We measure industry employment growth using either CRSP/Compustat figures for publicly-traded companies, or the Bureau of Economic Analysis data for public and private companies classified using NAIC industry codes. Our results hold for either of these measures, as seen in Panels A and B of Table 2.

Unclassified departures are more likely to happen relative to there being no turnover if the firm's stock return, ROA or employment growth relative to the industry is lower, if the industry ROA is lower, if the recent three-year industry ROA is below its ten-year trend, and if the stock market return is lower, consistent with our theory. When the industry's ROA is trending downward, the continuation value for the incumbent to stay with the firm is low – the prospects of the industry are not good and the value of future payments to be received from the firm is lower. Similarly, the continuation value for the incumbent is higher when the firm is doing well relative to the industry, in terms of ROA or sales growth, and when the market is doing well, since the expected value of future

payments from the firm is higher.²⁰

Consistent with our hypothesis that the CEO's outside option matters for his decision to retire, and mirroring the result from Figure 6, we find that the likelihood of retirements increases if the stock market has done well in year before the turnover occurs. Better stock market performance may lead to there being more director positions available, and also to an increase in the value of the CEO's existing retirement fund. We find that if the firm's stock return or employment growth relative to the industry are higher, the odds of the CEO retiring decrease. Since CEO compensation increases with firm stock performance and also with firm size, and some managers may also enjoy empire building, we interpret these results as indicating that if the value of staying in the match is higher, the CEO is less likely to retire.

Finally, the results in Table 2 show that CEOs younger than 65 years are significantly less likely to either retire or leave for unknown reasons, relative to older individuals. At the same time, the likelihood of being fired relative to continuing as a CEO does not depend on the executive's age.

4.2 Match formation

Once a firm-CEO match has been dissolved, a new CEO must be brought in. We seek to understand whether firm, industry and market conditions determine what type of replacement CEO is hired, conditional on the firm experiencing a CEO turnover.

We start by first documenting some general patterns in types of replacements hired during 1993-2005. The frequency of replacements by company insiders has decreased over time ($\beta=-0.01$, t-stat=-2.48 in an unreported regression) from 70% in 1993 to 59.5% in 2005, supporting the argument that general management skills are now relatively more valuable than firm-specific skills compared to earlier periods (Frydman (2005)). Also, the frequency of replacements by individuals coming from privately-held firms has increased over time ($\beta=0.01$, t-stat=2.50 in an unreported regression), from 1.75% in 1993 to 5.40% in 2005.

In line with our hypothesis that matches are formed based on the fit of the CEO's skill set with the company's needs, we find evidence suggesting that companies going through difficult times, either because of idiosyncratic reasons or because of industry

²⁰Moreover, in the spirit of the asymmetric information model in Gibbons & Katz (1991), leaving when the industry is going through bad times allows the CEO to not be inferred as being as low a type as if he left while the industry was experiencing a boom.

conditions, are more likely to hire replacement CEOs with a different background than the incumbent executive.

We find that company outsiders are more likely to be brought in after a firing or after a voluntary departure of the incumbent, which tend to occur when the firm or the industry experience difficult times, than after a retirement. Moreover, most of these outsiders are from a different industry according to the Fama French 48 industry classification system. The same is true if we use the 2-digit SIC industry classification code, which yields 61 different industries in our sample.

Figure 7 indicates the types of replacement CEOs hired after each type of departure and suggest that the type of replacement CEO hired depends on the reason for the departure of the prior CEO. Replacements by company insiders are significantly more likely if the prior CEO left because of retirement than if he possibly quit or was fired. In the case of retirements, only 20.3% of the new CEOs are from outside the company: 4.2% are from the same industry (based on 2-digit SIC codes), 11.6% are from a different industry, and 4.5% come from a non-publicly traded company. In the case of possible quits, 28.3% of the new CEOs are from outside the company: 5.5% are from the same industry, 15.7% are from a different industry, and 7.1% are from a non-publicly traded company. After firings, 37.8% of replacements are company outsiders: 9.1% are from the same industry, 21.2% from another industry, and 7.5% from a non-publicly traded company.

We check the robustness of these results by estimating a multinomial logit model of the relative likelihood of various types of replacement CEOs as function of the prior CEO's departure reason, and industry fixed-effects. The results are shown in Table 3 and confirm the unconditional findings.

To get more direct evidence that industry conditions matter for the type of replacement CEO hired, we split the firm-year observations into those belonging to industries with below-average and above-average ROA during 1993-2005. To keep the analysis simple, we bundle together all three types of replacement CEOs from outside the company, and refer to these individuals as "outsiders". Replacement CEOs hired from within the firm are referred to as "insiders".

Figure 8 shows that the number and frequency of turnover events for low and high ROA industries, and for each departure reason and replacement type. In low ROA industries there are more instances of firings and unclassified departures (possible quits) than in high ROA industries, and in such instances it is more likely that an outsider

will be brought in, relative to similar instances in high ROA industries. For instance, in high ROA industries there were 122 instances where the incumbent was fired and in 36% of these cases, he was replaced by an outsider. In low ROA industries there were 185 firings, and 39% of these instances led to an outside hire. Similarly, in high ROA industries there were 518 instances of possible quits, and 25% of these were followed by an outside hire. In low ROA industries, there were 619 instances of possible quits, and in 32% of these cases an outsider was brought in.

We interpret these patterns as evidence that the more likely it is that the incumbent CEO-firm match is bad, the more likely it is for the firm to bring in a replacement CEO with a different background and expertise than a company insider. This evidence is consistent with the finding documented by Allgood & Farrell (2003) that best firm-CEO matches tend to occur when inside CEOs follow previous CEOs who retire, and when outside CEOs follow previous CEOs who are dismissed.

To see whether these univariate results are robust, we estimate a multivariate probit model for the likelihood that the replacement CEO is an outsider. We allow stock market and real variables that describe firm, industry and market conditions to influence this likelihood, as we did in our analysis of types of CEO departures in Table 2. The results of this probit model are shown in Table 4.

Since we condition on there being turnover and then inquire what type of CEO is hired, our analysis is different from that in Parrino (1997), where firm-specific performance is used to predict what type of CEO is in place, and “no turnover” (i.e. the incumbent is still CEO) is one of the possible outcomes. The results there indicate that the likelihood of outside succession, relative to there being no turnover, is negatively related to industry-adjusted stock returns and ROA. In other words, replacing a CEO, and doing so with an outsider, happens when the firm is underperforming the industry. Our evidence complements the result in Parrino (1997) and also shows that industry conditions matter for the type of CEO hired. We argue that this is because of the effect of such conditions on the desired management style or specific skill set.

The results in Table 4 show that the probability of a replacement by an outsider relative to an insider is higher when the firm’s industry-adjusted stock return and ROA are lower, a result very much in the spirit of that of Parrino (1997). We also find that a succession by a company outsider is more likely relative to an inside succession when the industry ROA is lower, and if the industry has experienced a lower growth in employment. This pattern holds whether we measure employment using CRSP/Compustat figures that

refer to public companies only, or BEA figures that capture the overall employment in private and public companies (reported using the NAIC industry classification). Therefore, replacements by outsiders seem to be particularly common after poor firm and industry performance, that is, in times when continuing the same strategy as before may not be beneficial.

Figure 9 shows the dynamics of firm ROA performance relative to the industry for all CEO departure reasons and replacement types, to illustrate that these different types of turnover events happen to firms in different circumstances. Independent of the type of CEO departure, the firm's ROA relative to that of the industry is lower prior to the turnover event in cases where the new CEO is a company outsider, relative to those where there is no replacement or the new CEO is a company insider. The under-performance of firms under incumbent CEOs who are eventually replaced by outsiders is greatest in instances when the incumbent is fired, and smallest in instances when the incumbent's departure is due to retirement. Overall, it appears that outside CEOs are brought in to replace incumbents who have low levels of ability and are no longer a good match for the firm. Except in cases of forced turnover, new CEOs from inside the company seem to have the same ability as continuing CEOs.

The pay offered to the new CEO must compensate him for the market value of his skills. Since firms are optimizing over their choice for new managers, they will choose one with high levels of abilities that matter for the firm's performance. These skills are likely to be valuable within the industry and therefore the new hires will be paid more than incumbents in the industry. Outside hires must be compensated particularly highly because they have high levels of general skills which command high market prices because they can be deployed anywhere. We find evidence consistent with these arguments, as shown in Figures 10 to 14 and the compensation regression model in Table 5.

When an outsider is brought in, irrespective of the reason for departure of the prior CEO, his total pay is higher than that of an insider replacement, a continuing CEO or the prior CEO (Figure 10). Therefore, since pay does not decrease in the event of a replacement by an outsider, such events must occur because the outsider's ability or quality of match is higher than that of the incumbent, or perhaps because the outsider has more general human capital than the incumbent CEO.

The sizable increase in pay of the outsider relative to that of an insider replacement, a continuing CEO or the prior CEO is driven mostly by the value of the option grants given to the new CEO who is brought from outside the company (Figure 11) and less

so through bonuses (Figure 13) or other pay that is not classified as options, bonus or salary (Figure 14). Salaries of outsider replacement CEOs are actually lower than those received by CEOs in these three comparison categories (Figure 12).

The highest pay is received by new CEOs who come in after the prior CEO was fired, with outsiders getting paid more than insiders. New CEOs from inside the company are paid a similar amount as continuing CEOs at companies that do not experience turnover.

The regression models in Table 5 yield the same results as univariate findings in Figures 10 through 14. Controlling for industry and year fixed-effects, as well as firm market value, we find that the total pay of a new CEO is lowest if he is an insider replacing a retired incumbent (\$0.45 million less than the pay of a continuing CEO), and highest if he is a company outsider replacing a fired incumbent (\$2.5 million more than the pay of a continuing CEO). Irrespective of the departure reason (retirement, possible quit, or firing), the replacement CEO will earn total compensation equal or lower than continuing CEOs if he is a company insider, but higher than continuing CEOs if he is a company outsider.

5 Conclusion

We consider the link between industry and market conditions on the CEO labor market, using a matching environment where both the CEO and firm optimize over the relative value of preserving the match versus pursuing their outside option. In contrast to a principal-agent framework where only relative performance affects CEO turnover, in a matching environment both individual firm and CEO characteristics as well as broader industry and market conditions naturally drive turnover events.

In this setting, industry and aggregate business conditions determine the value of firms' and CEOs' outside options. Changes in industry conditions can affect the value of CEO-firm matches directly. Managers may have specific skills which enable them to best employ the firm's optimal strategy when they are hired. For example, if a manager is hired at a firm in an industry which is experiencing declining profit margins, they will likely have skills which enable them to best operate in an environment of consolidation and cost cutting. These skills increase the surplus of the match when the operating environment is stable. However, industry and aggregate shocks can change the environment and the associated optimal firm strategy. Hence, the firm might find it optimal to dissolve the match when such shocks arrive in order to find a new manager with the appropriate

skills.

We find empirical support for these ideas using a large dataset we construct describing turnover events during the period 1992-2006. We collect information regarding both the reason for the incumbent CEO's departure and the identity and background of the new CEO. This information allows us to ascertain with greater precision the reason behind the turnover event. We study the effect of firm, industry, and market conditions on the likelihood of turnovers characterized as retirements, possible quits, and forced departures. We similarly document the determinants of the choice of whether the replacement CEO will be a firm or industry insider or outsider. The empirical findings generally match our theoretical predictions and illustrate that the outside options of the firm and of the CEO drive the frequency and types of observed managerial turnover.

References

- Allgood, Sam, & Kathleen A. Farrell, 2003, The match between CEO and firm, *Journal of Business* 76, 317–341.
- Barro, Jason R., & Robert J. Barro, 1990, Pay, performance and turnover of bank *ceos*, *Journal of Labor Economics* 8, 448–481.
- Bertrand, Marianne, & Antoinette Schoar, 2003, Managing with style: The effect of managers on firm policies, *Quarterly Journal of Economics* 118, 1169:1208.
- DeMarzo, Peter, Mike Fishman, Zhiguo He, & Neng Wang, 2009, Dynamic agency and the q theory of investment, *Working paper* .
- DeMarzo, Peter M., & Michael J. Fishman, 2007a, Agency and optimal investment dynamics, *Review of Financial Studies* 20, 151–188.
- DeMarzo, Peter M., & Michael J. Fishman, 2007b, Optimal long-term financial contracting, *Review of Financial Studies* 20, 2079–2128.
- Edmans, Alex, & Xavier Gabaix, forthcoming, Is CEO pay really inefficient? A survey of new optimal contracting theories, *European Financial Management* .
- Eisfeldt, Andrea, & Adriano Rampini, 2008, Managerial incentives, capital reallocation, and the business cycle, *Journal of Financial Economics* 177–199.
- Frydman, Carola, 2005, Rising through the ranks. the evolution of the market for corporate executives, 1936-2003, *Harvard University, Working Paper* .
- Giannetti, Mariassunta, 2009, Serial CEO incentives and the structure of managerial contracts, *Working paper* .
- Gibbons, Robert, & Lawrence F. Katz, 1991, Layoffs and lemons, *Journal of Labor Economics* 9, 351–80.
- Gibbons, Robert, & Kevin J. Murphy, 1990, Relative performance evaluation for chief executive officers, *Industrial and Labor Relations Review* 43, 30S–51S.
- He, Zhiguo, 2007, Dynamic compensation contracts with private savings, *Working paper* .

- He, Zhiguo, 2009, A model of dynamic compensation and capital structure, *Working paper* .
- Holmstrom, B., 1982, in *Essays in Economics and Management in Honor of Lars Wahlbeck*, chapter Managerial incentive problems: A dynamic perspective (Helsinki, Finland), republished in the *Review of Economic Studies*, 1999, 66, 169-182.
- Huson, Mark R., Paul H. Malatesta, & Robert Parrino, 2004, Managerial succession and firm performance, *Journal of Financial Economics* 237–275.
- Huson, Mark R., Robert Parrino, & Laura Starks, 2001, Internal monitoring mechanisms and *ceo* turnover: a long-term perspective, *Journal of Finance* 56.
- Jenter, Dirk, & Fadi Kanaan, 2006, CEO turnover and relative performance evaluation, *Working paper, MIT* .
- Kaplan, Steven, Mark M. Klebanov, & Morten Sorensen, 2008, Which CEO characteristics and abilities matter?, *Working paper* .
- Kaplan, Steven, & Bernadette A. Minton, 2006, How has CEO turnover changed? Increasingly performance sensitive boards and increasingly uneasy CEOs, *NBER Working paper 12465* .
- Kuhnen, Camelia M., & Jeffrey Zwiebel, 2007, Executive pay, hidden compensation and managerial entrenchment, *Working paper* .
- Lustig, Hanno, Chad Syverson, & Stijn Van Nieuwerburgh, 2009, Technological change and the growing inequality in managerial compensation, *NBER Working Paper 14661* .
- Murphy, Kevin J., 1999, Executive compensation, *Handbook of Labor Economics* 3.
- Parrino, Robert, 1997, CEO turnover and outside succession, *Journal of Financial Economics* 46, 165–197.
- Peters, Florian S., & Alexander F. Wagner, 2007, The executive turnover risk premium, *Working paper* .
- Rosen, Sherwin, 1974, Hedonic prices and implicit markets: Product differentiation in pure competition., *Journal of Political Economy* 82.

Sannikov, Yuliy, forthcoming, A continuous-time version of the principal-agent problem,
Review of Economic Studies .

Warner, J., R. Watts, & K. Wruck, 1988, Stock prices and top management changes,
Journal of Financial Economics 20, 461–492.

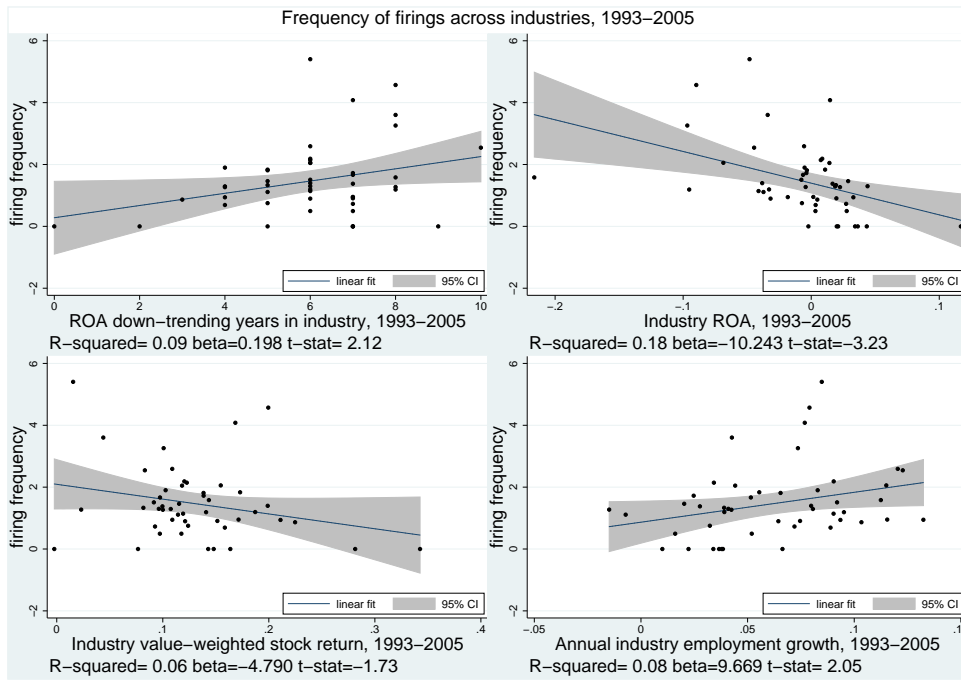


Figure 1: Frequency of firings and industry conditions during 1993-2005.

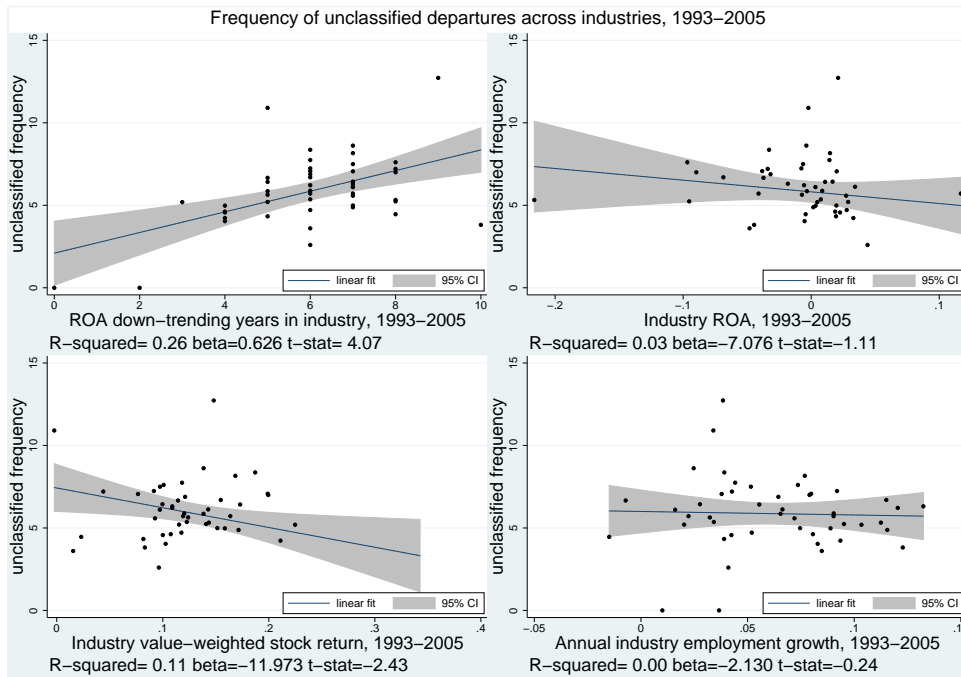


Figure 2: Frequency of unclassified departures and industry conditions during 1993-2005.

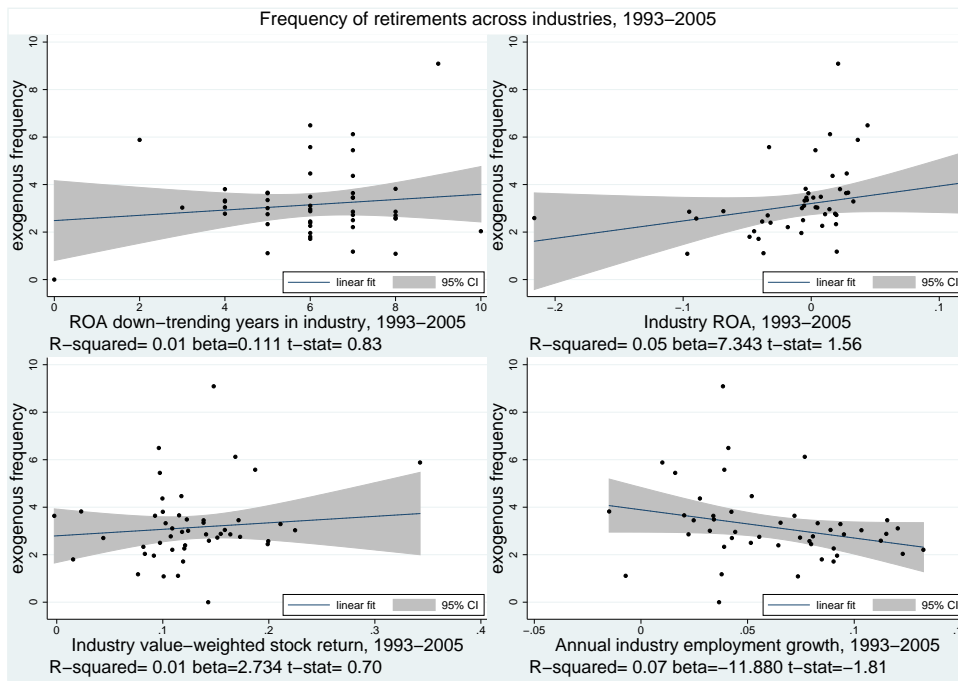


Figure 3: Frequency of retirements and industry conditions during 1993-2005.

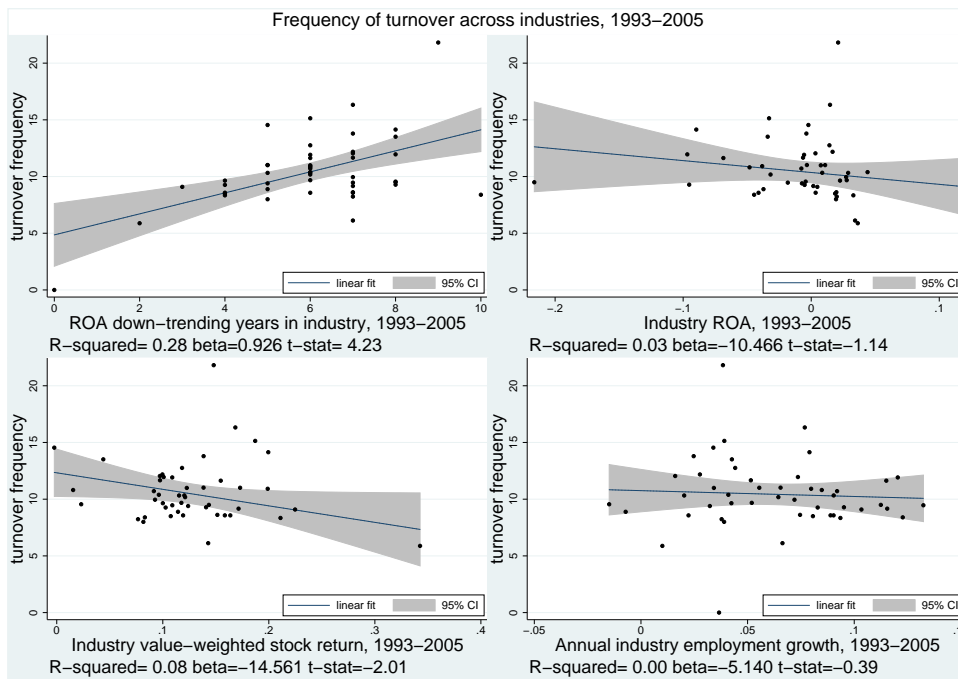


Figure 4: Frequency of turnover and industry conditions during 1993-2005.

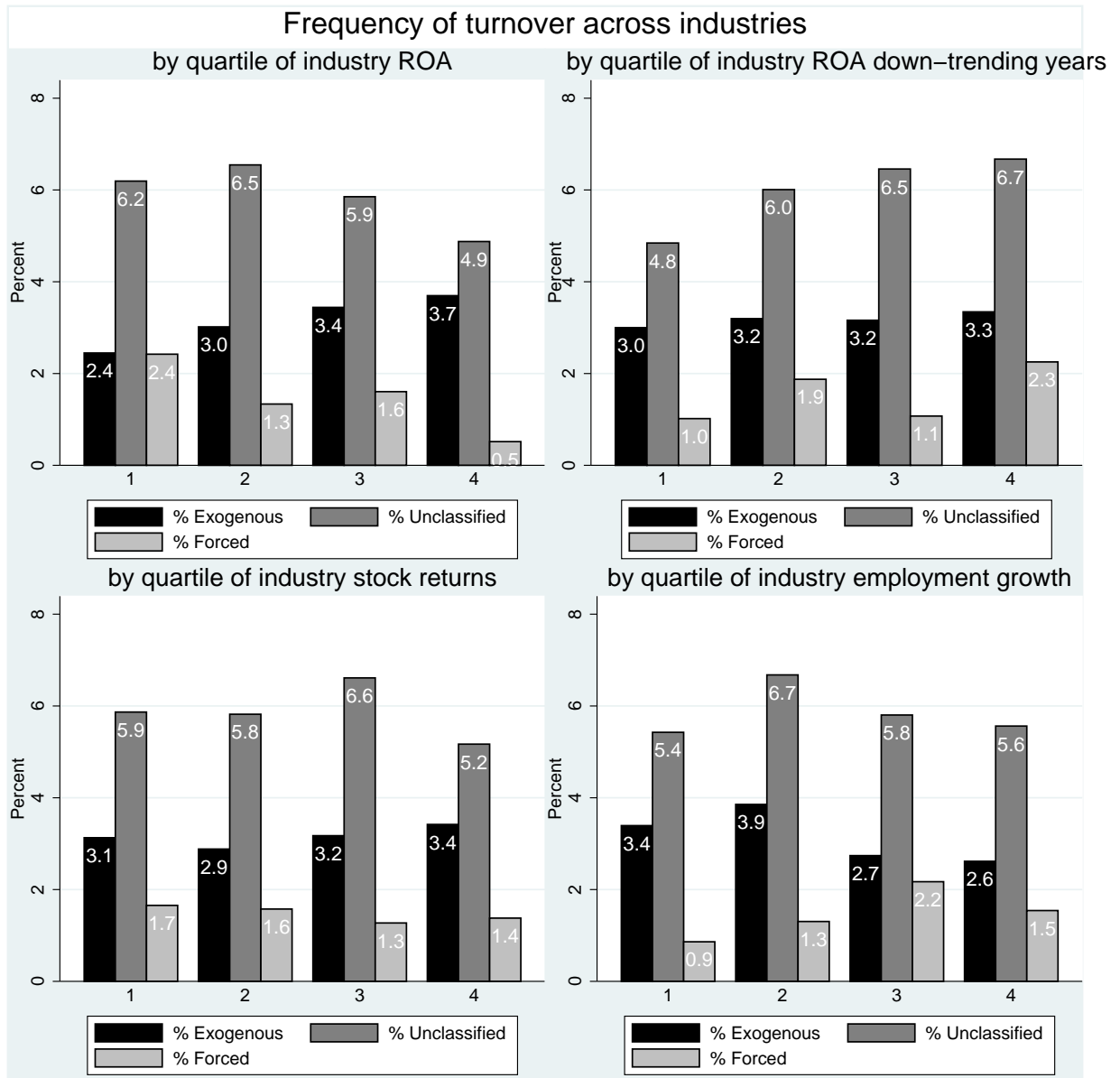


Figure 5: Frequency of turnover types as a function of industry conditions, 1993-2005.

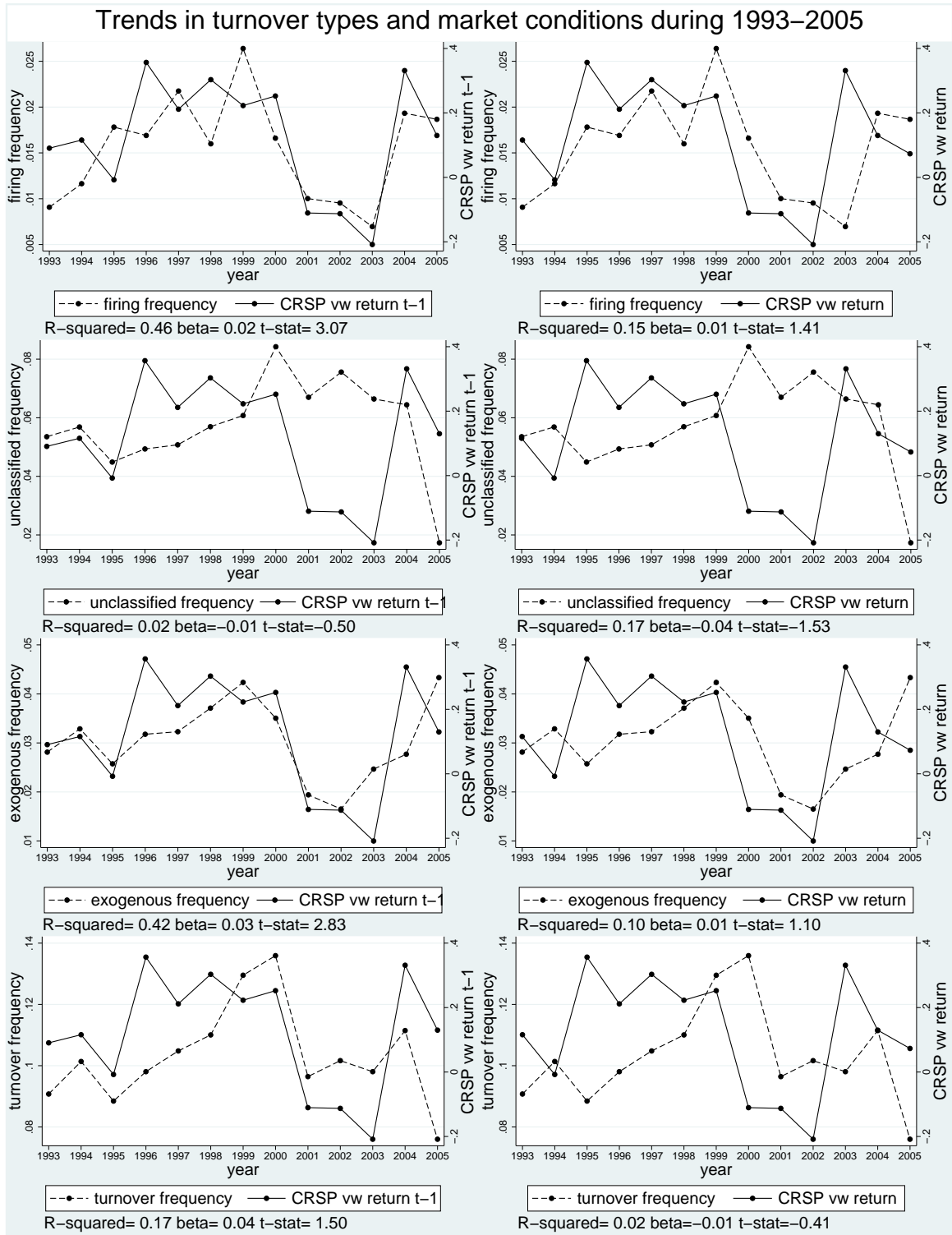


Figure 6: Turnover types and market conditions during 1993-2005.

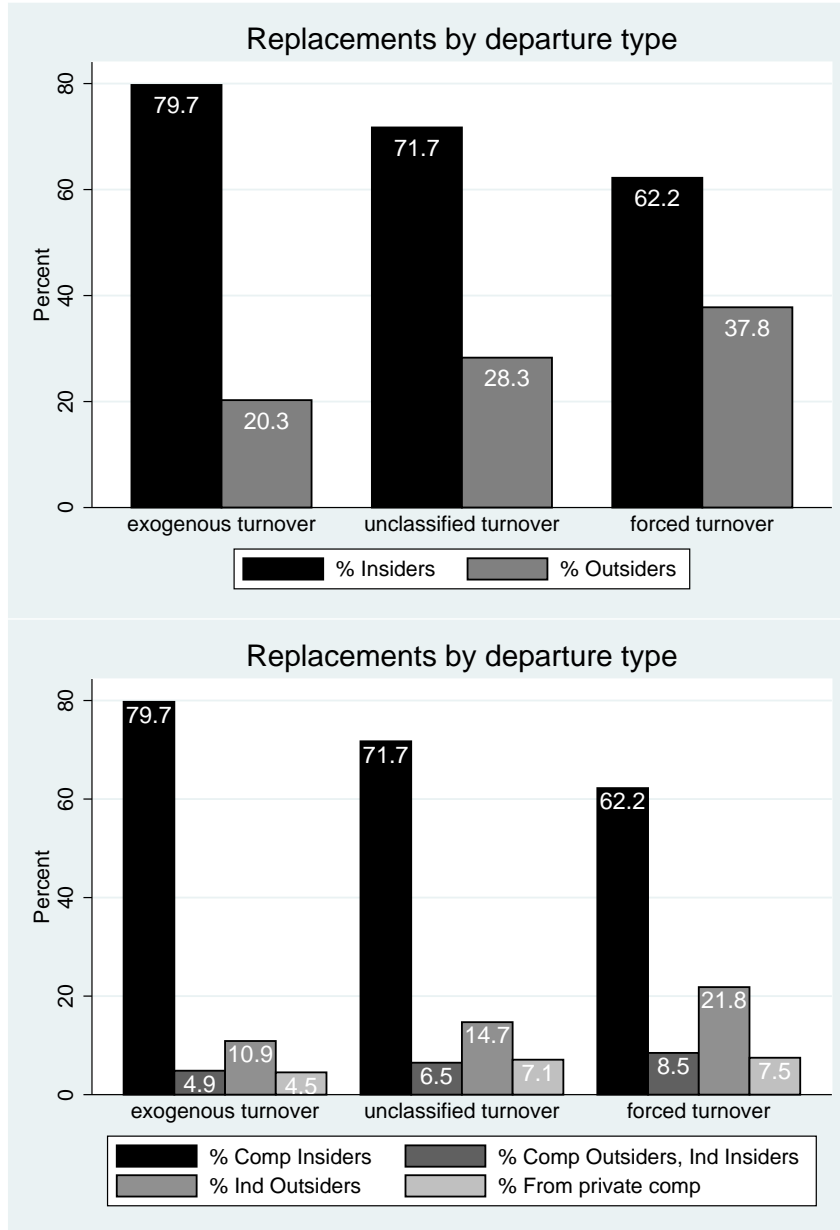


Figure 7: Replacement types and departure reasons.

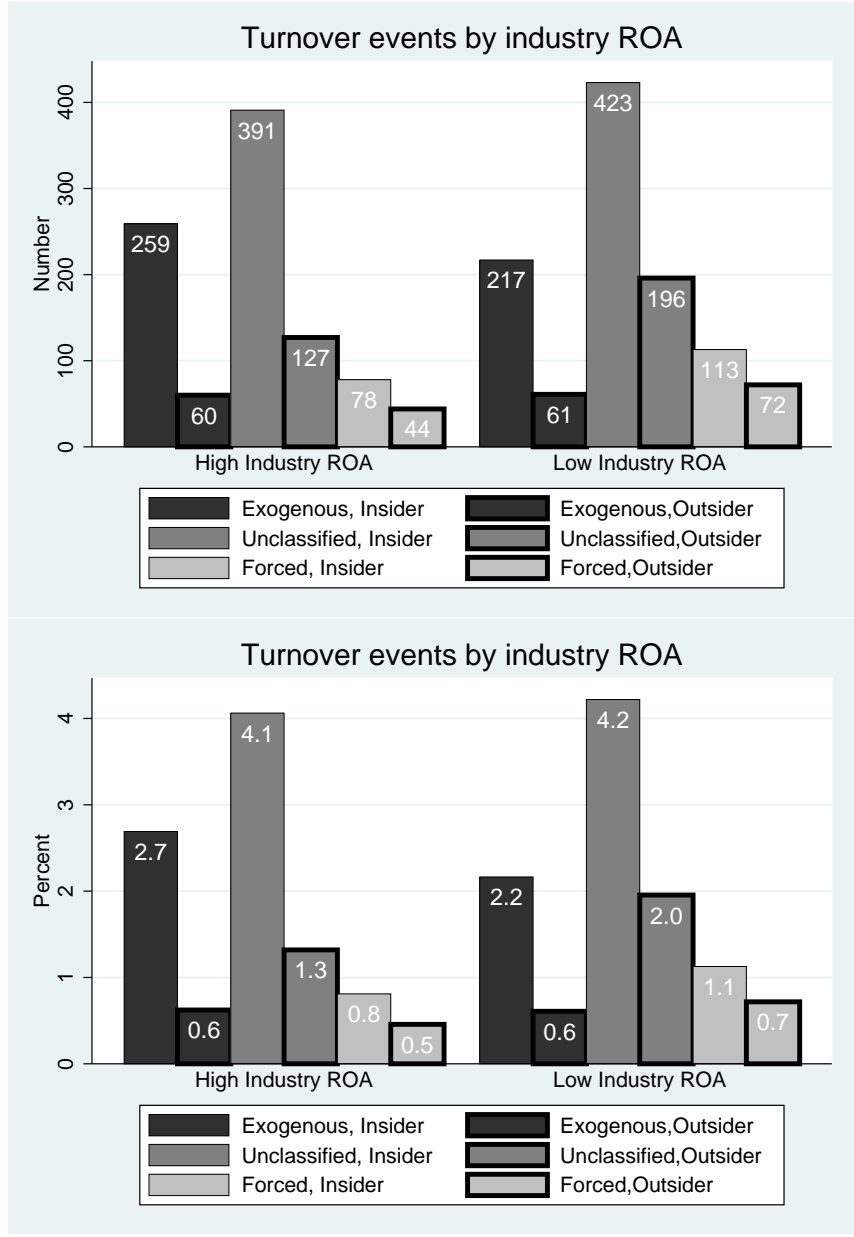


Figure 8: Turnover events (number and frequency) by industry ROA.

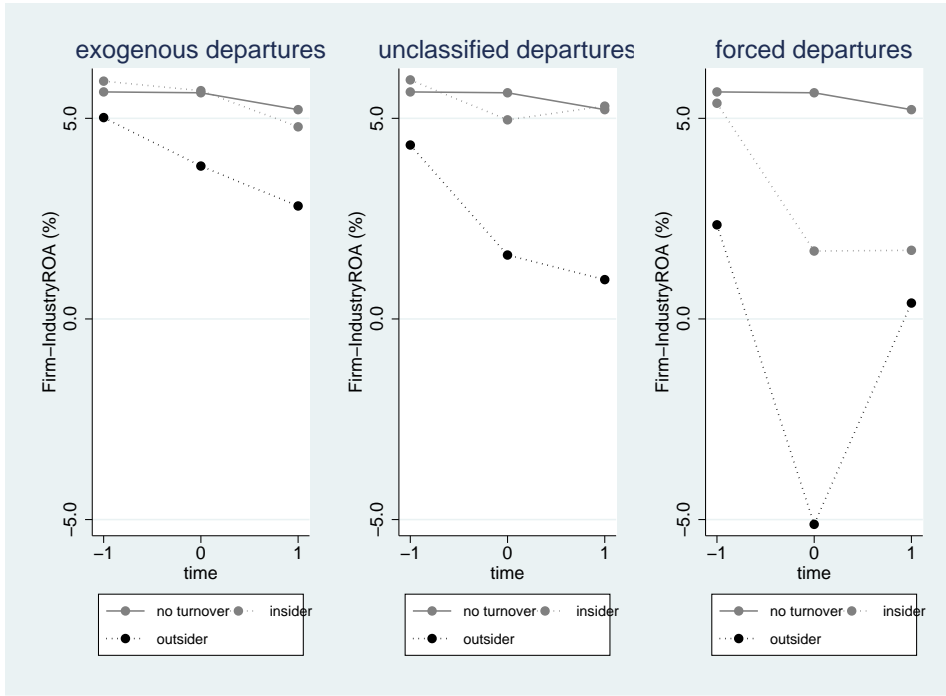


Figure 9: Firm relative to industry ROA dynamics around turnover year (time 0).

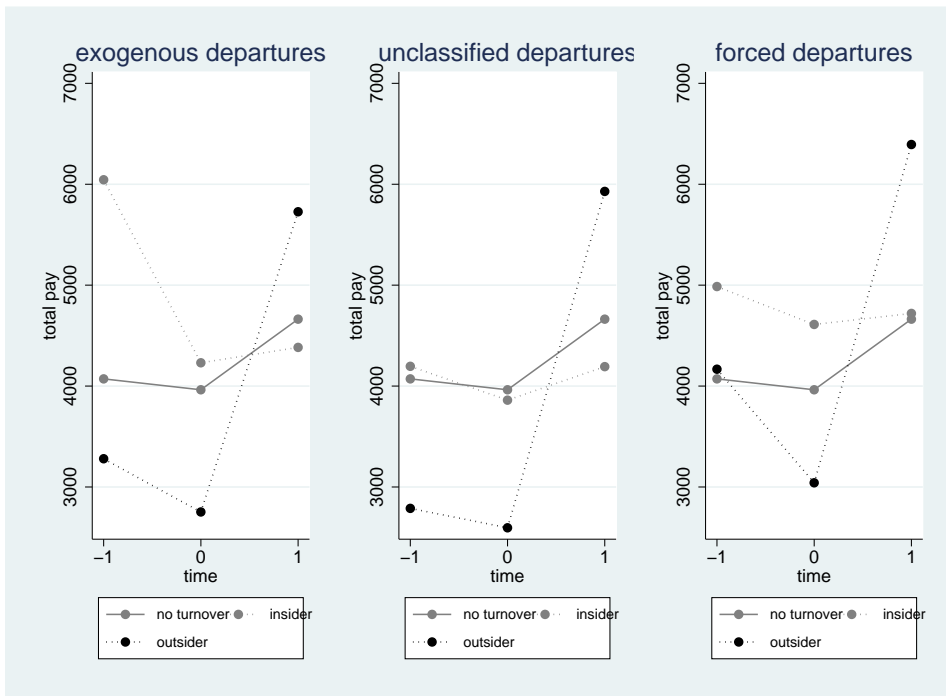


Figure 10: Total pay dynamics around turnover year (time 0).

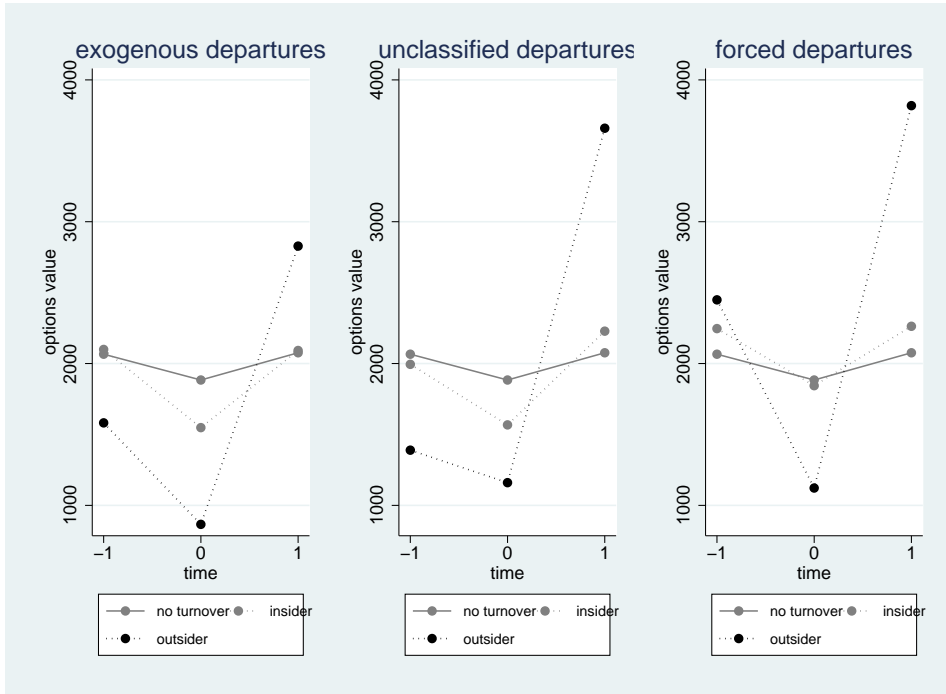


Figure 11: Options value dynamics around turnover year (time 0).

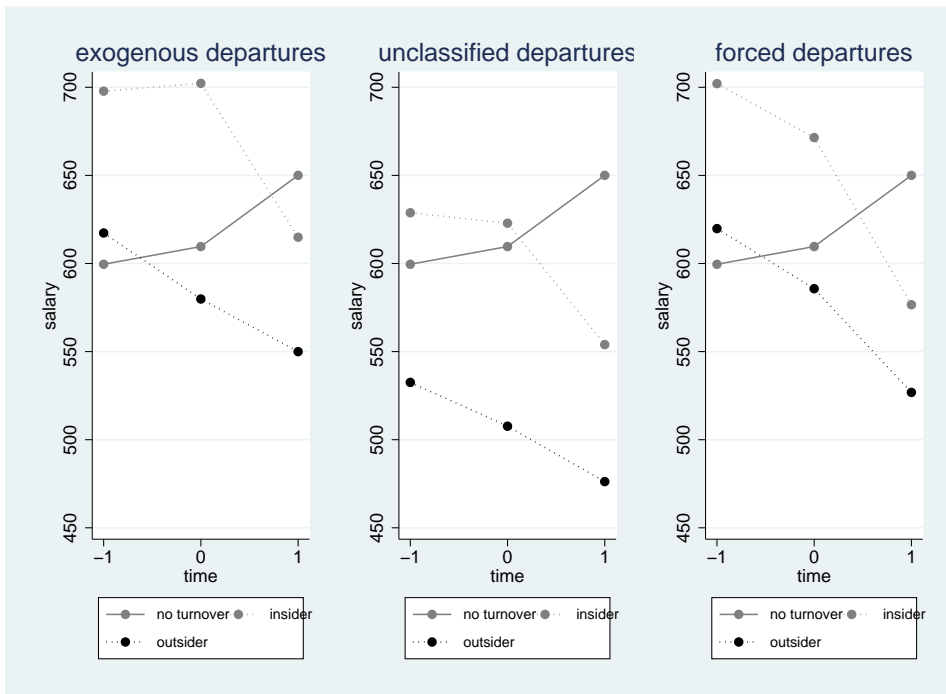


Figure 12: Salary dynamics around turnover year (time 0).

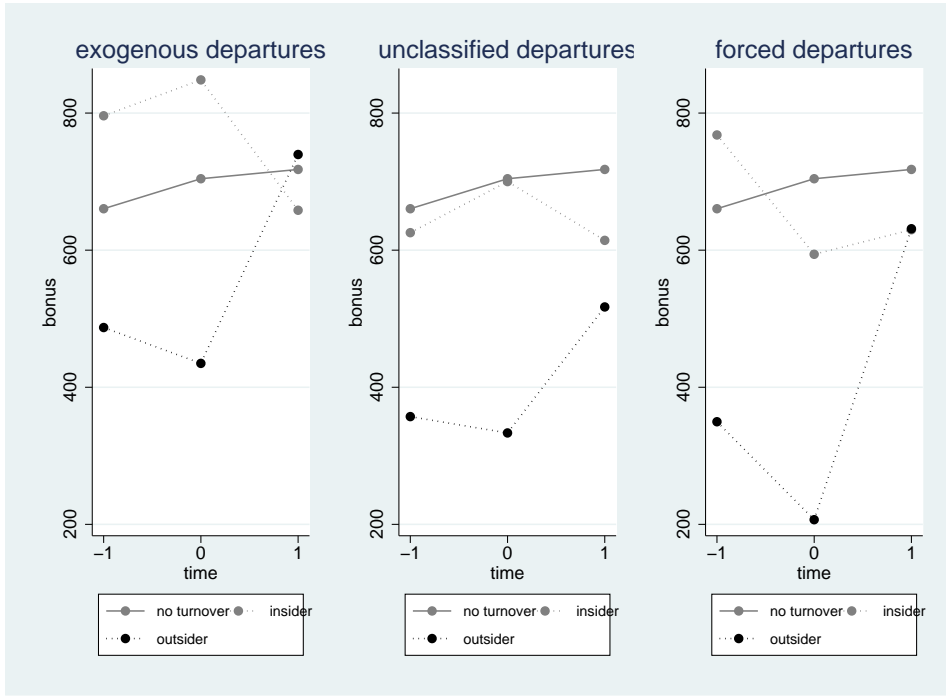


Figure 13: Bonus dynamics around turnover year (time 0).

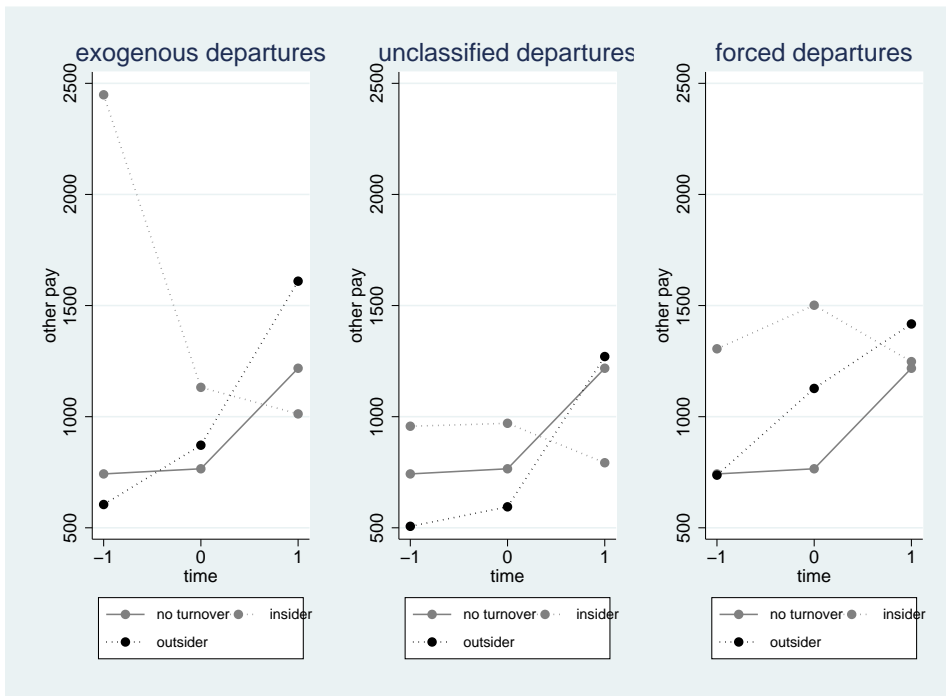


Figure 14: Other pay dynamics around turnover year (time 0).

Table 1: Multinomial logit model for CEO departure reasons. The reference category is “no turnover”. Exogenous turnover indicates instances where the CEO left the company because of age or health reasons. Forced turnover indicates instances where the CEO was forced out. Unclassified turnover refers to the CEO departures that were not exogenous, nor forced. Standard errors are clustered by Fama French 48 industry codes. Fama French 48 industry codes fixed-effects are included.

	Panel A			Panel B		
	exogenous turnover	unclassified turnover	forced turnover	exogenous turnover	unclassified turnover	forced turnover
$Firm - IndustryReturn_t$	-0.35 (-3.23)***	-0.47 (-4.92)***	-2.02 (-8.62)***	-0.35 (-3.23)***	-0.47 (-4.92)***	-2.02 (-8.62)***
$Industry - MarketReturn_t$	-0.02 (-0.10)	0.03 (0.23)	-1.23 (-3.99)***			
$VWMarketReturn_t$	0.29 (1.16)	-0.91 (-4.02)***	-0.66 (-1.66)*	0.31 (1.07)	-0.94 (-3.65)***	0.57 (1.52)
$Firm - IndustryReturn_{t-1}$	-0.15 (-1.82)*	-0.22 (-2.89)***	-0.82 (-4.79)***	-0.15 (-1.82)*	-0.22 (-2.89)***	-0.82 (-4.79)***
$Industry - MarketReturn_{t-1}$	-0.40 (-1.60)	0.03 (0.11)	-0.49 (-1.86)*			
$VWMarketReturn_{t-1}$	0.77 (4.00)***	-0.20 (-0.76)	0.86 (2.62)***	1.18 (3.93)***	-0.22 (-0.72)	1.35 (4.50)***
$VWFFIndustryReturn_t$				-0.02 (-0.10)	0.03 (0.23)	-1.23 (-3.99)***
$VWFFIndustryReturn_{t-1}$				-0.40 (-1.60)	0.03 (0.11)	-0.49 (-1.86)*
$IsUnder65_t$	-1.85 (-23.27)***	-1.30 (-13.34)***	0.09 (0.40)	-1.85 (-23.27)***	-1.30 (-13.34)***	0.09 (0.40)
Pseudo R^2	0.071			0.071		
No. of obs	19381			19381		

Fama French 48 industry fixed effects included

Table 2: Multinomial logit model for CEO departure reasons. The reference category is “no turnover”. Exogenous turnover indicates instances where the CEO left the company because of age or health reasons. Forced turnover indicates instances where the CEO was forced out. Unclassified turnover refers to the CEO departures that were not exogenous, nor forced. Standard errors are clustered by Fama French 48 industry codes. No industry fixed-effects are included.

	Panel A			Panel B		
	exogenous turnover	unclassified turnover	forced turnover	exogenous turnover	unclassified turnover	forced turnover
<i>Firm – IndustryReturn_t</i>	-0.32 (-2.90)***	-0.35 (-3.86)***	-1.87 (-6.90)***	-0.31 (-2.86)***	-0.35 (-3.82)***	-1.85 (-6.76)***
<i>Industry – MarketReturn_t</i>	0.07 (0.30)	0.17 (0.95)	-1.10 (-3.22)***	0.05 (0.22)	0.16 (0.92)	-1.06 (-3.26)***
<i>VWMarketReturn_t</i>	0.45 (1.42)	-0.48 (-2.01)**	-0.49 (-0.98)	0.37 (1.31)	-0.48 (-2.29)**	-0.38 (-0.88)
<i>Firm – IndustryReturn_{t-1}</i>	-0.14 (-1.80)*	-0.08 (-1.16)	-0.73 (-4.62)***	-0.13 (-1.72)*	-0.09 (-1.17)	-0.72 (-4.57)***
<i>Industry – MarketReturn_{t-1}</i>	-0.29 (-0.96)	0.20 (0.74)	-0.32 (-0.85)	-0.34 (-1.19)	0.21 (0.79)	-0.22 (-0.67)
<i>VWMarketReturn_{t-1}</i>	0.99 (3.94)***	0.18 (0.72)	0.81 (2.01)**	0.80 (3.24)***	0.16 (0.61)	0.84 (2.65)***
<i>Firm – IndustryROA_t</i>	0.02 (0.04)	-1.26 (-4.39)***	-1.89 (-4.28)***	-0.04 (-0.08)	-1.27 (-4.35)***	-1.93 (-4.21)***
<i>IndustryROA_t</i>	0.85 (1.49)	-2.31 (-2.16)**	-0.95 (-0.73)	0.84 (1.31)	-2.34 (-2.10)**	-1.48 (-1.32)
<i>IndustryROABelowTrend_t</i>	0.08 (0.85)	0.23 (3.62)***	0.29 (2.18)**	0.08 (0.94)	0.23 (3.85)***	0.26 (2.02)**
<i>Firm – IndustryEmploymentGrowth_t</i>	-0.65 (-2.64)***	-0.69 (-3.40)***	-0.30 (-1.14)			
<i>IndustryEmploymentGrowth_t</i>	-1.21 (-1.37)	-0.63 (-0.85)	1.97 (1.91)*			
<i>Firm – NAICEmploymentGrowth_t</i>				-0.69 (-2.82)***	-0.69 (-3.47)***	-0.28 (-1.05)
<i>NAICEmploymentGrowth_t</i>				0.69 (0.43)	-0.43 (-0.35)	5.18 (3.15)***
<i>IsUnder65_t</i>	-1.79 (-21.50)***	-1.27 (-13.57)***	0.09 (0.39)	-1.80 (-21.10)***	-1.28 (-13.71)***	0.09 (0.39)
Pseudo R^2	0.067			0.068		
No. of obs	18804			18751		

Table 3: Multinomial logit model for CEO replacement types. The reference replacement category is “company insider”. Fama French 48 industry code fixed effects are included. Standard errors clustered by Fama French 48 industry code.

	company outsider, industry insider	industry outsider from public co.	from private firms
<i>UnclassifiedDeparture_t</i>	0.37 (1.71)*	0.32 (1.83)*	0.34 (1.35)
<i>ForcedDeparture_t</i>	0.79 (2.70)***	0.89 (4.43)***	0.50 (1.31)
Pseudo R^2	0.073		
No. of obs	2125		
Fama French 48 industry fixed-effects included			

Table 4: Probit models for the likelihood that the replacement CEO is a company outsider. Reference category is “company insider”. Standard errors clustered by Fama French 48 industry code. No industry fixed effects included.

Dependent variable	Replacement is company outsider	
	Panel A	Panel B
<i>Firm – IndustryReturn_t</i>	-0.32 (-4.73)***	-0.33 (-4.68)***
<i>Industry – MarketReturn_t</i>	-0.01 (-0.07)	-0.02 (-0.09)
<i>VWMarketReturn_t</i>	0.38 (1.89)*	0.31 (1.65)*
<i>Firm – IndustryReturn_{t-1}</i>	-0.04 (-0.67)	-0.04 (-0.66)
<i>Industry – MarketReturn_{t-1}</i>	0.20 (1.58)	0.12 (0.97)
<i>VWMarketReturn_{t-1}</i>	0.04 (0.21)	0.04 (0.19)
<i>Firm – IndustryROA_t</i>	-1.22 (-5.12)***	-1.21 (-5.08)***
<i>IndustryROA_t</i>	-2.52 (-3.79)***	-2.14 (-2.88)***
<i>IndustryROABelowTrend_t</i>	-0.06 (-0.94)	-0.04 (-0.68)
<i>Firm – IndustryEmploymentGrowth_t</i>	0.06 (0.58)	
<i>IndustryEmploymentGrowth_t</i>	-1.20 (-2.23)**	
<i>Firm – NAICEmploymentGrowth_t</i>		0.04 (0.37)
<i>NAICEmploymentGrowth_t</i>		-2.85 (-2.95)***
<i>IsUnder65_t</i>	0.18 (2.57)**	0.18 (2.68)***
Pseudo R^2	0.042	0.043
No. of obs	1933	1930

Table 5: CEO compensation patterns. Reference event category is “no turnover at time t ”. All pay components are expressed in \$ thousands. Fama French 48 industry code fixed effects and year fixed effects are included. Standard errors are clustered by firm.

	<i>Salary</i> _{$t+1$}	<i>Bonus</i> _{$t+1$}	<i>Options</i> <i>Value</i> _{$t+1$}	<i>Other</i> <i>Pay</i> _{$t+1$}	<i>Total</i> <i>Pay</i> _{$t+1$}
<i>Retirement</i> _{t} , <i>Insider</i> _{t}	-61.80 (-5.96) ^{***}	-172.46 (-3.69) ^{***}	0.74 (0.00)	-216.56 (-2.28) ^{**}	-450.07 (-2.04) ^{**}
<i>Retirement</i> _{t} , <i>Outsider</i> _{t}	-91.61 (-4.75) ^{***}	114.06 (1.21)	785.94 (2.13) ^{**}	607.01 (2.32) ^{**}	1415.40 (2.72) ^{***}
<i>Voluntary</i> _{t} , <i>Insider</i> _{t}	-99.83 (-12.70) ^{***}	-142.48 (-4.06) ^{***}	14.22 (0.11)	-123.37 (-1.60)	-351.47 (-2.14) ^{**}
<i>Voluntary</i> _{t} , <i>Outsider</i> _{t}	-138.88 (-10.35) ^{***}	-153.38 (-3.86) ^{***}	1143.53 (4.05) ^{***}	222.17 (1.85) [*]	1073.44 (3.05) ^{***}
<i>Forced</i> _{t} , <i>Insider</i> _{t}	-94.73 (-4.46) ^{***}	-139.98 (-1.53)	225.48 (0.58)	41.86 (0.21)	32.62 (0.08)
<i>Forced</i> _{t} , <i>Outsider</i> _{t}	-92.60 (-3.18) ^{***}	58.82 (0.65)	1969.56 (3.52) ^{***}	556.05 (2.44) ^{**}	2491.83 (3.84) ^{***}
<i>MarketValue</i> _{t}	0.01 (16.85) ^{***}	0.04 (12.00) ^{***}	0.12 (14.50) ^{***}	0.07 (11.49) ^{***}	0.24 (19.08) ^{***}
Adj. R^2	0.284	0.204	0.172	0.168	0.275
Observations	19336	19336	19336	19336	19336

Fama French 48 industry fixed effects, year fixed effects included